# Test Sites, Study Areas, Practices and Crops, Release 1.0: 4-30-2015



Acknowledgement: Study summaries may be directly quoted from original author's abstract.

| Test Site ID | Test Site Name |
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| 2013007069 | Algoazany et al. 2007 |

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| Location | | Vermilion County | IL | US |
| Study Citation | 2007 | | | |
| | Algoazany, A.S., P.K. Kalita, C.F. Czapar, and J.K. Mitchell. | | | |
| | Phosphorus Transport through Drainage and Surface Runoff from a Flat Watershed in East Central Illinois, USA | | | |
| | J. Environ. Qual. 36:681-693 | | | |
| NRCS LRR | Central Feed Grains and Livestock Region | | | |
| NRCS MLRA | Illinois and Iowa Deep Loess and Drift, Eastern Part | | | |
| HUC_10 | 0512010810 | Test Site Scale | Field | |
| Experimental Design Type/ Description | Multiple Treatments, No Control, No Replication | | | |
| | The objective of this study was to assess the fate and transport of soluble phosphorus (soluble P) through subsurface drainage and surface runoff at four sites | | | |
| Crops | Corn, Soybeans | | | |
| Study Duration | 7 years | | | |

Summary

A long-term water quality monitoring program was established to evaluate the effects of agricultural management practices on water quality in the Little Vermilion River (LVR) watershed, IL. This watershed has intensive random and irregular subsurface drainage systems. The objective of this study was to assess the fate and transport of soluble phosphorus (soluble P) through subsurface drainage and surface runoff. Four sites (sites A, B, C, and E) that had subsurface and surface monitoring programs were selected for this study. Three of the four study sites had corn (Zea mays L.) and soybeans (Glycine max L.) planted in rotations and the other site had seed corn and soybeans. Subsurface drainage and surface runoff across all sites removed an average of 16.1 and 2.6% of rainfall, respectively. Annual flow-weighted soluble P concentrations fluctuated with the precipitation, while concentrations tended to increase with high precipitation coupled with high application rates. The long-term average flow-weighted soluble P concentrations in subsurface flow were 102, 99, 194, and 86 ug/L for sites A, B, C, and E, respectively. In contrast, the long-term average flow-weighted soluble P concentrations in surface runoff were 270, 253, 534, and 572 ug/L for sites As, Bs, Cs, and Es, respectively. These values were substantially greater than the critical values that promote eutrophication. Statistical analysis indicated that the effects of crop, discharge, and the interactions between site and discharge and crop and discharge on soluble P concentrations in subsurface flow were significant (a = 0.05). Soluble P mass loads in surface runoff responded to discharge more consistently than in the subsurface flow. Subsurface flow had substantially greater annual average soluble P mass loads than surface runoff due to greater flow volume.

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| **Study ID** | **201300706901** | **Study Area** | **A** | Area (ha) | 6.00 | Tillage | Reduced Tillage | Cover Crop | None |
| Practice ID | 1 | Practice Name | A Cons Till | General Practice | | Conservation Tillage | | Area Type | T |
| Category | Management | Study Focus | Tillage | Practice Overview | | NC-CCN-CT-CS-EN | | | |
| Irrigation | NR | Irrig. Descrip. | Not applicable | | | | | | |
| Soils | Silty Clay Loam- Drummer, Silty Loam- Flanagan | | | | | | | | |
| Fertilizer | Phosphorus was applied after crop harvest at sites A, B, and C, and was applied before planting at site E. | | | | | | | | |
| Comments | Fields at sites A and B were chisel-plowed and disked or field-cultivated every year. | | | | | | | | |

**Crop** 1 Corn, soybean rotation Yield -999999

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| **Study ID** | **201300706902** | **Study Area** | **B** | Area (ha) | 3.00 | Tillage | Reduced Tillage | Cover Crop | None |
| Practice ID | 2 | Practice Name | B Cons Till | General Practice | Conservation Tillage | | | Area Type | T |
| Category | Management | Study Focus | Tillage | Practice Overview | NC-CCN-CT-CS-EN | | | | |
| Irrigation | NR | Irrig. Descrip. | Not applicable | | | | | | |
| Soils | Silty Clay Loam- Drummer, Silty Loam- Flanagan | | | | | | | | |
| Fertilizer | Phosphorus was applied after crop harvest at sites A, B, and C, and was applied before planting at site E. | | | | | | | | |
| Comments | Fields at sites A and B were chisel-plowed and disked or field-cultivated every year. | | | | | | | | |

**Crop** 2 Soybean, corn rotation Yield -999999

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| **Study ID** | **201300706903** | **Study Area** | **C** | Area (ha) | 3.90 | Tillage | Reduced Tillage | Cover Crop | None |
| Practice ID | 3 | Practice Name | C Cons Till | General Practice | Conservation Tillage | | | Area Type | T |
| Category | Management | Study Focus | Tillage | Practice Overview | NC-CCN-CT-CS-EN | | | | |
| Irrigation | NR | Irrig. Descrip. | Not applicable | | | | | | |
| Soils | Silty Clay Loam- Drummer, Silty Loam- Flanagan | | | | | | | | |
| Fertilizer | Phosphorus was applied after crop harvest at sites A, B, and C, and was applied before planting at site E. | | | | | | | | |
| Comments | Tillage practices at site C included disking and field cultivation. | | | | | | | | |

**Crop** 3 Soybean, corn rotation Yield -999999

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| **Study ID** | **201300706904** | **Study Area** | **E** | Area (ha) | 2.31 | Tillage | No Till | Cover Crop | None |
| Practice ID | 4 | Practice Name | E No Till | General Practice | Conservation Tillage | | | Area Type | T |
| Category | Management | Study Focus | Tillage | Practice Overview | NC-CCN-NT-CS-EN | | | | |
| Irrigation | NR | Irrig. Descrip. | Not applicable | | | | | | |
| Soils | Silty Loam- Sabina, Xenia | | | | | | | | |
| Fertilizer | Phosphorus was applied after crop harvest at sites A, B, and C, and was applied before planting at site E. | | | | | | | | |
| Comments | Site E had NT throughout the study period. | | | | | | | | |

**Crop** 4 Corn, soybean rotation Yield -999999

| Test Site ID | Test Site Name |
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| **2013005035** | **Brandi-Dohrn, F. M., 1997** |

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|---|---|---|---|---|
| Location | Aurora | Marion | OR | US |

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|---|---|
| Study Citation | 1997 |
| | Brandi-Dohrn, F. M., R. P. Dick, M. Hess, S. M. Kauffman, D. D. Hemphill, Jr. and J. S. Selker. |
| | Nitrate leaching under a cereal rye cover crop |
| | J. Environ. Qual. 26:181-188. |
| NRCS LRR | Northwestern Forest, Forage, and Specialty Crop Region |
| NRCS MLRA | Northern Pacific Coast Range, Foothills, and Valleys |
| HUC_10 | 1709000905 Test Site Scale Plot |
| Experimental Design Type/ Description | Multiple Treatments w/ Control, No Replication |
| | plot study: complete randomized block |
| Crops | Corn, rye, broccoli, fallow, winter wheat |
| Study Duration | 3 years |

Summary

The objective of this study was to compare winter NO3-N leaching losses under winter-fallow and a winter cereal rye (Seeale cereale L.) cover crop following the harvest of sweet corn (Zea mays L.) or broccoli (Brassica oleracea var. italic Plenck). Leachate was sampled with passive capillary wick samplers that apply a suction of 0 to 5 kPa to the soil-pore water and intercept leachate in a pan of known area. Without disturbing the over-laying soil profile, 32 samplers (0.26 z) were installed at a depth of 1.2m in a Willamette loam (fine-silty mixed mesic Pachic Ultic Argixeroll). The randomized complete-block split plot design of this cover crop-crop rotation study (initiated in 1989) has cropping system (winter fallow vs. winter cereal rye) as main plots and three N application rates, ranging from 0 to 280 kg N ha-1yr-1, as subplots. At the recommended N rate for the summer crops, NO3 leaching losses were 48 kg N ha-1 under sweet corn-winter-fallow for winter 1992-1993, 55 kg N ha-1 under broccoli-winter-fallow for winter 1993-1994, and 103 kg N ha-1 under sweet corn-winter-fallow for winter 1994-1995, which were reduced to 32, 21, and 69 kg N ha-1, respectively, under winter cereal rye. For the first two winters, most of the variation (61%) in NO3- leaching was explained by N rate (29%), cereal rye uptake (17%), and volume of leachate (15%). Seasonal, flow-weighted concentrations at the recommended N rate were 13.4 mg N L-1 under sweet corn-winter-fallow (1992-1993), 21.9 mg N L-1 under broccoli-winter- fallow, and 17.8 mg N L-1 under sweet corn-winter-fallow (1994-1995), which were reduced by 39, 58, and 22%, respectively, under winter cereal rye.

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| **Study ID** | **201300503501** | **Study Area** | **N0 - No Cover Crop** | Area (ha) | 0.90 | Tillage | Conventional | Cover Crop | None |
| Practice ID | 1 | Practice Name | N0-Fallow | General Practice | | Control | | Area Type | C |
| Category | Management | Study Focus | Cover Crop, Fertilizer | Practice Overview | | NM-CCN-CN-CEX-EN | | | |
| Irrigation | Yes | Irrig. Descrip. | | | | | | | |
| Soils | Loam/Silt Loam, Loam/Clay Loam, Loam | | | | | | | | |
| Fertilizer | Three N application rates, ranging from 0 to 280 kg N ha/yr applied to subplots. | | | | | | | | |
| Comments | Vadose zone water flux was sampled with custom-made passive capillary wick samplers (PCAPS) that apply a tension to the soil-water via a fiberglass wick and intercept a known area of flow by a pan. The PCAPS were installed from trenches dug with a backhoe, where tunnels perpendicular to the trenches, so that the tunnel roof was at a depth of 1.2 m below the surface, the depth at which solution samples were collected. Using a vacuum pump, samples were extracted from the glass jars in the PCAPS via high density polyethylene access tubing into 2000-mL graduated cylinders on the surface. Samples were taken after 2 cm of cumulative precipitation. For the critical leaching time, November through May, samples were taken on average every 10.6 days. Cropping system (winter cover crop or summer vegetable crop) and N application rate (zero, medium and recommended rates of N fertilizer) were the study variables. | | | | | | | | |

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| **Crop** | 1 | Fallow | Yield | -999999 |
| **Crop** | 7 | Sweet Corn, Fallow | Yield | -999999 |
| **Crop** | 13 | Broccoli, Winter Wheat | Yield | -999999 |
| **Crop** | 19 | Winter Wheat, Fallow | Yield | -999999 |
| **Crop** | 25 | Broccoli, Fallow | Yield | -999999 |
| **Crop** | 31 | Sweet Corn, Fallow | Yield | -999999 |
| **Crop** | 37 | Broccoli | Yield | -999999 |

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| **Study ID** | **201300503502** | **Study Area** | **N0 - Cereal Rye Cover Crop** | Area (ha) | 0.90 | Tillage | Conventional | Cover Crop | Cereal Rye |
| Practice ID | 2 | Practice Name | N0-Cover | General Practice | | Cover Crop | | Area Type | T |
| Category | Management | Study Focus | Cover Crop, Fertilizer | Practice Overview | | NC-CCY-CN-CEX-EN | | | |
| Irrigation | Yes | Irrig. Descrip. | | | | | | | |
| Soils | Loam/Silt Loam, Loam/Clay Loam, Loam | | | | | | | | |
| Fertilizer | Three N application rates, ranging from 0 to 280 kg N ha/yr applied to subplots. | | | | | | | | |
| Comments | Winter Cereal Rye. Cropping system (winter cover crop or summer vegetable crop) and N application rate (zero, medium and recommended rates of N fertilizer) were the study variables. | | | | | | | | |

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| **Crop** | 2 | Cereal Rye | Yield | -999999 |
| **Crop** | 8 | Sweet Corn, Cereal Rye | Yield | -999999 |

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| **Crop** | 14 | Broccoli, Cereal Rye | Yield | -999999 |
| **Crop** | 20 | Sweet Corn, Cereal Rye | Yield | -999999 |
| **Crop** | 26 | Broccoli, Cereal Rye | Yield | -999999 |
| **Crop** | 32 | Sweet Corn, Cereal Rye | Yield | -999999 |
| **Crop** | 38 | Broccoli | Yield | -999999 |

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| **Study ID** | **201300503503** | **Study Area** | **N1 - No Cover Crop** | Area (ha) | 0.90 | Tillage | Conventional | Cover Crop | None |
| Practice ID | 3 | Practice Name | N1-Fallow | General Practice | | Control | | Area Type | C |
| Category | Management | Study Focus | Cover Crop, Fertilizer | Practice Overview | | NM-CCN-CN-CEX-EN | | | |
| Irrigation | Yes | Irrig. Descrip. | | | | | | | |
| Soils | Loam/Silt Loam, Loam/Clay Loam, Loam | | | | | | | | |
| Fertilizer | Three N application rates, ranging from 0 to 280 kg N ha/yr applied to subplots. | | | | | | | | |
| Comments | | | | | | | | | |

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| **Crop** | 3 | Fallow | Yield | -999999 |
| **Crop** | 9 | Sweet Corn, Fallow | Yield | -999999 |
| **Crop** | 15 | Broccoli, Winter Wheat | Yield | -999999 |
| **Crop** | 21 | Winter Wheat, Fallow | Yield | -999999 |
| **Crop** | 27 | Broccoli, Fallow | Yield | -999999 |
| **Crop** | 33 | Sweet Corn, Fallow | Yield | -999999 |
| **Crop** | 39 | Broccoli | Yield | -999999 |

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| **Study ID** | **201300503504** | **Study Area** | **N1 - Cereal Rye Cover Crop** | Area (ha) | 0.90 | Tillage | Conventional | Cover Crop | Cereal Rye |
| Practice ID | 4 | Practice Name | N1-Cover | General Practice | | Cover Crop | | Area Type | T |
| Category | Management | Study Focus | Cover Crop, Fertilizer | Practice Overview | | NC-CCY-CN-CEX-EN | | | |
| Irrigation | Yes | Irrig. Descrip. | | | | | | | |
| Soils | Loam/Silt Loam, Loam/Clay Loam, Loam | | | | | | | | |
| Fertilizer | Three N application rates, ranging from 0 to 280 kg N ha/yr applied to subplots. | | | | | | | | |
| Comments | Winter Cereal Rye. Cropping system (winter cover crop or summer vegetable crop) and N application rate (zero, medium and recommended rates of N fertilizer) were the study variables. | | | | | | | | |

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| **Crop** | 4 | Cereal Rye | Yield | -999999 |

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| **Crop** | 10 | Sweet Corn, Cereal Rye | Yield | -999999 |
| **Crop** | 16 | Broccoli, Cereal Rye | Yield | -999999 |
| **Crop** | 22 | Sweet Corn, Cereal Rye | Yield | -999999 |
| **Crop** | 28 | Broccoli, Cereal Rye | Yield | -999999 |
| **Crop** | 34 | Sweet Corn, Cereal Rye | Yield | -999999 |
| **Crop** | 40 | Broccoli | Yield | -999999 |

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| **Study ID** | **201300503505** | **Study Area** | **N2 - No Cover Crop** | Area (ha) | 0.90 | Tillage | Conventional | Cover Crop | None |
| Practice ID | 5 | Practice Name | N2-Fallow | General Practice | | Control | | Area Type | C |
| Category | Management | Study Focus | Cover Crop, Fertilizer | Practice Overview | | NM-CCN-CN-CEX-EN | | | |
| Irrigation | Yes | Irrig. Descrip. | | | | | | | |
| Soils | Loam/Silt Loam, Loam/Clay Loam, Loam | | | | | | | | |
| Fertilizer | Three N application rates, ranging from 0 to 280 kg N ha/yr applied to subplots. | | | | | | | | |
| Comments | | | | | | | | | |

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| **Crop** | 5 | Fallow | Yield | -999999 |
| **Crop** | 11 | Sweet Corn, Fallow | Yield | -999999 |
| **Crop** | 17 | Broccoli, Winter Wheat | Yield | -999999 |
| **Crop** | 23 | Winter Wheat, Fallow | Yield | -999999 |
| **Crop** | 29 | Broccoli, Fallow | Yield | -999999 |
| **Crop** | 35 | Sweet Corn, Fallow | Yield | -999999 |
| **Crop** | 41 | Broccoli | Yield | -999999 |

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| **Study ID** | **201300503506** | **Study Area** | **N2 - Cereal Rye Cover Crop** | Area (ha) | 0.90 | Tillage | Conventional | Cover Crop | Cereal Rye |
| Practice ID | 6 | Practice Name | N2-Cover | General Practice | | Cover Crop | | Area Type | T |
| Category | Management | Study Focus | Cover Crop, Fertilizer | Practice Overview | | NC-CCY-CN-CEX-EN | | | |
| Irrigation | Yes | Irrig. Descrip. | | | | | | | |
| Soils | Loam/Silt Loam, Loam/Clay Loam, Loam | | | | | | | | |
| Fertilizer | Three N application rates, ranging from 0 to 280 kg N ha/yr applied to subplots. | | | | | | | | |
| Comments | Winter Cereal Rye. Cropping system (winter cover crop or summer vegetable crop) and N application rate (zero, medium and recommended rates of N fertilizer) were the study variables. | | | | | | | | |

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| **Crop** | 6 | Cereal Rye | Yield | -999999 |
| **Crop** | 12 | Sweet Corn, Cereal Rye | Yield | -999999 |
| **Crop** | 18 | Broccoli, Cereal Rye | Yield | -999999 |
| **Crop** | 24 | Sweet Corn, Cereal Rye | Yield | -999999 |
| **Crop** | 30 | Broccoli, Cereal Rye | Yield | -999999 |
| **Crop** | 36 | Sweet Corn, Cereal Rye | Yield | -999999 |
| **Crop** | 42 | Broccoli | Yield | -999999 |


Acknowledgement: Study summaries may be directly quoted from original author's abstract.

| Test Site ID | Test Site Name |
|---|---|
| **2013007054** | **Chichester et al. 1992** |

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| Location | Riesel | McLennan | TX | US |
| Study Citation | 1992 | | | |
| | Chichester, F.W., and C. W. Richardson. | | | |
| | Sediment and Nutrient Loss from Clay Soils as Affected by Tillage | | | |
| | J. Environ. Qual. 21(4): 587-590 | | | |
| NRCS LRR | Southwestern Prairies Cotton and Forage Region | | | |
| NRCS MLRA | Texas Blackland Prairie, Southern Part | | | |
| HUC_10 | 1207010101 | Test Site Scale | Field | |
| Experimental Design Type/ Description | Multiple Treatments w/ Control and Replication | | | |
| | A conventional tillage (CT) system was used on three watersheds, and a no-till (NT) system was used on the other three watersheds. | | | |
| Crops | Corn, Wheat, Sorghum | | | |
| Study Duration | 6 years | | | |


Summary

This study was designed to compare the effect of no-till (NT) and conventional chisel-till (CT) soil management on runoff water volumes, sediment loss, and N and P loss from small watersheds on a clay soil. Three NT and three CT watersheds located on Houston Black clay vertisol soil (fine, montmorillonitic, thermic, Udic Pellusterts) in east central Texas were used for the study. Wheat (Triticum aestivum L.), corn (Zea mays L.) and sorghum [Sorghum bicolor (L.) Moench] were grown rotationally on the watersheds from 1984 to 1989. Runoff amounts, sediment loss, and N and P losses were measured for each rainfall event that produced runoff. Runoff volume was not changed by tillage system and sediment loss and N and P losses in runoff were less, on average, from NT than from CT. Runoff averaged 1 .3 ML ha-1 annually for both CT and NT. Average annual quantities for sediment and nutrient losses were: 160 kg/ha and 1575 kg ha-1 for sediment, 3.8 kg ha-1 and 8.1 kg ha-1 for N, and 0.8 kg ha-1 and 1.5 kg ha-1 for P for NT and CT, respectively. These results indicate that the loss of sediment and nutrients from agricultural lands could be minimized by using NT on clay soils.


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| **Study ID** | **201300705401** | **Study Area** | **W13** | Area (ha) | 4.60 | Tillage | Conventional | Cover Crop | Not specified |
| Practice ID | 1 | Practice Name | W13 WW T CF | General Practice | | Control | | Area Type | C |
| Category | Management | Study Focus | Tillage | Practice Overview | | NM-CCN-CN-CEX-EN | | | |
| Irrigation | NR | Irrig. Descrip. | | | | | | | |
| Soils | Clay- Houston Black | | | | | | | | |
| Fertilizer | Fertilizer was applied in solution with 112 kg/ha of 10-15-0 (N-P-K) being applied as starter at planting, and the bulk of N and P side-dress dribbled as 24-3-0 (N-P-K) about 30 d after planting. | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. | | | | | | | | |

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| **Crop** | 1 | Corn | Yield | 6121 | kg/ha |
| **Crop** | 2 | Wheat | Yield | 3687 | kg/ha |
| **Crop** | 3 | Sorghum | Yield | 6334 | kg/ha |
| **Crop** | 4 | Corn | Yield | 6308 | kg/ha |
| **Crop** | 5 | Wheat | Yield | 3322 | kg/ha |

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| **Crop** | 6 | Sorghum | | Yield | 5826 | kg/ha | | | |
| **Study ID** | **201300705402** | **Study Area** | **Y6** | Area (ha) | 6.60 | Tillage | No Till | Cover Crop | Not specified |
| Practice ID | 2 | Practice Name | Y6 No Till | General Practice | | Conservation Tillage | | Area Type | T |
| Category | Management | Study Focus | Tillage | Practice Overview | | NM-CCN-NT-CEX-EN | | | |
| Irrigation | NR | Irrig. Descrip. | | | | | | | |
| Soils | Clay- Houston Black | | | | | | | | |
| Fertilizer | Fertilizer was applied in solution with 112 kg/ha of 10-15-0 (N-P-K) being applied as starter at planting, and the bulk of N and P side-dress dribbled as 24-3-0 (N-P-K) about 30 d after planting. | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. MANAGE identified practices include: No Till, Waterway, Terrace, Contour Farming. | | | | | | | | |
| **Crop** | 1 | Corn | | Yield | 2893 | kg/ha | | | |
| **Crop** | 2 | Wheat | | Yield | 3212 | kg/ha | | | |
| **Crop** | 3 | Sorghum | | Yield | 5103 | kg/ha | | | |
| **Crop** | 4 | Corn | | Yield | 3713 | kg/ha | | | |
| **Crop** | 5 | Wheat | | Yield | 2022 | kg/ha | | | |
| **Crop** | 6 | Sorghum | | Yield | 2483 | kg/ha | | | |
| **Study ID** | **201300705403** | **Study Area** | **Y8** | Area (ha) | 8.40 | Tillage | No Till | Cover Crop | Not specified |
| Practice ID | 3 | Practice Name | Y8 No Till | General Practice | | Conservation Tillage | | Area Type | T |
| Category | Management | Study Focus | Tillage | Practice Overview | | NM-CCN-NT-CEX-EN | | | |
| Irrigation | NR | Irrig. Descrip. | | | | | | | |
| Soils | Clay- Houston Black | | | | | | | | |
| Fertilizer | Fertilizer was applied in solution with 112 kg/ha of 10-15-0 (N-P-K) being applied as starter at planting, and the bulk of N and P side-dress dribbled as 24-3-0 (N-P-K) about 30 d after planting. | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. MANAGE identified practices include: No Till, Waterway, Terrace, Contour Farming. | | | | | | | | |
| **Crop** | 1 | Corn | | Yield | 4758 | kg/ha | | | |
| **Crop** | 2 | Wheat | | Yield | 3005 | kg/ha | | | |
| **Crop** | 3 | Sorghum | | Yield | 2748 | kg/ha | | | |
| **Crop** | 4 | Corn | | Yield | 5187 | kg/ha | | | |
| **Crop** | 5 | Wheat | | Yield | 1363 | kg/ha | | | |

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|---|---|---|---|---|---|---|---|---|---|
| **Crop** | 6 | Sorghum | | Yield | 1532 | kg/ha | | | |
| **Study ID** | **201300705404** | **Study Area** | **Y10** | Area (ha) | 7.50 | Tillage | No Till | Cover Crop | Not specified |
| Practice ID | 4 | Practice Name | Y10 No Till | General Practice | | Conservation Tillage | | Area Type | T |
| Category | Management | Study Focus | Tillage | Practice Overview | | NM-CCN-NT-CEX-EN | | | |
| Irrigation | NR | Irrig. Descrip. | | | | | | | |
| Soils | Clay- Houston Black | | | | | | | | |
| Fertilizer | Fertilizer was applied in solution with 112 kg/ha of 10-15-0 (N-P-K) being applied as starter at planting, and the bulk of N and P side-dress dribbled as 24-3-0 (N-P-K) about 30 d after planting. | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. MANAGE identified practices include: No Till, Waterway, Terrace, Contour Farming. | | | | | | | | |
| **Crop** | 1 | Corn | | Yield | 4014 | kg/ha | | | |
| **Crop** | 2 | Wheat | | Yield | 2250 | kg/ha | | | |
| **Crop** | 3 | Sorghum | | Yield | 3529 | kg/ha | | | |
| **Crop** | 4 | Sorghum | | Yield | 4427 | kg/ha | | | |
| **Crop** | 5 | Wheat | | Yield | -999999 | kg/ha | | | |
| **Crop** | 6 | Sorghum | | Yield | 2632 | kg/ha | | | |
| **Study ID** | **201300705405** | **Study Area** | **Y13** | Area (ha) | 4.60 | Tillage | Conventional | Cover Crop | Not specified |
| Practice ID | 5 | Practice Name | Y13 WW T CF | General Practice | | Control | | Area Type | C |
| Category | Management | Study Focus | Tillage | Practice Overview | | NM-CCN-CN-CEX-EN | | | |
| Irrigation | NR | Irrig. Descrip. | | | | | | | |
| Soils | Clay- Houston Black | | | | | | | | |
| Fertilizer | Fertilizer was applied in solution with 112 kg/ha of 10-15-0 (N-P-K) being applied as starter at planting, and the bulk of N and P side-dress dribbled as 24-3-0 (N-P-K) about 30 d after planting. | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. | | | | | | | | |
| **Crop** | 1 | Corn | | Yield | 4397 | kg/ha | | | |
| **Crop** | 2 | Wheat | | Yield | 2670 | kg/ha | | | |
| **Crop** | 3 | Sorghum | | Yield | 3836 | kg/ha | | | |
| **Crop** | 4 | Sorghum | | Yield | 6455 | kg/ha | | | |
| **Crop** | 5 | Wheat | | Yield | 190 | kg/ha | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Crop** | 6 | Sorghum | | Yield | 6418 | kg/ha | | | |
| **Study ID** | **201300705406** | **Study Area** | **W12** | Area (ha) | 4.00 | Tillage | Conventional | Cover Crop | Not specified |
| Practice ID | 6 | Practice Name | W12 WW T CF | General Practice | | Control | | Area Type | C |
| Category | Management | Study Focus | Tillage | Practice Overview | | NM-CCN-CN-CEX-EN | | | |
| Irrigation | NR | Irrig. Descrip. | | | | | | | |
| Soils | Clay- Houston Black | | | | | | | | |
| Fertilizer | Fertilizer was applied in solution with 112 kg/ha of 10-15-0 (N-P-K) being applied as starter at planting, and the bulk of N and P side-dress dribbled as 24-3-0 (N-P-K) about 30 d after planting. | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. | | | | | | | | |
| **Crop** | 1 | Corn | | Yield | 4794 | kg/ha | | | |
| **Crop** | 2 | Wheat | | Yield | 3389 | kg/ha | | | |
| **Crop** | 3 | Sorghum | | Yield | 4717 | kg/ha | | | |
| **Crop** | 4 | Corn | | Yield | 7288 | kg/ha | | | |
| **Crop** | 5 | Wheat | | Yield | 1735 | kg/ha | | | |
| **Crop** | 6 | Sorghum | | Yield | 5643 | kg/ha | | | |

| Test Site ID | Test Site Name |
|---|---|
| **2013001003** | **Cypress Creek** |

| | | | | |
|---|---|---|---|---|
| Location | | Christian | IL | US |

| | |
|---|---|
| Study Citation | 2006 |
| | SCHOONOVER, Jon E.; KARL W. J. WILLIARD, JAMES J. ZACZEK, JEAN C. MANGUN and ANDREW D. CARVER |
| | AGRICULTURAL SEDIMENT REDUCTION BY GIANT CANE AND FOREST RIPARIAN BUFFERS |
| | |
| NRCS LRR | East and Central Farming and Forest Region |
| NRCS MLRA | Kentucky and Indiana Sandstone and Shale Hills and Valleys, Southern Par |
| HUC_10 | 0714010801 Test Site Scale Plot |
| Experimental Design Type/ Description | Multiple Treatments, No Control, With Replication |
| | Plot Study/No Control: The research objectives were to determine if both giant cane and mixed deciduous forest stands were effective filters of agricultural sediment in overland flow on an annual and seasonal basis and to assess whether the two riparian vegetation types differed significantly in their abilities to attenuate agricultural sediment.To achieve these objectives, 10m wide riparian plots in each vegetation type were monitored at 3.3m increments for sediment retention during significant storm events. The design resulted in two replicates in each vegetation type at each sampling distance (3.3 m) and the study was also replicated over time (i.e., individual rainfall events). |
| Crops | Corn, Soybeans |
| Study Duration | 1 year |

Summary

The sediment filtering capabilities of giant cane (Arundinaria gigantea (Walt.) Chapm.) and forest riparian buffers were compared in a southern Illinois, USA non tile drained agricultural watershed. Giant cane, a bamboo species, serves as important wildlife habitat throughout its native range in the southeastern and lower midwestern United States. Overland flow samples were collected at the field edge and at 3.3 m, 6.6 m, and 10.0m within the riparian buffers during 19 precipitation events over a 1-year period. On an annual basis, significant sediment reductions occurred by 3.3m and 6.6m in the cane and forest buffers, respectively. The giant cane buffer reduced incoming sediment mass by 94% within the first 3.3 m, while the forest buffer reduced sediment by 86% over 6.6 m. Within 10.0m of the field edge, the cane and forest buffers reduced sediment mass by 100% and 76%, respectively. On a seasonal basis, the cane buffer outperformed the forest buffer. During each of the four seasons, the cane buffer reduced sediment masses within 3.3m of the field edge, while the forest buffer showed initial reductions occurring at 6.6m during the summer, fall, and winter. No detectable reductions occurred during the spring in the forested buffer. Reductions in sediment concentrations were less evident compared to mass basis, indicating that infiltration may be a more important sediment reduction mechanism than particle settling. Both the forest and giant cane buffers had relatively high measured soil infiltration rates. Study results indicate that giant cane is an appropriate species to include in riparian buffer restoration designs for sediment control.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300100301** | **Study Area** | **Agricultural Field A** | Area (ha) | 0.13 | Tillage | No Till | Cover Crop | Yellow Rocket,Barbarea vulgaris R. Br. |
| Practice ID | 1 | Practice Name | Giant Cane | General Practice | Riparian Buffer | | | Area Type | T |
| Category | Structural | Study Focus | Buffer | Practice Overview | NC-CCY-NT-CS-EB | | | | |
| Irrigation | NR | Irrig. Descrip. | not reported | | | | | | |
| Soils | The riparian soils within the two cover types and the adjacent agricultural soils were classified as Haymond silt loam (Coarse-silty, mixed, nonacid, mesic Typic Udifluvent), and the underlying geology of the area was Ste. Genevieve (or Levias) and Warsaw | | | | | | | | |
| Fertilizer | Fertilizers added during alternating corn years. | | | | | | | | |
| Comments | Two overland flow collectors were placed at each of the four sampling locations (i.e., field edge or 0.0 m, 3.3 m, 6.6 m, and 10.0m from the field edge) in both of the riparian buffers (Figure 1). The design resulted in two replicates in each vegetation type at each sampling distance (3.3 m) and the study was also replicated over time (i.e., individual rainfall events). This arrangement allowed for calculation of percent sediment reduction at successive distances. | | | | | | | | |

**Crop** 1 corn (Zea mays L.)/ soybeans (Glycine m Yield -999999

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300100302** | **Study Area** | **Agricultural Field B** | Area (ha) | 0.13 | Tillage | No Till | Cover Crop | Yellow Rocket,Barbarea vulgaris R. Br. |
| Practice ID | 2 | Practice Name | Forest | General Practice | Riparian Buffer | | | Area Type | T |
| Category | Structural | Study Focus | Buffer | Practice Overview | NC-CCY-NT-CS-EB | | | | |
| Irrigation | NR | Irrig. Descrip. | not reported | | | | | | |
| Soils | The riparian soils within the two cover types and the adjacent agricultural soils were classified as Haymond silt loam (Coarse-silty, mixed, nonacid, mesic Typic Udifluvent), and the underlying geology of the area was Ste. Genevieve (or Levias) and Warsaw | | | | | | | | |
| Fertilizer | Fertilizers added during alternating corn years. | | | | | | | | |
| Comments | Two overland flow collectors were placed at each of the four sampling locations (i.e., field edge or 0.0 m, 3.3 m, 6.6 m, and 10.0m from the field edge) in both of the riparian buffers (Figure 1). The design resulted in two replicates in each vegetation type at each sampling distance (3.3 m) and the study was also replicated over time (i.e., individual rainfall events). This arrangement allowed for calculation of percent sediment reduction at successive distances. | | | | | | | | |

**Crop** 2 corn (Zea mays L.)/ soybeans (Glycine m Yield -999999

| Test Site ID | Test Site Name |
|---|---|
| **2013007050** | **Drury et al. 1993** |
| Location | Woodslee, Ontario, XX, CA |
| Study Citation | 1993<br>Drury, C.F., D.J. McKenney, W.I. Findlay, and J.D. Gaynor.<br>Influence of Tillage on Nitrate Loss in Surface Runoff and Tile Drainage<br>Soil Sci. Soc. Am. J. 57: 797-802. |
| NRCS LRR | Canada |
| NRCS MLRA | Canada |
| HUC_10 | -999999 |
| Test Site Scale | Plot |
| Experimental Design Type/ Description | Multiple Treatments w/ Control and Replication<br>plot study: complete randomized block |
| Crops | Corn, Kentucky Bluegrass |
| Study Duration | 3 years |

Summary

A study was conducted to determine the effect of conservation (no-tillage [NT] and ridge tillage [RT]) and conventional (moldboard plow) tillage systems on NO3- loss through surface runoff and tile drainage. Nitrate concentrations and total volume of surface runoff and tile drainage from conventional tillage (CT), no-tillage (NT), and ridge tillage (RT) all planted in continuous corn (Zea mays L.), and Kentucky bluegrass (BG, Poa pratensis L. ) treatments, were measured for 3 yr, 1989 to 1991. All corn tillage treatments received a total of 178.6 kg N ha-1 annually during the growing season. The volume of water drained through the tiles in the corn tillage systems always exceeded the volume in surface runoff, typically by factors of 2 to 4. Tile drainage was greatest from the CT treatments, least from BG, and approximately equal from RT and NT treatments in 1989 and 1990. Concentrations of NO3- in tile water from CT, RT, and NT treatments exceeded the maximum recommended safe limit for drinking water (10 mg N L-1) in 79% of the leaching events, with flow-weighted concentrations between 12 and 17 mg N L-1 in 1989 and 1990. Flow-weighted NO3- concentrations were only 1.2 and 2.6 mg N L-1 from BG in 1989 and 1990, respectively. The total NO3- lost in tile water in 1989 was 18, 14, 14, and 1 kg N ha-1 from the CT, RT, NT, and BG treatments, respectively, whereas in 1990 there were 29, 20, 20, and 3 kg N ha-1 lost from the CT, RT, NT, and BG treatments, respectively. Nitrate losses in surface runoff were lower than in tile drainage, with maximums of 2.6 kg N ha-1 for the RT and NT treatments in 1989 and 5.5 kg N ha-1 for the RT treatment in 1990. In 1989 and 1990, both RT and NT treatments had greater yields and N uptake in grain than the CT treatment. A serious drought in 1991 limited corn yield, N uptake in grain, and NO3- loss.


Acknowledgement: Study summaries may be directly quoted from original author's abstract.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300705001** | **Study Area** | **CT** | Area (ha) | 0.10 | Tillage | Conventional | Cover Crop | Not specified |
| Practice ID | 1 | Practice Name | CT Conv | General Practice | | Control | | Area Type | C |
| Category | Management | Study Focus | Tillage | Practice Overview | | NM-CCN-CN-CO-EN | | | |
| Irrigation | NR | Irrig. Descrip. | | | | | | | |
| Soils | Clay Loam- Brookston | | | | | | | | |
| Fertilizer | All plots received 132 kg/ha 8-32-16 (N-P-K) fertilizer at planting as a band application. In addition all plots received 168 kg N/ha NH4NO3 fertilizer metered through a brush applicator when the corn was at the six-leaf stage. The Kentucky bluegrass treatment also received a broadcast application of 132 kg/ha 8-32-16 fertilizer in the fall. | | | | | | | | |
| Comments | This 3-year study investigated the effect of tillage on nutrient loss to both surface and subsurface waters. The experimental design was split-plot (in-time) and used a randomized, complete block design that incorporated four treatments with two replications each. The treatments included continuous corn with conventional tillage (CT), no-tillage(NT), and ridge-tillage (RT); and Kentucky bluegrass (BG). The third year of the study exemplified drought conditions. The plot size was 12.2m x 82.5m, longitudinally centered above a tile drain. BMPs with average to above normal rainfall tended to improve yields, while in the drought year, plots with BMPs were below the control, and all yields were well below average. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Corn | Yield | 5.71 | tonnes/ha |
| **Crop** | 2 | Corn | Yield | 7.57 | tonnes/ha |
| **Crop** | 3 | Corn | Yield | 1.91 | tonnes/ha |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300705002** | **Study Area** | **NT** | Area (ha) | 0.10 | Tillage | No Till | Cover Crop | Not specified |
| Practice ID | 2 | Practice Name | NT No Till | General Practice | | Conservation Tillage | | Area Type | T |
| Category | Management | Study Focus | Tillage | Practice Overview | | NM-CCN-NT-CO-EN | | | |
| Irrigation | NR | Irrig. Descrip. | | | | | | | |
| Soils | Clay Loam- Brookston | | | | | | | | |
| Fertilizer | All plots received 132 kg/ha 8-32-16 (N-P-K) fertilizer at planting as a band application. In addition all plots received 168 kg N/ha NH4NO3 fertilizer metered through a brush applicator when the corn was at the six-leaf stage. The Kentucky bluegrass treatment also received a broadcast application of 132 kg/ha 8-32-16 fertilizer in the fall. | | | | | | | | |
| Comments | This 3-year study investigated the effect of tillage on nutrient loss to both surface and subsurface waters. The experimental design was split-plot (in-time) and used a randomized, complete block design that incorporated four treatments with two replications each. The treatments included continuous corn with conventional tillage (CT), no-tillage(NT), and ridge-tillage (RT); and Kentucky bluegrass (BG). The third year of the study exemplified drought conditions. The plot size was 12.2m x 82.5m, longitudinally centered above a tile drain. BMPs with average to above normal rainfall tended to improve yields, while in the drought year, plots with BMPs were below the control, and all yields were well below average. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Corn | Yield | 6.42 | tonnes/ha |
| **Crop** | 2 | Corn | Yield | 8.51 | tonnes/ha |
| **Crop** | 3 | Corn | Yield | 0.88 | tonnes/ha |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300705003** | **Study Area** | **RT** | Area (ha) | 0.10 | Tillage | Ridge Till | Cover Crop | Not specified |
| Practice ID | 3 | Practice Name | RT Conv | General Practice | Conservation Tillage | | | Area Type | T |
| Category | Management | Study Focus | Tillage | Practice Overview | NM-CCN-CT-CO-EN | | | | |
| Irrigation | NR | Irrig. Descrip. | | | | | | | |
| Soils | Clay Loam- Brookston | | | | | | | | |
| Fertilizer | All plots received 132 kg/ha 8-32-16 (N-P-K) fertilizer at planting as a band application. In addition all plots received 168 kg N/ha NH4NO3 fertilizer metered through a brush applicator when the corn was at the six-leaf stage. The Kentucky bluegrass treatment also received a broadcast application of 132 kg/ha 8-32-16 fertilizer in the fall. | | | | | | | | |
| Comments | This 3-year study investigated the effect of tillage on nutrient loss to both surface and subsurface waters. The experimental design was split-plot (in-time) and used a randomized, complete block design that incorporated four treatments with two replications each. The treatments included continuous corn with conventional tillage (CT), no-tillage(NT), and ridge-tillage (RT); and Kentucky bluegrass (BG). The third year of the study exemplified drought conditions. The plot size was 12.2m x 82.5m, longitudinally centered above a tile drain. BMPs with average to above normal rainfall tended to improve yields, while in the drought year, plots with BMPs were below the control, and all yields were well below average. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Corn | Yield | 6.01 | tonnes/ha |
| **Crop** | 2 | Corn | Yield | 9.07 | tonnes/ha |
| **Crop** | 3 | Corn | Yield | 1.06 | tonnes/ha |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300705004** | **Study Area** | **BG** | Area (ha) | 0.10 | Tillage | None | Cover Crop | Kentucky Bluegrass (rather than corn crop) |
| Practice ID | 4 | Practice Name | BG Pasture | General Practice | Cover Crop | | | Area Type | T |
| Category | Management | Study Focus | Tillage | Practice Overview | NM-CCY-NT-GHP-EN | | | | |
| Irrigation | NR | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Clay Loam- Brookston | | | | | | | | |
| Fertilizer | All plots received 132 kg/ha 8-32-16 (N-P-K) fertilizer at planting as a band application. In addition all plots received 168 kg N/ha NH4NO3 fertilizer metered through a brush applicator when the corn was at the six-leaf stage. The Kentucky bluegrass treatment also received a broadcast application of 132 kg/ha 8-32-16 fertilizer in the fall. | | | | | | | | |
| Comments | This 3-year study investigated the effect of tillage on nutrient loss to both surface and subsurface waters. The experimental design was split-plot (in-time) and used a randomized, complete block design that incorporated four treatments with two replications each. The treatments included continuous corn with conventional tillage (CT), no-tillage(NT), and ridge-tillage (RT); and Kentucky bluegrass (BG). The third year of the study exemplified drought conditions. The plot size was 12.2m x 82.5m, longitudinally centered above a tile drain. BMPs with average to above normal rainfall tended to improve yields, while in the drought year, plots with BMPs were below the control, and all yields were well below average. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Kentucky Bluegrass | Yield | -999999 | tonnes/ha |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 2 | Kentucky Bluegrass | Yield | -999999 | tonnes/ha |
| **Crop** | 3 | Kentucky Bluegrass | Yield | -999999 | tonnes/ha |

| Test Site ID | Test Site Name |
|---|---|
| **2013005101** | **Drury, C. F., 1996** |

| | | | | |
|---|---|---|---|---|
| Location | Harrow | Ontario | XX | CA |
| Study Citation | 1996 | | | |
| | Drury, C. F., C. S. Tan, J. D. Gaynor, T. O. Oloya and T. W. Welacky. | | | |
| | Influence of controlled drainage-subirrigation on surface and tile drainage nitrate loss. | | | |
| | J. Environ. Qual. 25:317-324. | | | |
| NRCS LRR | Canada | | | |
| NRCS MLRA | Canada | | | |
| HUC_10 | -999999 | Test Site Scale | Plot | |
| Experimental Design Type/ Description | Multiple Treatments w/ Control and Replication | | | |
| | plot study: complete randomized block | | | |
| Crops | Corn | | | |
| Study Duration | 4 years | | | |


Summary

Controlled drainage-subirrigation (CDS), conservation tillage, and corn (Zea mays L.) production practices were evaluated as methods of reducing NO3- loss through tile drainage. Controlled drainage-subirrigation was used to manage water from precipitation and subirrigation. Samples of tile drainage (5801) and surface runoff (3274) water were collected with autosamplers during each runoff event over a 3-yr period. Annual tile drainage volumes were reduced 24% with CDS compared with the drainage (DR) treatments. Flow weighted mean NO3- concentrations of tile drainage water was reduced 25% from 10.6 mg N/L for the DR treatments to 7.9 mg N/L for the CDS treatments. The average annual NO3- loss was reduced 43% from 25.8 kg N/ha for the DR treatment to 14.6 kg N/ha for the CDS treatments. Eighty-eight to 95% of the NO3- losses from all treatments occurred in the noncrop period (1 Nov. - 31 Apr.). Conservation tillage in combination with CDS reduced annual NO3- losses 49% (11.6 kg N/ha) when compared with the conventional moldboard plow tillage and DR treatment. Annual NO3- loss through surface runoff was increased to 1.9 kg N/ha with eh CDs treatments compared with 1.4 kg N/ha with eh DR treatment, this loss was minor compared with losses incurred through tile drainage. Controlled drainage-subirrigation is a technological advancement in soil and water management as it enables farms to minimize the effect of dry summers on crop growth and reduce NO3- contamination of drainage water.


| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300510101** | **Study Area** | **DR - MP** | Area (ha) | 0.20 | Tillage | Conventional | Cover Crop | Not specified |
| Practice ID | 1 | Practice Name | DR - MP | General Practice | | Control | | Area Type | C |
| Category | Management | Study Focus | Controlled Drainage, Tillage | Practice Overview | | NM-CCN-CN-CO-EN | | | |
| Irrigation | No | Irrig. Descrip. | N/A (rainfall) | | | | | | |

| | |
|---|---|
| Soils | Brookston clay loam (Typic Argiaquoll) |
| Fertilizer | Fertilizer (8-32-16) was banded beside the seed at a rate of 132 kg/ha. Urea (46-0-0) was applied with a brush applicator of custom design at the six-leaf stage. In 1991, urea was applied at 115 kg N/ha. This rate was adjusted from 170 kg N/ha to account for N released from the previous 2yr alfalfa. in 1992 to 1994, side-dressed urea as applied at an average rate of 167 kg N/ha, based on the average NO3 soil test of soil samples collected on the day of planting. Atrazine, metribuzin, and metolachlor were banded over the corn row immediately after planning to control weeds. |
| Comments | (Control: Tile Drainage + Moldboard Plow) This study compares a combination of tillage, drainage and vegetative cover combinations. Sixteen plots represent 4 crop-tillage combinations and two water management treatments with two replications each. Each plot is 15m x 67m on <1% slope. Corn was planted on all plots at a rate of 65,000 plants/ha in 75 cm wide rows. Fertilizer (8-32-16) was banded at a rate of 132 kg/ha, with additional N applied as urea at the 6-leaf stage. Two tile drains ran parallel to each plot. |

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|---|---|---|---|---|---|---|---|---|---|
| **Crop** | 1 | corn | | Yield | -999999 | NA | | | |
| **Study ID** | **201300510102** | **Study Area** | **DR - SS** | Area (ha) | 0.20 | Tillage | Reduced Tillage (Soil Saver) | Cover Crop | Not specified |
| Practice ID | 2 | Practice Name | DR - SS | General Practice | | Conservation Tillage | | Area Type | T |
| Category | Management | Study Focus | Controlled Drainage, Tillage | Practice Overview | | NM-CCN-CT-CO-EN | | | |
| Irrigation | No | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Brookston clay loam (Typic Argiaquoll) | | | | | | | | |
| Fertilizer | Fertilizer (8-32-16) was banded beside the seed at a rate of 132 kg/ha. Urea (46-0-0) was applied with a brush applicator of custom design at the six-leaf stage. In 1991, urea was applied at 115 kg N/ha. This rate was adjusted from 170 kg N/ha to account for N released from the previous 2yr alfalfa. in 1992 to 1994, side-dressed urea as applied at an average rate of 167 kg N/ha, based on the average NO3 soil test of soil samples collected on the day of planting. Atrazine, metribuzin, and metolachlor were banded over the corn row immediately after planning to control weeds. | | | | | | | | |
| Comments | This study compares a combination of tillage, drainage and vegetative cover combinations. Sixteen plots represent 4 crop-tillage combinations and two water management treatments with two replications each. Each plot is 15m x 67m on <1% slope. Corn was planted on all plots at a rate of 65,000 plants/ha in 75 cm wide rows. Fertilizer (8-32-16) was banded at a rate of 132 kg/ha, with additional N applied as urea at the 6-leaf stage. Two tile drains ran parallel to each plot. | | | | | | | | |
| **Crop** | 2 | corn | | Yield | -999999 | NA | | | |
| **Study ID** | **201300510103** | **Study Area** | **DR - MP + IC** | Area (ha) | 0.20 | Tillage | Conventional | Cover Crop | Ryegrass |
| Practice ID | 3 | Practice Name | DR - MP + IC | General Practice | | Cover Crop | | Area Type | T |
| Category | Management | Study Focus | Controlled Drainage, Tillage, Cover Crop | Practice Overview | | NM-CCY-CN-CO-EN | | | |
| Irrigation | No | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Brookston clay loam (Typic Argiaquoll) | | | | | | | | |
| Fertilizer | Fertilizer (8-32-16) was banded beside the seed at a rate of 132 kg/ha. Urea (46-0-0) was applied with a brush applicator of custom design at the six-leaf stage. In 1991, urea was applied at 115 kg N/ha. This rate was adjusted from 170 kg N/ha to account for N released from the previous 2yr alfalfa. in 1992 to 1994, side-dressed urea as applied at an average rate of 167 kg N/ha, based on the average NO3 soil test of soil samples collected on the day of planting. Atrazine, metribuzin, and metolachlor were banded over the corn row immediately after planning to control weeds. | | | | | | | | |
| Comments | This study compares a combination of tillage, drainage and vegetative cover combinations. Sixteen plots represent 4 crop-tillage combinations and two water management treatments with two replications each. Each plot is 15m x 67m on <1% slope. Corn was planted on all plots at a rate of 65,000 plants/ha in 75 cm wide rows. Fertilizer (8-32-16) was banded at a rate of 132 kg/ha, with additional N applied as urea at the 6-leaf stage. Two tile drains ran parallel to each plot. | | | | | | | | |
| **Crop** | 3 | corn | | Yield | -999999 | NA | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300510104** | **Study Area** | **DR - SS + IC** | Area (ha) | 0.20 | Tillage | Reduced Tillage (Soil Saver) | Cover Crop | Ryegrass |
| Practice ID | 4 | Practice Name | DR - SS + IC | General Practice | Conservation Tillage and Cover Crop | | | Area Type | T |
| Category | Management | Study Focus | Controlled Drainage, Tillage, Cover Crop | Practice Overview | NM-CCY-CT-CO-EN | | | | |
| Irrigation | No | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Brookston clay loam (Typic Argiaquoll) | | | | | | | | |
| Fertilizer | Fertilizer (8-32-16) was banded beside the seed at a rate of 132 kg/ha. Urea (46-0-0) was applied with a brush applicator of custom design at the six-leaf stage. In 1991, urea was applied at 115 kg N/ha. This rate was adjusted from 170 kg N/ha to account for N released from the previous 2yr alfalfa. in 1992 to 1994, side-dressed urea as applied at an average rate of 167 kg N/ha, based on the average NO3 soil test of soil samples collected on the day of planting. Atrazine, metribuzin, and metolachlor were banded over the corn row immediately after planning to control weeds. | | | | | | | | |
| Comments | This study compares a combination of tillage, drainage and vegetative cover combinations. Sixteen plots represent 4 crop-tillage combinations and two water management treatments with two replications each. Each plot is 15m x 67m on <1% slope. Corn was planted on all plots at a rate of 65,000 plants/ha in 75 cm wide rows. Fertilizer (8-32-16) was banded at a rate of 132 kg/ha, with additional N applied as urea at the 6-leaf stage. Two tile drains ran parallel to each plot. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 4 | corn | Yield | -999999 | NA |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300510105** | **Study Area** | **CDS - MP** | Area (ha) | 0.20 | Tillage | Conventional | Cover Crop | Not specified |
| Practice ID | 5 | Practice Name | CDS - MP | General Practice | Drainage Water Management | | | Area Type | T |
| Category | Management | Study Focus | Controlled Drainage, Tillage, | Practice Overview | NM-CCN-CN-CO-ED | | | | |
| Irrigation | Yes | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Brookston clay loam (Typic Argiaquoll) | | | | | | | | |
| Fertilizer | Fertilizer (8-32-16) was banded beside the seed at a rate of 132 kg/ha. Urea (46-0-0) was applied with a brush applicator of custom design at the six-leaf stage. In 1991, urea was applied at 115 kg N/ha. This rate was adjusted from 170 kg N/ha to account for N released from the previous 2yr alfalfa. in 1992 to 1994, side-dressed urea as applied at an average rate of 167 kg N/ha, based on the average NO3 soil test of soil samples collected on the day of planting. Atrazine, metribuzin, and metolachlor were banded over the corn row immediately after planning to control weeds. | | | | | | | | |
| Comments | This study compares a combination of tillage, drainage and vegetative cover combinations. Sixteen plots represent 4 crop-tillage combinations and two water management treatments with two replications each. Each plot is 15m x 67m on <1% slope. Corn was planted on all plots at a rate of 65,000 plants/ha in 75 cm wide rows. Fertilizer (8-32-16) was banded at a rate of 132 kg/ha, with additional N applied as urea at the 6-leaf stage. Two tile drains ran parallel to each plot. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 5 | corn | Yield | -999999 | NA |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300510106** | **Study Area** | **CDS - SS** | Area (ha) | 0.20 | Tillage | Reduced Tillage (Soil Saver) | Cover Crop | Not specified |
| Practice ID | 6 | Practice Name | CDS - SS | General Practice | Drainage Water Management and Conservation Tillage | | | Area Type | T |
| Category | Management | Study Focus | Controlled Drainage, Tillage | Practice Overview | NM-CCN-CT-CO-ED | | | | |
| Irrigation | Yes | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Brookston clay loam (Typic Argiaquoll) | | | | | | | | |
| Fertilizer | Fertilizer (8-32-16) was banded beside the seed at a rate of 132 kg/ha. Urea (46-0-0) was applied with a brush applicator of custom design at the six-leaf stage. In 1991, urea was applied at 115 kg N/ha. This rate was adjusted from 170 kg N/ha to account for N released from the previous 2yr alfalfa. in 1992 to 1994, side-dressed urea as applied at an average rate of 167 kg N/ha, based on the average NO3 soil test of soil samples collected on the day of planting. Atrazine, metribuzin, and metolachlor were banded over the corn row immediately after planning to control weeds. | | | | | | | | |
| Comments | | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 6 | corn | Yield | -999999 | NA |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300510107** | **Study Area** | **CDS - MP + IC** | Area (ha) | 0.20 | Tillage | Conventional | Cover Crop | Ryegrass |
| Practice ID | 7 | Practice Name | CDS - MP + IC | General Practice | Drainage Water Management and Conservation Tillage and Cover Crop | | | Area Type | T |
| Category | Management | Study Focus | Controlled Drainage, Tillage, Cover Crop | Practice Overview | NM-CCY-CN-CO-ED | | | | |
| Irrigation | Yes | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Brookston clay loam (Typic Argiaquoll) | | | | | | | | |
| Fertilizer | Fertilizer (8-32-16) was banded beside the seed at a rate of 132 kg/ha. Urea (46-0-0) was applied with a brush applicator of custom design at the six-leaf stage. In 1991, urea was applied at 115 kg N/ha. This rate was adjusted from 170 kg N/ha to account for N released from the previous 2yr alfalfa. in 1992 to 1994, side-dressed urea as applied at an average rate of 167 kg N/ha, based on the average NO3 soil test of soil samples collected on the day of planting. Atrazine, metribuzin, and metolachlor were banded over the corn row immediately after planning to control weeds. | | | | | | | | |
| Comments | | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | corn | Yield | -999999 | |
| **Crop** | 7 | corn | Yield | -999999 | NA |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300510108** | **Study Area** | **CDS - SS + IC** | Area (ha) | 0.20 | Tillage | Reduced Tillage (Soil Saver) | Cover Crop | Ryegrass |
| Practice ID | 8 | Practice Name | CDS - SS + IC | General Practice | Drainage Water Management and Conservation Tillage and Cover Crop | | | Area Type | T |
| Category | Management | Study Focus | Controlled Drainage, Tillage, Cover Crop | Practice Overview | NM-CCY-CT-CO-ED | | | | |
| Irrigation | Yes | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Brookston clay loam (Typic Argiaquoll) | | | | | | | | |
| Fertilizer | Fertilizer (8-32-16) was banded beside the seed at a rate of 132 kg/ha. Urea (46-0-0) was applied with a brush applicator of custom design at the six-leaf stage. In 1991, urea was applied at 115 kg N/ha. This rate was adjusted from 170 kg N/ha to account for N released from the previous 2yr alfalfa. in 1992 to 1994, side-dressed urea as applied at an average rate of 167 kg N/ha, based on the average NO3 soil test of soil samples collected on the day of planting. Atrazine, metribuzin, and metolachlor were banded over the corn row immediately after planning to control weeds. | | | | | | | | |
| Comments | This study compares a combination of tillage, drainage and vegetative cover combinations. Sixteen plots represent 4 crop-tillage combinations and two water management treatments with two replications each. Each plot is 15m x 67m on <1% slope. Corn was planted on all plots at a rate of 65,000 plants/ha in 75 cm wide rows. Fertilizer (8-32-16) was banded at a rate of 132 kg/ha, with additional N applied as urea at the 6-leaf stage. Two tile drains ran parallel to each plot. | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 8 | corn | Yield | -999999 | NA |

| Test Site ID | Test Site Name |
|---|---|
| 2013005136 | Gaynor, J. D., 1995 |

| | | | | |
|---|---|---|---|---|
| Location | Harrow | Ontario | XX | CA |
| Study Citation | 1995 | | | |
| | Gaynor, J.D. and W.I. Findlay. | | | |
| | Soil and phosphorous loss from conservation and conventional tillage in corn production. | | | |
| | J. Environ. Qual. 24:734-741. | | | |
| NRCS LRR | Canada | | | |
| NRCS MLRA | Canada | | | |
| HUC_10 | -999999 | Test Site Scale | Plot | |
| Experimental Design Type/ Description | Multiple Treatments w/ Control, No Replication | | | |
| | plot study: no replications | | | |
| Crops | Corn | | | |
| Study Duration | 3 years | | | |

Summary

Conservation tillage is encouraged in southwestern Ontario by concern for soil erosion and compaction. The contribution of agriculture to eutrophication of the Great Lakes by P is also at issue. Soil loss and ortho-P transport were measured from a conventional and two conservation tillage treatments (zero and ridge tillage) from January 1988 to 30 Sept. 1990 to evaluate their impact on meeting Great Lakes water quality objectives for P. Sediment concentration from the poorly drained, Brookston clay loam (clayey, mixed, mesic Typic Haplaquolls), cropped to corn (Zea mays L.) was 2.1 times larger in surface runoff than tile discharge (0.20 g/L) but tile discharge contributed 44 to 65% of the soil loss probably from preferential flow. Conservation tillage reduced average soil loss 49% from conventional tillage (899 kg/ha). Conservation tillage increased ortho-P concentrations in runoff 2.2 times from conventional tillage (0.25 mg/L). Orthophosphate transport decreased in the order zero>ridge>conventional tillage. Average ortho-P was 1.7 to 2.7 times greater from conservation than conventional tillage (559 g/ha/yr). Subsurface drainage accounted for 55 to 68% of the ortho-P transported. Transport of total soluble P and total P (sum of sediment-attached P and soluble P, only measured in 1990) increased 2.2 and 2.0 times, respectively, with conservation than conventional tillage. Dissolved P accounted for 84 to 93% of the P transported from the three tillage treatments. Sediment-attached P constituted 7 to 16% of total P loss. Conservation tillage effectively reduced soil erosion but increased P loss.

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300513601** | **Study Area** | **Ridge** | Area (ha) | 0.10 | Tillage | Ridge Till | Cover Crop | None |
| Practice ID | 234 | Practice Name | RidgeTill | General Practice | Conservation Tillage | | | Area Type | T |
| Category | Management | Study Focus | Tillage | Practice Overview | NM-CCN-CT-CO-EN | | | | |
| Irrigation | No | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Clay Loam- Brookston | | | | | | | | |
| Fertilizer | Side-dressed fertilizer (132 kg/ha 8-32-16); a brush applicator of custom design, was used for the midseason fertilizer application of 168 kg/ha 34-0-0; fertilizer was subsurface applied in a band 7 to 10 cm from the seed at a depth of 6 to 8 cm. | | | | | | | | |
| Comments | This study compared the impact of no-till and ridge-tillage on runoff from continuous corn. Annual concentration means are given for both surface and subsurface drainage. | | | | | | | | |

| | | | | |
|---|---|---|---|---|
| **Crop** | 1 | Corn | Yield | -999999 |
| **Crop** | 2 | Corn | Yield | -999999 |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 3 | Corn | Yield | -999999 | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300513602** | **Study Area** | **Zero** | Area (ha) | 0.10 | Tillage | No Till | Cover Crop | None |
| Practice ID | 235 | Practice Name | NoTill | General Practice | | Conservation Tillage | | Area Type | T |
| Category | Management | Study Focus | Tillage | Practice Overview | | NM-CCN-NT-CO-EN | | | |
| Irrigation | No | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Clay Loam- Brookston | | | | | | | | |
| Fertilizer | Side-dressed fertilizer (132 kg/ha 8-32-16); a brush applicator of custom design, was used for the midseason fertilizer application of 168 kg/ha 34-0-0; fertilizer was subsurface applied in a band 7 to 10 cm from the seed at a depth of 6 to 8 cm. | | | | | | | | |
| Comments | This study compared the impact of no-till and ridge-tillage on runoff from continuous corn. Annual concentration means are given for both surface and subsurface drainage. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Corn | Yield | -999999 | |
| **Crop** | 2 | Corn | Yield | -999999 | |
| **Crop** | 3 | Corn | Yield | -999999 | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300513603** | **Study Area** | **Conventional** | Area (ha) | 0.10 | Tillage | Conventional | Cover Crop | None |
| Practice ID | 233 | Practice Name | Conventional | General Practice | | Control | | Area Type | C |
| Category | Management | Study Focus | Tillage | Practice Overview | | NM-CCN-CN-CO-EN | | | |
| Irrigation | No | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Clay Loam- Brookston | | | | | | | | |
| Fertilizer | Side-dressed fertilizer (132 kg/ha 8-32-16); a brush applicator of custom design, was used for the midseason fertilizer application of 168 kg/ha 34-0-0; fertilizer was subsurface applied in a band 7 to 10 cm from the seed at a depth of 6 to 8 cm. | | | | | | | | |
| Comments | This study compared the impact of no-till and ridge-tillage on runoff from continuous corn. Annual concentration means are given for both surface and subsurface drainage. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Corn | Yield | -999999 | |
| **Crop** | 2 | Corn | Yield | -999999 | |
| **Crop** | 3 | Corn | Yield | -999999 | |

| Test Site ID | Test Site Name |
|---|---|
| **2013005525** | **Ghidey, F., 1999** |

| | | | | |
|---|---|---|---|---|
| Location | Centralia | Boone | MO | US |
| Study Citation | 1999 | | | |
| | Ghidey, F., E. E. Alberts, N. R. Kitchen, and R. N. Lerch. | | | |
| | Farming system effects on nitrate loss to surface runoff. | | | |
| | Paper No. 99-2189. 2000 ASAE International Meeting. American Society of Agricultural Engineers: St. Joseph, Michigan. | | | |
| NRCS LRR | Central Feed Grains and Livestock Region | | | |
| NRCS MLRA | Central Claypan Areas | | | |
| HUC_10 | 0711000601 | Test Site Scale | Field | |
| Experimental Design Type/ Description | Multiple Treatments, No Control, No Replication | | | |
| | The effects of crop management systems including tillage, rate of fertilizer application, and type of application on the transport of nitrates in surface runoff were studied on two field-size watersheds. | | | |
| Crops | Corn, Soybeans, Sorghum | | | |
| Study Duration | 4 years | | | |

Summary

The effects of crop management systems including tillage, rate of fertilizer application, and type of application on the transport of nitrates in surface runoff were studied on two field-size watershed located in the claypan soil region of north-central Missouri. Water samples were collected from the drainage areas for NO3-N and NH4-N analysis during each runoff event from 1993-1997. In general, the study showed that method of incorporation, runoff volume, and timing of runoff event relative to date of application had greater influence in the loss of nitrates to surface runoff than application rate.

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300552501** | **Study Area** | **FS1** | Area (ha) | 35.49 | Tillage | Minimum Till, Fertilizer Incorporated | Cover Crop | Not specified |
| Practice ID | 751 | Practice Name | Field 1 | General Practice | Conservation Tillage | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NC-CCN-CT-CS-EN | | | | |
| Irrigation | NR | Irrig. Descrip. | Not applicable | | | | | | |
| Soils | 70% Adco silt loam with 0-1 % slope, 20% of Mexico Silt clay loam with 1-3% slope, and 10% Mexico silt loam with 0-2% slope. | | | | | | | | |
| Fertilizer | Nitrogen (as UAN) was applied at the rates of 190, 123, and 190 kg/ha in 1993,1995, and 1997, respectively. The fertilizer was broadcast and incorporated with field cultivator prior to planting. | | | | | | | | |
| Comments | Field 1 was farmed using a high chemical input, minimum-till corn and soybean rotation with the goals of maximizing grain yield and profit. Fertilizer was broadcast and incorporated prior to planting each spring. No runoff was measured in 1996. | | | | | | | | |

| | | | | |
|---|---|---|---|---|
| **Crop** | 1 | corn | Yield | -999999 |
| **Crop** | 2 | soybean | Yield | -999999 |
| **Crop** | 3 | grain sorghum | Yield | -999999 |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 4 | soybean | Yield | -999999 | |
| **Crop** | 5 | corn | Yield | -999999 | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300552502** | **Study Area** | **FS2** | Area (ha) | 24.20 | Tillage | Minimum till, then no till in 1997 | Cover Crop | Not specified |
| Practice ID | 752 | Practice Name | Field 2 | General Practice | | Conservation Tillage and Nutrient Management | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | | NC-CCN-NT-SBG-EN | | | |
| Irrigation | NR | Irrig. Descrip. | Not applicable | | | | | | |

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|---|---|
| Soils | 30% Adco silt loam with 0-1% slope, 30% Mexico silt loam with 1-3% slope, 15% Putnam silt loam with 0-1% slope, and 25% Leonard silt clay loam with 1-4% slope. |
| Fertilizer | Nitrogen (as UAN) was applied at the rates of 190, 123, and 190 kg/ha in 1993,1995, and 1997, respectively. The fertilizer was broadcast and incorporated with field cultivator prior to planting. In 1997, FS2 was under no-till system and nitrogen (as anhydrous ammonia) at the rate of 127 kg/ha was knifed-in 2 d before planting. On planting date, nitrogen (as UAN) at the rate of 20 kg/ha was surface applied and not incorporated. |
| Comments | Field 2 was farmed using medium chemical input minimum-till sorghum-soybean rotation. This farming system was designed to maximize profit and water quality benefits. In 1993, fertilizer was broadcast and incorporated; in 1995 it was not incorporated, and in 1997, anhydrous ammonia was knifed in prior to planting with an additional amount surface banded. FS2 was under no-tillage in 1997. |

| | | | | |
|---|---|---|---|---|
| **Crop** | 6 | grain sorghum | Yield | -999999 |
| **Crop** | 7 | soybean | Yield | -999999 |
| **Crop** | 8 | grain sorghum | Yield | -999999 |
| **Crop** | 9 | soybean | Yield | -999999 |
| **Crop** | 10 | grain sorghum | Yield | -999999 |

| Test Site ID | Test Site Name |
|---|---|
| 2013005148 | Ginting, D., 1998 |

| | | | | |
|---|---|---|---|---|
| Location | Morris | Stevens | MN | US |
| Study Citation | 1998 | | | |
| | Ginting, D., J. F. Moncrief, S. C. Gupta and S. D. Evans. | | | |
| | Interaction between manure and tillage system on phosphorus uptake and runoff losses | | | |
| | J. Environ. Qual. 27:1403-1410. | | | |
| NRCS LRR | Central Feed Grains and Livestock Region | | | |
| NRCS MLRA | Till Plains | | | |
| HUC_10 | 0702000203 | Test Site Scale | Plot | |
| Experimental Design Type/ Description | Multiple Treatments w/ Control and Replication | | | |
| | plot study: complete randomized block | | | |
| Crops | Corn | | | |
| Study Duration | 3 years | | | |

Summary

Application of manure on soils having high P test has raised concerns over the eutrophication of lakes and rivers. The objective of this study was to evaluate the effects of one time application of 164 kg P/ha form solid beef (Bos taurus L.) manure on soil Olsen P dynamics, P uptake by corn (Zea mays L.) grain, and P losses as total P (TP), particulate P (PP), and dissolved molybdate reactive P (DMRP) in both snowmelt and rainfall runoff under ridge tillage (RT) and moldboard plow (MP) systems for 1992 to 1994. Soil O was consistently higher in the manure than no manure treated plots (17.9 vs. 12.3 mg/kg in 1993 and 23.7 vs. 13.8 mg/kg in 1994. Phosphorus uptake was greater from the manure than no manure treated plots (24.5 vs. 19.8 kg/ha and 23.5 vs. 18.8 kg/ha). Annual PP and TP losses were either similar or lower from manure than no manure treated plots. Particulate P losses by rainfall runoff were lower from the RT vs. MP systems (0.25 vs. 1.95 kg/ha in 1993 and 0.006 vs. 0.65 kg/ha in 1994). The opposite was apparent for DMRP losses in snowmelt, which were higher from the RT than MP system (0.11 vs. 0.01 kg/ha and 0.14 vs. 0.03 kg/ha). The RT system is an environmentally better system than the MP system due to its substantial reduction in annual PP and TP losses.

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300514801** | **Study Area** | **MP - Manure** | Area (ha) | 0.01 | Tillage | Conventional | Cover Crop | None |
| Practice ID | 521 | Practice Name | MP | General Practice | | Control | | Area Type | C |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | | NC-CCN-CN-CO-EN | | | |
| Irrigation | No | Irrig. Descrip. | N/A (rainfall) | | | | | | |

| | |
|---|---|
| Soils | Forman (fine-loamy, mixed Udic Argiboroll)-Buse (fine-loamy, mixed Udorthentic Haploboroll) |
| Fertilizer | The manure treatment was a one-time broadcast application of solid beef manure at 16.3 mg/ha (dry wt. basis). Manure was applied with a box type manure spreader. Manure application provided 164 kg total P, 481 kg Kjeldahl-N, and 375 kg total K per hectare. |
| Comments | Twelve erosion plots (each 22m x 3m) cropped with continuous corn, were used to quantify P losses by snowmelt and rainfall. The plots were on a 12% slope, and were isolated by corrugated steel plates to accommodate 4 rows of corn, using a split plot design. Four treatments were applied with three replications each: 2 levels of manure application, and ridge-till vs. conventional moldboard plowing. However, the tillage treatment is the only comparison relevant to this data base. Therefore, results are reported for these two treatments as geometric means over both manure treatments. Total runoff was collected from each event and plot, with a well-mixed, composite sample gathered from the mixture. |

| | | | | |
|---|---|---|---|---|
| **Crop** | 1 | Corn | Yield | -999999 |
| **Crop** | 2 | Corn | Yield | 7 Mg/ha |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Crop** | 3 | Corn | Yield | 9.8 | Mg/ha | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Study ID** | **201300514802** | **Study Area** | **MP - No Manure** | Area (ha) | 0.01 | Tillage | Conventional | Cover Crop | None |
| Practice ID | 522 | Practice Name | MP | General Practice | Control | Area Type | C |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NM-CCN-CN-CO-EN |
| Irrigation | No | Irrig. Descrip. | N/A (rainfall) |
| Soils | Forman (fine-loamy, mixed Udic Argiboroll)-Buse (fine-loamy, mixed Udorthentic Haploboroll) |
| Fertilizer | On July 16, 1993, 45 kg N/ha (NH4NO3) was broadcast applied on no manure plots to ensure sufficient N for corn production. |
| Comments | Twelve erosion plots (each 22m x 3m) cropped with continuous corn, were used to quantify P losses by snowmelt and rainfall. The plots were on a 12% slope, and were isolated by corrugated steel plates to accommodate 4 rows of corn, using a split plot design. Four treatments were applied with three replications each: 2 levels of manure application, and ridge-till vs. conventional moldboard plowing. However, the tillage treatment is the only comparison relevant to this data base. Therefore, results are reported for these two treatments as geometric means over both manure treatments. Total runoff was collected from each event and plot, with a well-mixed, composite sample gathered from the mixture. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Crop** | 1 | Corn | Yield | -999999 | | | |
| **Crop** | 2 | Corn | Yield | 6.6 | Mg/ha | | |
| **Crop** | 3 | Corn | Yield | 9.3 | Mg/ha | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Study ID** | **201300514803** | **Study Area** | **RT - Manure** | Area (ha) | 0.01 | Tillage | Ridge Till | Cover Crop | None |
| Practice ID | 523 | Practice Name | RT | General Practice | Conservation Tillage | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NC-CCN-CT-CO-EN |
| Irrigation | No | Irrig. Descrip. | N/A (rainfall) |
| Soils | Forman (fine-loamy, mixed Udic Argiboroll)-Buse (fine-loamy, mixed Udorthentic Haploboroll) |
| Fertilizer | The manure treatment was a one-time broadcast application of solid beef manure at 16.3 mg/ha (dry wt. basis). Manure was applied with a box type manure spreader. Manure application provided 164 kg total P, 481 kg Kjeldahl-N, and 375 kg total K per hectare. |
| Comments | Twelve erosion plots (each 22m x 3m) cropped with continuous corn, were used to quantify P losses by snowmelt and rainfall. The plots were on a 12% slope, and were isolated by corrugated steel plates to accommodate 4 rows of corn, using a split plot design. Four treatments were applied with three replications each: 2 levels of manure application, and ridge-till vs. conventional moldboard plowing. However, the tillage treatment is the only comparison relevant to this data base. Therefore, results are reported for these two treatments as geometric means over both manure treatments. Total runoff was collected from each event and plot, with a well-mixed, composite sample gathered from the mixture. |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Crop** | 1 | Corn | Yield | -999999 | | | |
| **Crop** | 2 | Corn | Yield | 7 | Mg/ha | | |
| **Crop** | 3 | Corn | Yield | 9.8 | Mg/ha | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300514804** | **Study Area** | **RT - No Manure** | Area (ha) | 0.01 | Tillage | Ridge Till | Cover Crop | None |
| Practice ID | 524 | Practice Name | RT | General Practice | Conservation Tillage | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NM-CCN-CT-CO-EN | | | | |
| Irrigation | No | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Forman (fine-loamy, mixed Udic Argiboroll)-Buse (fine-loamy, mixed Udorthentic Haploboroll) | | | | | | | | |
| Fertilizer | On July 16, 1993, 45 kg N/ha (NH4NO3) was broadcast applied on no manure plots to ensure sufficient N for corn production. | | | | | | | | |
| Comments | Twelve erosion plots (each 22m x 3m) cropped with continuous corn, were used to quantify P losses by snowmelt and rainfall. The plots were on a 12% slope, and were isolated by corrugated steel plates to accommodate 4 rows of corn, using a split plot design. Four treatments were applied with three replications each: 2 levels of manure application, and ridge-till vs. conventional moldboard plowing. However, the tillage treatment is the only comparison relevant to this data base. Therefore, results are reported for these two treatments as geometric means over both manure treatments. Total runoff was collected from each event and plot, with a well-mixed, composite sample gathered from the mixture. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Corn | Yield | -999999 | |
| **Crop** | 2 | Corn | Yield | 6.6 | Mg/ha |
| **Crop** | 3 | Corn | Yield | 9.3 | Mg/ha |

| Test Site ID | Test Site Name |
|---|---|
| 2013007053 | Goulet et al. 2006 |

| | | | | |
|---|---|---|---|---|
| Location | Quebec City | Quebec | XX | CA |
| Study Citation | 2006 | | | |
| | Goulet, M., J. Gallichand, M. Duchemin, and M. Giroux. | | | |
| | Measured and Computed Phosphorus Losses by Runoff and Subsurface Drainage in Eastern Canada | | | |
| | Applied Eng. Agric. 22(2): 203-213. | | | |
| NRCS LRR | Canada | | | |
| NRCS MLRA | Canada | | | |
| HUC_10 | -999999 | Test Site Scale | Plot | |
| Experimental Design Type/ Description | Multiple Treatments, No Control, No Replication | | | |
| | Nine plots equipped for measurement and sampling water from runoff and subsurface drainage | | | |
| Crops | Canola, Corn, Barley, Grass | | | |
| Study Duration | 2 years | | | |


Summary

This research was conducted to compare results of a PI model with measured values of P losses, to an adjacent watercourse, from nine 0.19-ha experimental plots monitored from January 2001 to December 2002. The experimental setup was located near Québec City, Canada, and allowed measurement of both surface and subsurface P losses. The 18 computed PI annual risk values (9 plots × 2 years) ranged from low to moderate. During the monitoring period, 98% of the water and 95% of the P moved out of the plots via the subsurface drainage system. P losses through subsurface drains represented, on average, 514 g total P ha-1 yr-1 compared to 26 g total P ha-1 yr-1 by surface runoff. On average, 84% of the total P losses were under particulate form. A stepwise regression showed that only three of the ten PI model components (total P budget, soil erosion, and organic manure application) were responsible for 86% of the measured total P losses variations. The correlation between PI values and measured total P losses (r = 0.63) was significant at the 0.10 probability level. Fixing all PI components to a value of 1.0 increased the correlation (r = 0.73), indicating possible improvement of the predictive capability of the model through optimization of the weights.


| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300705301** | **Study Area** | **1** | Area (ha) | 0.22 | Tillage | Conventional (moldboard plow) | Cover Crop | Not specified |
| Practice ID | 1 | Practice Name | 1 Conv NM | General Practice | | Nutrient Management | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | | NC-CCN-CN-GHP-EN | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Silt Loam- Les Bras | | | | | | | | |
| Fertilizer | 45 kg/ha/yr P2O5 mineral fertilizer broadcasted in May | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | BMMM (4 yr. rotation of barley and me | Yield | -999999 | NA |
| **Crop** | 10 | BMMM (4 yr. rotation of barley and me | Yield | -999999 | NA |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300705302** | **Study Area** | **2** | Area (ha) | 0.22 | Tillage | Conventional (moldboard plow) | Cover Crop | Not specified |
| Practice ID | 2 | Practice Name | 2 Conv NM | General Practice | Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NM-CCN-CN-GHP-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Silt Loam- Les Bras | | | | | | | | |
| Fertilizer | 50 kg/ha/yr P2O5 beef manure with manure spreader after 1st cut | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 2 | BMMM (4 yr. rotation of barley and me | Yield | -999999 | NA |
| **Crop** | 11 | BMMM (4 yr. rotation of barley and me | Yield | -999999 | NA |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300705303** | **Study Area** | **3** | Area (ha) | 0.22 | Tillage | Conventional (moldboard plow) | Cover Crop | Not specified |
| Practice ID | 3 | Practice Name | 3 Conv NM | General Practice | Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NM-CCN-CN-GHP-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Silt Loam- Les Bras | | | | | | | | |
| Fertilizer | 68 kg/ha/yr P2O5 organic fertilizer at sowing | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 3 | BMMM (4 yr. rotation of barley and me | Yield | -999999 | NA |
| **Crop** | 12 | BMMM (4 yr. rotation of barley and me | Yield | -999999 | NA |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300705304** | **Study Area** | **4** | Area (ha) | 0.22 | Tillage | Conventional (moldboard plow) | Cover Crop | Not specified |
| Practice ID | 4 | Practice Name | 4 Conv NM | General Practice | Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NM-CCN-CN-GHP-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Silt Loam- Les Bras | | | | | | | | |
| Fertilizer | 21 kg/ha/yr P2O5 organic fertilizer at sowing | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 4 | BMMM (4 yr. rotation of barley and me | Yield | -999999 | NA |
| **Crop** | 13 | BMMM (4 yr. rotation of barley and me | Yield | -999999 | NA |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300705305** | **Study Area** | **5** | Area (ha) | 0.12 | Tillage | Chisel Plow | Cover Crop | Not specified |
| Practice ID | 5 | Practice Name | 5 Cons Till | General Practice | Reduced Tillage | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NC-CCN-CT-CEX-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Silt Loam- Les Bras | | | | | | | | |
| Fertilizer | 86 kg/ha/yr P2O5 mineral fertilizer using row spreading at sowing | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. Chisel plow. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 5 | CACCB (4 yr. rotation of Canola, Corn, C | Yield | -999999 | NA |
| **Crop** | 14 | CACCB (4 yr. rotation of Canola, Corn, C | Yield | -999999 | NA |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300705306** | **Study Area** | **6** | Area (ha) | 0.11 | Tillage | Conventional (moldboard plow) | Cover Crop | Not specified |
| Practice ID | 6 | Practice Name | 6 Conv NM | General Practice | Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NM-CCN-CN-CEX-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Silt Loam- Les Bras | | | | | | | | |
| Fertilizer | 44 kg/ha/yr P2O5 mineral fertilizer at sowing | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 6 | CACCB (4 yr. rotation of Canola, Corn, C | Yield | -999999 | NA |
| **Crop** | 15 | CACCB (4 yr. rotation of Canola, Corn, C | Yield | -999999 | NA |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300705307** | **Study Area** | **7** | Area (ha) | 0.11 | Tillage | Conventional (moldboard plow) | Cover Crop | Not specified |
| Practice ID | 7 | Practice Name | 7 Conv NM | General Practice | Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NM-CCN-CN-CEX-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Silt Loam- Les Bras | | | | | | | | |
| Fertilizer | 64 kg/ha/yr P2O5 organic fertilizer at sowing | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 7 | CACCB (4 yr. rotation of Canola, Corn, C | Yield | -999999 | NA |
| **Crop** | 16 | CACCB (4 yr. rotation of Canola, Corn, C | Yield | -999999 | NA |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300705308** | **Study Area** | **8** | Area (ha) | 0.11 | Tillage | Chisel Plow | Cover Crop | Not specified |
| Practice ID | 8 | Practice Name | 8 Cons Till | General Practice | Reduced Tillage | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NC-CCN-CT-CEX-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Silt Loam- Les Bras | | | | | | | | |
| Fertilizer | 222 kg/ha/yr P2O5 liquid swine manure using row spreading at sowing | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. Chisel plow. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 8 | CACCB (4 yr. rotation of Canola, Corn, C | Yield | -999999 | NA |
| **Crop** | 17 | CACCB (4 yr. rotation of Canola, Corn, C | Yield | -999999 | NA |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300705309** | **Study Area** | **9** | Area (ha) | 0.20 | Tillage | Conventional (moldboard plow) | Cover Crop | Not specified |
| Practice ID | 9 | Practice Name | 9 Conv NM | General Practice | Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NM-CCN-CN-GHP-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Silt Loam- Les Bras | | | | | | | | |
| Fertilizer | 70 kg/ha/yr P2O5 mineral fertilizer at sowing | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 9 | BMMM (4 yr. rotation of barley and me | Yield | -999999 | NA |
| **Crop** | 18 | BMMM (4 yr. rotation of barley and me | Yield | -999999 | NA |

| Test Site ID | Test Site Name |
|---|---|
| **2013007004** | **Grigg et al. 2004** |

| | | | | |
|---|---|---|---|---|
| Location | Baton Rouge | East Baton Rouge | LA | US |
| Study Citation | 2004 | | | |
| | Grigg, B.C., L.M. Southwick, J.L. Fouss, and T.S. Kornecki. | | | |
| | Climate Impacts on Nitrate Loss in Drainage Waters from a Southern Alluvial Soil | | | |
| | Trans. ASAE 47(2): 445-451. | | | |
| NRCS LRR | South Atlantic and Gulf Slope Cash Crops, Forest, and Livestock Region | | | |
| NRCS MLRA | Carolina and Georgia Sand Hills | | | |
| HUC_10 | 0807020208 | Test Site Scale | Plot | |
| Experimental Design Type/ Description | Multiple Treatments w/ Control and Replication | | | |
| | plot study: complete randomized block | | | |
| Crops | Corn | | | |
| Study Duration | 2 years | | | |


Summary

Field studies in the Lower Mississippi River Valley region were used to evaluate the impact of climate (rainfall) on nitrate loss from agricultural fields in both normal (1996) and drought (1999) periods at the Ben Hur Water Quality Site in Baton Rouge, Louisiana. Four replicates of two treatments, surface drainage only (SUR) and surface drainage + deep controlled drainage (DCD), were initiated on 0.21 ha plots planted to corn (Zea mays L). After each rainfall/runoff event, the volumes of runoff and subsurface drainage were analyzed for soluble nitrate concentration and loss. No significant drainage treatment impacts were found on runoff volume and nitrate loss in runoff. Nitrate loss in runoff was impacted by climate, with a four-fold decrease in nitrate loss during the drought, caused by decreased volume of runoff. Conversely, the mass of nitrate loss in leachate increased two-fold during the drought. Diverting subsurface drainage effluent (DCD) to surface receiving waters increased nitrate transport to these waters by 2.6 times in the normal climate, and over ten-fold during the drought, compared to SUR management. In either climate, but particularly during drought, subsurface drainage could potentially accelerate eutrophication of receiving waters of this region. When compared to DCD, these results suggest that SUR should be the water Management practice in this region.


| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300700401** | **Study Area** | **Normal Year- SUR** | Area (ha) | 0.21 | Tillage | Minimum Till | Cover Crop | None |
| Practice ID | 1 | Practice Name | Normal Year- SUR Cons Till | General Practice | Controlled Drainage, Conservation Tillage | | | Area Type | C |
| Category | Management | Study Focus | Controlled Drainage | Practice Overview | NM-CCN-CT-CO-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Silt Loam- Commerce | | | | | | | | |
| Fertilizer | Liquid nitrogen fertilizer was injected below the soil surface adjacent to the crop row at a rate of 224 kg N/ha-yr, based on soil analysis and fertilizer recommendations. Fertilizer N was applied (three-way split) before June 10 of each year: 25% at planting, 50% at 30 d after emergence, and the remaining 25% in early June. | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. Minimal tillage. | | | | | | | | |

**Crop** 1 Corn Yield 5.9 Mg/ha

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300700402** | **Study Area** | **Normal Year- DCD (Deep Co** | Area (ha) | 0.21 | Tillage | Minimum Till | Cover Crop | None |
| Practice ID | 2 | Practice Name | Normal Year- DCD Cons Till | General Practice | Controlled Drainage, Conservation Tillage | | | Area Type | T |
| Category | Management | Study Focus | Controlled Drainage | Practice Overview | NM-CCN-CT-CO-ED | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Silt Loam- Commerce | | | | | | | | |
| Fertilizer | Liquid nitrogen fertilizer was injected below the soil surface adjacent to the crop row at a rate of 224 kg N/ha-yr, based on soil analysis and fertilizer recommendations. Fertilizer N was applied (three-way split) before June 10 of each year: 25% at planting, 50% at 30 d after emergence, and the remaining 25% in early June. | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. Minimal tillage. | | | | | | | | |

**Crop** 2 Corn Yield 5.7 Mg/ha

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300700403** | **Study Area** | **Drought Year- SUR** | Area (ha) | 0.21 | Tillage | Minimum Till | Cover Crop | None |
| Practice ID | 3 | Practice Name | Drought Year- SUR Cons Till | General Practice | Controlled Drainage, Conservation Tillage | | | Area Type | T |
| Category | Management | Study Focus | Controlled Drainage | Practice Overview | NM-CCN-CT-CO-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Silt Loam- Commerce | | | | | | | | |
| Fertilizer | Liquid nitrogen fertilizer was injected below the soil surface adjacent to the crop row at a rate of 224 kg N/ha-yr, based on soil analysis and fertilizer recommendations. Fertilizer N was applied (three-way split) before June 10 of each year: 25% at planting, 50% at 30 d after emergence, and the remaining 25% in early June. | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. Minimal tillage. | | | | | | | | |

**Crop** 3 Corn Yield 2.4 Mg/ha

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300700404** | **Study Area** | **Drought Year- DCD (Deep Co** | Area (ha) | 0.21 | Tillage | Minimum Till | Cover Crop | None |
| Practice ID | 4 | Practice Name | Drought Year- DCD Cons Till | General Practice | Controlled Drainage, Conservation Tillage | | | Area Type | T |
| Category | Management | Study Focus | Controlled Drainage | Practice Overview | NM-CCN-CT-CO-ED | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Silt Loam- Commerce | | | | | | | | |
| Fertilizer | Liquid nitrogen fertilizer was injected below the soil surface adjacent to the crop row at a rate of 224 kg N/ha-yr, based on soil analysis and fertilizer recommendations. Fertilizer N was applied (three-way split) before June 10 of each year: 25% at planting, 50% at 30 d after emergence, and the remaining 25% in early June. | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. Minimal tillage. | | | | | | | | |

| | | | | |
|---|---|---|---|---|
| **Crop** | 4 | Corn | Yield | 3.1 Mg/ha |


Acknowledgement: Study summaries may be directly quoted from original author's abstract.

| Test Site ID | Test Site Name |
|---|---|
| **2013005159** | **Guilliard, Karl, 1999** |

| | | | | |
|---|---|---|---|---|
| Location | Storrs | Tolland | CT | US |
| Study Citation | 1999 | | | |
| | Guilliard, K., T. F. Morris, and K. L. Kopp | | | |
| | The Pre-Sidedress Soil Nitrate Test and Nitrate Leaching from Corn | | | |
| | J. Environ. Qual. 28(6):1845-1852. | | | |
| NRCS LRR | Northeastern Forage and Forest Region | | | |
| NRCS MLRA | Connecticut Valley | | | |
| HUC_10 | 0110000202 | Test Site Scale | Plot | |
| Experimental Design Type/ Description | Multiple Treatments w/ Control and Replication | | | |
| | plot study: complete randomized block | | | |
| Crops | Corn | | | |
| Study Duration | 2 years | | | |


Summary

The pre-sidedress soil nitrate test (PSNT) is recommended in many states as a best management practice (BMP) for corn (Zea mays L.). A 2-yr study was conducted in Connecticut on a Woodbridge fine sandy loam soil (coarse loamy, mixed mesic Aquic Dystrochrept) to determine NO3-N concentrations and losses in soil water from corn managed with three different N fertilization regimes: (i) PRE, 196 kg N/ha applied preplant; (ii) PSNT-1, 90 kg N/ha applied at preplant and any remaining N needs estimated by the PSNT (0 kg/ha in 1995 and 45 kg/ha in 1996); and (iii) PSNT-2, no preplant N and all N needs estimated by the PSNT (34 kg/ha in 1995 and 123 kg/ha in 1996). Percolate was collected with zero-tension pan lysimeters. Flow-weighted NO3-N concentrations from the PRE treatment were 22.3 mg/L in 1995 and 17.4 mg/L in 1996; the PSNT treatments were <8.0 mg/L. Losses of NO3-N as a percent of N applied in 1995 were 20%, 10%, and 12% for PRE, PSNT-1, and PSNT-2 respectively, and 31%, 21%, and 21% , respectively, in 1996. Greatest leaching losses occurred after corn harvest. Corn yields were not significantly (P>0.05) different among N treatments. These findings suggest that a well calibrated soil N test can reduce excess fertilization and the potential for NO3 contamination of groundwater.


| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300515901** | **Study Area** | **PRE** | Area (ha) | 0.01 | Tillage | Conventional | Cover Crop | Winter rye |
| Practice ID | 238 | Practice Name | PRE | General Practice | | Control | | Area Type | C |
| Category | Management | Study Focus | Fertilizer | Practice Overview | | NC-CCY-CN-CO-EN | | | |
| Irrigation | NR | Irrig. Descrip. | N/A (rainfall) | | | | | | |

| | |
|---|---|
| Soils | Woodbridge fine sandy loam (Aquic Dystrochrept) |
| Fertilizer | Preplant N fertilization at a rate of 196 kg N/ha, which was calculated using a yield goal of 16.8 mg dry matter/ha with a previous cropping history of corn grown for silage |
| Comments | This study used a randomized complete block design with its plot study using 3 treatments, 3 replicates each. Lysimeters were used to measure leachate. The control (PrePlant) applied recommended nitrogen fertilizer (196kg N/ha) before planting. The second treatment had 90 kg N/ha applied pre-plant, and additional N applied pre-sidedress (PSNT1) as recommended by a soil nitrate test. The third treatment had no pre-plant N applied, and only applied the amount indicated by the soil nitrate test (PSNT2). Corn was grown on all three plots. |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Corn | Yield | 18.3 | Mg/ha |
| **Crop** | 2 | Corn | Yield | 16.1 | Mg/ha |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300515902** | **Study Area** | **PSNT-1** | Area (ha) | 0.01 | Tillage | Conventional | Cover Crop | Winter rye |
| Practice ID | 239 | Practice Name | PSNT-1 | General Practice | Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Fertilizer | Practice Overview | NM-CCY-CN-CO-EN | | | | |
| Irrigation | NR | Irrig. Descrip. | natural rainfall | | | | | | |
| Soils | Woodbridge fine sandy loam (Aquic Dystrochrept) | | | | | | | | |
| Fertilizer | 90 kg N/ha preplant with any additional N needs estimated by the PSNT and applied as a side-dress. This is the current recommendation procedure for use of the PSNT in Connecticut for nonmanured soils. | | | | | | | | |
| Comments | This study used a randomized complete block design with its plot study using 3 treatments, 3 replicates each. Lysimeters were used to measure leachate. The control (PrePlant) applied recommended nitrogen fertilizer (196kg N/ha) before planting. The second treatment had 90 kg N/ha applied pre-plant, and additional N applied pre-sidedress (PSNT1) as recommended by a soil nitrate test. The third treatment had no pre-plant N applied, and only applied the amount indicated by the soil nitrate test (PSNT2). Corn was grown on all three plots. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Corn | Yield | 18.1 | Mg/ha |
| **Crop** | 2 | Corn | Yield | 15.7 | Mg/ha |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300515903** | **Study Area** | **PSNT-2** | Area (ha) | 0.01 | Tillage | Conventional | Cover Crop | Winter rye |
| Practice ID | 240 | Practice Name | PSNT-2 | General Practice | Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Fertilizer | Practice Overview | NM-CCY-CN-CO-EN | | | | |
| Irrigation | NR | Irrig. Descrip. | | | | | | | |
| Soils | Woodbridge fine sandy loam (Aquic Dystrochrept) | | | | | | | | |
| Fertilizer | No preplant N and N needs estimated by the PSNT and applied as a side-dress, the current recommendation procedure for used of the PSNT in Connecticut for manured soils. | | | | | | | | |
| Comments | This study used a randomized complete block design with its plot study using 3 treatments, 3 replicates each. Lysimeters were used to measure leachate. The control (PrePlant) applied recommended nitrogen fertilizer (196kg N/ha) before planting. The second treatment had 90 kg N/ha applied pre-plant, and additional N applied pre-sidedress (PSNT1) as recommended by a soil nitrate test. The third treatment had no pre-plant N applied, and only applied the amount indicated by the soil nitrate test (PSNT2). Corn was grown on all three plots. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Corn | Yield | 15.4 | Mg/ha |
| **Crop** | 2 | Corn | Yield | 15.3 | Mg/ha |

| Test Site ID | Test Site Name |
|---|---|
| **2013005161** | **Hall, D. W., 1993** |

| | | | | |
|---|---|---|---|---|
| Location | Ephrata | Lancaster | PA | US |
| Study Citation | 1993 | | | |
| | Hall, D. W. and D. W. Risser. | | | |
| | Effects of Agricultural Nutrient Management on Nitrogen Fate and Transport in Lancaster County, Pennsylvania. | | | |
| | Water Resour. Bull. 29(1):55-76. | | | |
| NRCS LRR | Northern Atlantic Slope Diversified Farming Region | | | |
| NRCS MLRA | Conestoga Headwaters RCWP 148 | | | |
| HUC_10 | 0205030609 | Test Site Scale | Field | |
| Experimental Design Type/ Description | Before-After | | | |
| | pre- and post-BMP | | | |
| Crops | Corn, tobacco, rye, grass, fruits, vegetables | | | |
| Study Duration | 6 years | | | |

Summary

Nitrogen inputs to, and outputs from, a 55-acre site in Lancaster County, Pennsylvania, were estimated to determine the pathways and relative magnitude of loads of nitrogen entering and leaving the site, and to compare the loads of nitrogen before and after the implementation of nutrient management. Inputs of nitrogen to the site were manure fertilizer, commercial fertilizer, nitrogen in precipitation, and nitrogen in groundwater inflow; and these sources averaged 93, 4, 2, and 1 percent of average annual nitrogen additions, respectively. Outputs of nitrogen from the site were nitrogen in harvested crops, loads of nitrogen in surface runoff, volatilization of nitrogen, and loads of nitrogen in ground-water discharge, which averaged 37, less than 1, 25, and 38 percent of average annual nitrogen removals from the site, respectively. Virtually all of the nitrogen leaving the site that was not removed in harvested crops or by volatilization was discharged in the groundwater. Applications of manure and fertilizer nitrogen to 47.5 acres of cropped fields decreased about 33 percent, from an average of 22,700 pounds per year (480 pounds per acre per year) before nutrient management to 15,175 pounds of nitrogen per year (320 pounds per acre per year) after the implementation of nutrient management practices. Nitrogen loads in ground-water discharged from the site decreased about 30 percent, from an average of 292 pounds of nitrogen per million gallons of ground water before nutrient management to an average of 203 pounds of nitrogen per million gallons as a result of the decreased manure and commercial fertilizer applications. Reductions in manure and commercial fertilizer applications caused a reduction of approximately 11,000 pounds (3,760 pounds per year; 70 pounds per acre per year) in the load of nitrogen discharged in ground water from the 55-acre site during the three-year period 1987-1990.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300516101** | **Study Area** | **Lancaster County** | Area (ha) | 22.25 | Tillage | Not Specified | Cover Crop | None |
| Practice ID | 241 | Practice Name | PreBMP | General Practice | | Control | | Area Type | C |
| Category | Management | Study Focus | Fertilizer | Practice Overview | | NC-CCN-CN-CEX-EN | | | |
| Irrigation | Yes | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Hagerstown and Duffield series silt loams and silt-clay loams | | | | | | | | |
| Fertilizer | Inputs of nitrogen to the site were manure fertilizer from cattle, swine, and poultry and commercial fertilizer | | | | | | | | |
| Comments | The crops grown in this watershed included corn, tobacco, rye, sudangrass, fruits and vegetables. The median slope was 5%. The pre-BMP period was 1985-86; post-BMP was 1988-90. Nutrient management was the BMP. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Corn | Yield | -999999 | NA |
| **Crop** | 2 | Tobacco | Yield | -999999 | NA |
| **Crop** | 3 | Rye | Yield | -999999 | NA |
| **Crop** | 4 | Corn | Yield | -999999 | NA |
| **Crop** | 5 | Tobacco | Yield | -999999 | NA |
| **Crop** | 6 | Rye | Yield | -999999 | NA |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300516102** | **Study Area** | **Lancaster County** | Area (ha) | 22.25 | Tillage | Not Specified | Cover Crop | None |
| Practice ID | 242 | Practice Name | PostBMP | General Practice | | Nutrient Management | | Area Type | T |
| Category | Management | Study Focus | Fertilizer | Practice Overview | | NM-CCN-CN-CEX-EN | | | |
| Irrigation | Yes | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Hagerstown and Duffield series silt loams and silt-clay loams | | | | | | | | |
| Fertilizer | | | | | | | | | |
| Comments | The crops grown in this watershed included corn, tobacco, rye, sudangrass, fruits and vegetables. The median slope was 5%. The pre-BMP period was 1985-86; post-BMP was 1988-90. Nutrient management was the BMP. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 7 | Corn | Yield | -999999 | NA |
| **Crop** | 8 | Tobacco | Yield | -999999 | NA |
| **Crop** | 9 | Sudan Grass | Yield | -999999 | NA |
| **Crop** | 10 | Corn | Yield | -999999 | NA |
| **Crop** | 11 | Tobacco | Yield | -999999 | NA |
| **Crop** | 12 | Fruit and Vegetables | Yield | -999999 | NA |
| **Crop** | 13 | Corn | Yield | -999999 | NA |
| **Crop** | 14 | Tobacco | Yield | -999999 | NA |
| **Crop** | 15 | Fruit and Vegetables | Yield | -999999 | NA |
| **Crop** | 16 | Corn | Yield | -999999 | NA |
| **Crop** | 17 | Tobacco | Yield | -999999 | NA |
| **Crop** | 18 | Fruit and Vegetables | Yield | -999999 | NA |

| Test Site ID | Test Site Name |
|---|---|
| **2013007055** | **Harmel et al. 2004a** |

| | | | | |
|---|---|---|---|---|
| Location | Riesel | McLennan | TX | US |
| Study Citation | 2004 | | | |
| | Harmel, R.D., H.A. Torbert, B.E. Haggard, R. Haney, and M. Dozier. | | | |
| | Water Quality Impacts of Converting to a Poultry Litter Fertilization Strategy | | | |
| | J. Environ. Qual. 33:2229-2242 | | | |
| NRCS LRR | Southwestern Prairies Cotton and Forage Region | | | |
| NRCS MLRA | Texas Blackland Prairie, Southern Part | | | |
| HUC_10 | 1207010101 | Test Site Scale | Field | |
| Experimental Design Type/ Description | Multiple Treatments w/ Controls, No Replication | | | |
| Crops | Corn, Grass, Grazing | | | |
| Study Duration | 3 years | | | |

Summary

Because of precision application technology, variable rate fertilizer application based on within-field heterogeneity has the potential to decrease negative water quality impacts. Therefore, the objective of this paired watershed study was to evaluate the impact of variable rate nitrogen (N) fertilizer application on surface water quality. The variable rate (VR) field was divided into management units designated as poor, moderate, and high based on measured yield potential and received 100–160 kg/ha of N fertilizer. A portion of the N application was uniformly applied pre-plant or at planting, and rest was sidedressed at variable rates. The uniform rate (UR) field received uniform N application at 135 kg/ha. Surface water runoff and water quality were monitored for each field, and collected samples were analyzed for N and phosphorus (P) constituents. During the 2-year monitoring period with 22 storm sampling events, variable rate N application resulted in few water quality differences compared to uniform rate application, but overall median NO3 + NO2–N concentrations were significantly lower for the variable rate field in the second year of variable rate N application. Overall and event mean NO3 + NO2–N concentrations from the variable rate field tended to be higher, but median concentrations from the uniform rate field tended to be higher.

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300705501** | **Study Area** | **W12** | Area (ha) | 4.00 | Tillage | Conventional | Cover Crop | |
| Practice ID | 1 | Practice Name | W12 | General Practice | | Fertilizer | | Area Type | T |
| Category | Management | Study Focus | Fertilizer | Practice Overview | | NC-CCN-CN-CO-EN | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Clay- Houston Black | | | | | | | | |
| Fertilizer | 9 Mg/ha poultry litter | | | | | | | | |
| Comments | Imported from MANAGE 2013; practices include: Conservation, Waterway, Terrace, Contour Farming. | | | | | | | | |

| Crop | Yield |
|---|---|

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300705502** | **Study Area** | **W13** | Area (ha) | 4.60 | Tillage | Conventional | Cover Crop | None |
| Practice ID | 2 | Practice Name | W13 | General Practice | Fertilizer | | | Area Type | T |
| Category | Management | Study Focus | Fertilizer | Practice Overview | NM-CCN-CN-CO-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Clay- Houston Black | | | | | | | | |
| Fertilizer | 4.5 Mg/ha Poultry litter. In 2001-02, a 3-year crop rotation (corn-corn-wheat) was initiated with each field receiving a constant annual litter application rate. In the corn years, target available N rates were set at approximately 170 kg/ha based on production recommendations by Gass. It was assumed that the litter N available in the first year following application increased from 40% initially to 50% in 2004-2008 as soil microbial communities were enhanced. It was also assumed that 5-10% of littler N was available in the second year following application. Supplemental N was applied prior to planting if needed to reach the 170 kg/ha N target. In the wheat years, no supplemental N was added because litter supplied adequate N for what production (>67 kg available N/ha). | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. MANAGE identified practices include: Conservation, Waterway, Terrace, Contour Farming. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Corn | Yield | -999999 | NA |
| **Crop** | 2 | Corn | Yield | -999999 | NA |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300705503** | **Study Area** | **Y6** | Area (ha) | 6.60 | Tillage | Conventional | Cover Crop | None |
| Practice ID | 3 | Practice Name | Y6 | General Practice | Control-Crop | | | Area Type | C |
| Category | Management | Study Focus | Fertilizer | Practice Overview | NM-CCN-CN-CO-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Clay- Houston Black | | | | | | | | |
| Fertilizer | Inorganic P, no poultry litter. The cropland control field received only inorganic N and P at rates of 170 kg N/ha and 14 kg P/ha in corn years and at 80 kg N/ha and 17 kg P/ha in wheat years. | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. MANAGE identified practices include: Conservation, Waterway, Terrace, Contour Farming. | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 3 | Corn | Yield | -999999 | NA |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300705504** | **Study Area** | **Y10** | Area (ha) | 7.50 | Tillage | Conventional | Cover Crop | None |
| Practice ID | 4 | Practice Name | Y10 | General Practice | Fertilizer | | | Area Type | T |
| Category | Management | Study Focus | Fertilizer | Practice Overview | NC-CCN-CN-CO-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |

Soils: Clay- Houston Black

Fertilizer: 6.7 Mg/ha poultry litter. In 2001-02, a 3-year crop rotation (corn-corn-wheat) was initiated with each field receiving a constant annual litter application rate. In the corn years, target available N rates were set at approximately 170 kg/ha based on production recommendations by Gass. It was assumed that the litter N available in the first year following application increased from 40% initially to 50% in 2004-2008 as soil microbial communities were enhanced. It was also assumed that 5-10% of littler N was available in the second year following application. Supplemental N was applied prior to planting if needed to reach the 170 kg/ha N target. In the wheat years, no supplemental N was added because litter supplied adequate N for what production (>67 kg available N/ha).

Comments: Imported from MANAGE 2013; additional meta data added in 2015. MANAGE identified practices include: Conservation, Waterway, Terrace, Contour Farming.

**Crop** 4 Corn Yield -999999 NA

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300705505** | **Study Area** | **Y8** | Area (ha) | 8.40 | Tillage | Conventional | Cover Crop | None |
| Practice ID | 5 | Practice Name | Y8 | General Practice | Fertilizer | | | Area Type | T |
| Category | Management | Study Focus | Fertilizer | Practice Overview | NC-CCN-CN-CO-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |

Soils: Clay- Houston Black

Fertilizer: 13.4 Mg/ha poultry litter. In 2001-02, a 3-year crop rotation (corn-corn-wheat) was initiated with each field receiving a constant annual litter application rate. In the corn years, target available N rates were set at approximately 170 kg/ha based on production recommendations by Gass. It was assumed that the litter N available in the first year following application increased from 40% initially to 50% in 2004-2008 as soil microbial communities were enhanced. It was also assumed that 5-10% of littler N was available in the second year following application. Supplemental N was applied prior to planting if needed to reach the 170 kg/ha N target. In the wheat years, no supplemental N was added because litter supplied adequate N for what production (>67 kg available N/ha).

Comments: Imported from MANAGE 2013; practices include: Conservation, Waterway, Terrace, Contour Farming.

**Crop** 5 Corn Yield -999999 NA

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300705506** | **Study Area** | **Y13** | Area (ha) | 4.60 | Tillage | Conventional | Cover Crop | None |
| Practice ID | 6 | Practice Name | Y13 | General Practice | | Fertilizer | | Area Type | T |
| Category | Management | Study Focus | Fertilizer | Practice Overview | | NM-CCN-CN-CO-EN | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Clay- Houston Black | | | | | | | | |
| Fertilizer | 4.6 Mg/ha poutry litter. In 2001-02, a 3-year crop rotation (corn-corn-wheat) was initiated with each field receiving a constant annual litter application rate. In the corn years, target available N rates were set at approximately 170 kg/ha based on production recommendations by Gass. It was assumed that the litter N available in the first year following application increased from 40% initially to 50% in 2004-2008 as soil microbial communities were enhanced. It was also assumed that 5-10% of littler N was available in the second year following application. Supplemental N was applied prior to planting if needed to reach the 170 kg/ha N target. In the wheat years, no supplemental N was added because litter supplied adequate N for what production (>67 kg available N/ha). | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. MANAGE identified practices include: Conservation, Waterway, Terrace, Contour Farming. | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 6 | Corn | Yield | -999999 | NA |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300705507** | **Study Area** | **SW12** | Area (ha) | 1.20 | Tillage | None | Cover Crop | None |
| Practice ID | 7 | Practice Name | SW12 Pasture | General Practice | | Control-Pasture | | Area Type | C |
| Category | Management | Study Focus | Fertilizer | Practice Overview | | NM-CCN-NT-GHP-EN | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Clay- Houston Black | | | | | | | | |
| Fertilizer | 0 Mg/ha poultry litter. Received no litter since acted as control | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 7 | Native Prairie | Yield | -999999 | NA |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300705508** | **Study Area** | **SW17** | Area (ha) | 1.20 | Tillage | None | Cover Crop | None |
| Practice ID | 8 | Practice Name | SW17 Pasture | General Practice | | Control-Pasture | | Area Type | C |
| Category | Management | Study Focus | Fertilizer | Practice Overview | | NM-CCN-NT-GHP-EN | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Clay- Houston Black | | | | | | | | |
| Fertilizer | 0 Mg/ha poutry litter. Received no litter since acted as control. The grazed pasture watershed (SW17) was opened for selective grazing at rates from 0.4-0.8 ha/cow for about eight months per year. | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 8 | Coastal Bermudagrass (Grazing) | Yield | -999999 | NA |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300705509** | **Study Area** | **Y14** | Area (ha) | 2.30 | Tillage | None | Cover Crop | None |
| Practice ID | 9 | Practice Name | Y14 Pasture | General Practice | Fertilizer | | | Area Type | T |
| Category | Management | Study Focus | Fertilizer | Practice Overview | NC-CCN-NT-GHP-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Clay- Houston Black | | | | | | | | |
| Fertilizer | 13.4. Mg/ha poultry litter. No fertilizer was applied to any of the pasture fields in 2000-01, but a consistent litter application rate was applied to Y14 and W10 in the late summer each year from 2001-08. For the pasture watersheds, no supplemental inorganic N or P was applied. | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. | | | | | | | | |

**Crop** 9 Kleingrass Yield -999999 NA

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300705510** | **Study Area** | **W10** | Area (ha) | 8.00 | Tillage | None | Cover Crop | None |
| Practice ID | 10 | Practice Name | W10 Pasture | General Practice | Fertilizer | | | Area Type | T |
| Category | Management | Study Focus | Fertilizer | Practice Overview | NM-CCN-NT-GHP-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Clay- Houston Black | | | | | | | | |
| Fertilizer | 6.7 Mg/ha poutry litter. No fertilizer was applied to any of the pasture fields in 2000-01, but a consistent litter application rate was applied to Y14 and W10 in the late summer each year from 2001-08. For the pasture watersheds, no supplemental inorganic N or P was applied. | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. | | | | | | | | |

**Crop** 10 Coastal Bermudagrass Yield -999999 NA

| Test Site ID | Test Site Name |
|---|---|
| **2013007062** | **Harmel et al. 2004b** |

| | | | | |
|---|---|---|---|---|
| Location | Temple | Bell | TX | US |
| Study Citation | 2004 | | | |
| | Harmel, R.D., H.A. Torbert, A.L. Kenimer, and S.W. Searcy. | | | |
| | Runoff Water Quality Impact of Variable Rate Sidedress Nitrogen Application | | | |
| | Precision Agric. 5: 247-261. | | | |
| NRCS LRR | Southwestern Prairies Cotton and Forage Region | | | |
| NRCS MLRA | Texas Blackland Prairie, Southern Part | | | |
| HUC_10 | 1207020401 | Test Site Scale | Field | |
| Experimental Design Type/ Description | Multiple Treatments, No Control, No Replication | | | |
| Crops | Corn | | | |
| Study Duration | 2 years | | | |

Summary

Because of precision application technology, variable rate fertilizer application based on within-field heterogeneity has the potential to decrease negative water quality impacts. Therefore, the objective of this paired watershed study was to evaluate the impact of variable rate nitrogen (N) fertilizer application on surface water quality. The variable rate (VR) field was divided into management units designated as poor, moderate, and high based on measured yield potential and received 100–160 kg/ha of N fertilizer. A portion of the N application was uniformly applied pre-plant or at planting, and rest was sidedressed at variable rates. The uniform rate (UR) field received uniform N application at 135 kg/ha. Surface water runoff and water quality were monitored for each field, and collected samples were analyzed for N and phosphorus (P) constituents. During the 2-year monitoring period with 22 storm sampling events, variable rate N application resulted in few water quality differences compared to uniform rate application, but overall median NO3 + NO2–N concentrations were significantly lower for the variable rate field in the second year of variable rate N application. Overall and event mean NO3 + NO2–N concentrations from the variable rate field tended to be higher, but median concentrations from the uniform rate field tended to be higher.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300706201** | **Study Area** | **Uniform Rate Field** | Area (ha) | 5.70 | Tillage | Not specified | Cover Crop | None |
| Practice ID | 1 | Practice Name | Uniform Rate Field Cons Till | General Practice | Fertilizer | | | Area Type | T |
| Category | Management | Study Focus | Fertilizer | Practice Overview | NC-CCN-CN-CO-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Clay- Houston Black, Ferris, Heiden | | | | | | | | |
| Fertilizer | 2/9/00 - Surface applied 64 kg/ha N and 39 kg/ha P as mixture of liquid 32-0-0 and 11-37-004/26/00 - Knifed in 71 kg/ha N as liquid 32-0-0 | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. MANAGE identified practices include: Conservation, Terrace, Waterway. | | | | | | | | |

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|---|---|---|---|---|
| **Crop** | 1 | Corn (No Winter Cover Crop) | Yield | 7.9 Mg/ha |
| **Crop** | 2 | Corn (No Winter Cover Crop) | Yield | 5.4 Mg/ha |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300706202** | **Study Area** | **Variable Rate Field** | Area (ha) | 9.10 | Tillage | Not specified | Cover Crop | None |
| Practice ID | 2 | Practice Name | Variable Rate Field Cons Till | General Practice | Fertilizer | | | Area Type | T |
| Category | Management | Study Focus | Fertilizer | Practice Overview | NM-CCN-CN-CO-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Clay- Houston Black, Ferris, Heiden | | | | | | | | |
| Fertilizer | 2/26/99 - surface applied 83 kg/ha N as liquid 32-0-03/2/99 - Knifed in 12 kg/ha N and 39 kg/ha P as mixture of liquid 32-0-0 and 11-37-0 at planting4/17/99 - knifed in variable rate N (13, 37, 60 kg/ha) as liquid 32-0-0 | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. MANAGE identified practices include: Conservation, Terrace, Waterway. | | | | | | | | |

| | | | | |
|---|---|---|---|---|
| **Crop** | 1 | Corn (No Winter Cover Crop) | Yield | 7.7 Mg/ha |
| **Crop** | 2 | Corn (No Winter Cover Crop) | Yield | 5.5 Mg/ha |

| Test Site ID | Test Site Name |
|---|---|
| **2013001004** | **IDRA Farm** |

| | | | | |
|---|---|---|---|---|
| Location | | Quebec | XX | CA |

| | |
|---|---|
| Study Citation | 2010 |
| | Caron, E., P. Lafrance, J. Auclair, and M. Duchemin |
| | Impact of Grass and Grass with Poplar Buffer Strips on Atrazine and Metolachlor Losses in Surface Runoff and Subsurface Infiltration from Agricultural Plots |
| | |
| NRCS LRR | Canada |
| NRCS MLRA | Canada |
| HUC_10 | -999999 Test Site Scale Plot |
| Experimental Design Type/ Description | Multiple Treatments w/ Control and Replication |
| | plot study: complete randomized block Study objective: to compare the impact of grass and grass+tree buffer strips on the exported masses of dissolved atrazine, metolachlor, and desethylatrazine (DEA) in runoff and subsurface infiltration water (infiltration water under the buffer zones). Monitoring of herbicide losses by infiltration just below the buffer zones, along with runoff, allows for an estimate of their respective contributions. The unique experimental design allows for the specific study under natural rainfall of the distribution (runoff versus subsurface infiltration) of exported masses of dissolved herbicides under those buffers zones. A second objective of this 2-yr study was to account for the possible variability of meteorological conditions that determine the flow distribution in the field. The distribution between surface runoff and subsurface infiltration under those two kinds of buffer strips is expected to have an impact on herbicide attenuation and on total herbicide losses toward surface water. |
| Crops | Corn |
| Study Duration | 2 years |

Summary

In many areas of intensive corn production, atrazine and metolachlor are among the most commonly found herbicides in surface and groundwater. This 2-yr study compared the impact of grass and grass+tree buffer strips on the exported masses of atrazine, metolachlor, and a degradation product of atrazine, desethylatrazine (DEA). The experimental system consisted of four replicate plots in a three-way completely randomized design (no buffer zone, grass buffer zone, and grass+tree buffer strips). The field plots were 5 m wide and 30 m long and grown in corn. The grass and grass+tree buffer strips were 5 m and had the same grass vegetation except for eight young hybrid poplars. Over the 2-yr study, surface runoff and subsurface infiltration water (under the buffer strip) were collected after the initial three rainfall events after herbicide application. Dissolved atrazine, metolachlor, and DEA were analyzed by gas chromatography/mass spectrometry. The presence of buffer strips decreased the exported masses of atrazine and metolachlor in surface runoff . A three-way ANOVA with treatment (type of buffer strip), water (surface runoff or subsurface infiltration), and time between herbicide application and rainfall event as factors showed a significant reduction (40–60% in 2004 and 75–95% in 2005) in the total (surface runoff +infiltrated water) exported masses of atrazine and metolachlor in the presence of buffer strips. Rainfall events after herbicide application were different between the 2 yr and greatly affected the flow distribution (e.g., subsurface infiltration) and the leached herbicide concentrations. No significant difference in the capacity to reduce herbicide exports was observed between grass and grass+tree buffer strip treatments; the poorly developed young poplar biomass at the time of the study may partly explain this observation.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300100401** | **Study Area** | **Field Plot - Control** | Area (ha) | 0.02 | Tillage | Not specified | Cover Crop | None |
| Practice ID | 1 | Practice Name | Control | General Practice | | Control | | Area Type | C |
| Category | Structural | Study Focus | Buffer | Practice Overview | | NC-CCN-CN-CO-EN | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | The surface horizon (Ap, 0–15 cm) is a silty-clay loam with an organic matter content of 3.4%. The A horizon is 29 cm deep, the B horizon is 30 to 68 cm deep, and the C horizon is 69 to 115 cm deep. The bulk density of the horizons varies from 1.25 for th | | | | | | | | |
| Fertilizer | The experimental plots were fertilized with liquid swine manure using the typical application rate of 40 t/ha recommended for the Chaudière-Appalaches region on 31 May 2004 and on 25 May 2005, when the corn reached the three- or four leaf stage. | | | | | | | | |
| Comments | The grass composition of the buffer zones was 45% red fescue, 45% white redtop, and 10% ryegrass. The grass + tree buffer zone had eight hybrid poplars in addition to the grass species. area ratio source/strip was 6.0 | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | corn (Zea mays L.) | Yield | -999999 | NA |
| **Crop** | 4 | corn (Zea mays L.) | Yield | -999999 | NA |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300100402** | **Study Area** | **Field Plot - Grass** | Area (ha) | 0.02 | Tillage | Not specified | Cover Crop | None |
| Practice ID | 2 | Practice Name | Grass | General Practice | | Filter Strip | | Area Type | T |
| Category | Structural | Study Focus | Buffer | Practice Overview | | NC-CCN-CN-CO-EB | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | The surface horizon (Ap, 0–15 cm) is a silty-clay loam with an organic matter content of 3.4%. The A horizon is 29 cm deep, the B horizon is 30 to 68 cm deep, and the C horizon is 69 to 115 cm deep. The bulk density of the horizons varies from 1.25 for th | | | | | | | | |
| Fertilizer | The experimental plots were fertilized with liquid swine manure using the typical application rate of 40 t/ha recommended for the Chaudière-Appalaches region on 31 May 2004 and on 25 May 2005, when the corn reached the three- or four leaf stage. | | | | | | | | |
| Comments | The grass composition of the buffer zones was 45% red fescue, 45% white redtop, and 10% ryegrass. The grass + tree buffer zone had eight hybrid poplars in addition to the grass species. area ratio source/strip was 6.0 | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 2 | corn (Zea mays L.) | Yield | -999999 | NA |
| **Crop** | 5 | corn (Zea mays L.) | Yield | -999999 | NA |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300100403** | **Study Area** | **Field Plot - Grass+Tree** | Area (ha) | 0.02 | Tillage | Not specified | Cover Crop | None |
| Practice ID | 3 | Practice Name | Grass+Tree | General Practice | Filter Strip | | | Area Type | T |
| Category | Structural | Study Focus | Buffer | Practice Overview | NC-CCN-CN-CO-EB | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |

| | |
|---|---|
| Soils | The surface horizon (Ap, 0–15 cm) is a silty-clay loam with an organic matter content of 3.4%. The A horizon is 29 cm deep, the B horizon is 30 to 68 cm deep, and the C horizon is 69 to 115 cm deep. The bulk density of the horizons varies from 1.25 for th |
| Fertilizer | The e experimental plots were fertilized with liquid swine manure using the typical application rate of 40 t/ha recommended for the Chaudière-Appalaches region on 31 May 2004 and on 25 May 2005, when the corn reached the three- or four leaf stage. |
| Comments | The grass composition of the buffer zones was 45% red fescue, 45% white redtop, and 10% ryegrass. The grass + tree buffer zone had eight hybrid poplars in addition to the grass species. area ratio source/strip was 6.0 |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 3 | corn (Zea mays L.) | Yield | -999999 | NA |
| **Crop** | 6 | corn (Zea mays L.) | Yield | -999999 | NA |


Acknowledgement: Study summaries may be directly quoted from original author's abstract.

| Test Site ID | Test Site Name |
|---|---|
| **2013005202** | **Jordan, T. E., 1993** |
| Location | Centreville, Queen Anne's, MD, US |
| Study Citation | 1993<br>Jordan, T. E., D. L. Correll and D. E. Weller.<br>Nutrient interception by a riparian forest receiving inputs from adjacent cropland.<br>J. Environ. Qual. 22:467-473. |
| NRCS LRR | Atlantic and Gulf Coast Lowland Forest and Crop Region |
| NRCS MLRA | Atlantic Coast Flatwoods |
| HUC_10 | 0206000204 Test Site Scale Field |
| Experimental Design Type/ Description | Inflow-Outflow<br>To investigate the ability of riparian forest to intercept nutrients leaving adjacent cropland, examined changes in the chemistry of groundwater flowing from a corn field through a riparian forest. |
| Crops | Corn |
| Study Duration | 1 year |

Summary

To investigate the ability of riparian forest to intercept nutrients leaving adjacent cropland, the authors examined changes in the chemistry of groundwater flowing from a corn (Zea mays L.) field through a riparian forest. This study provided a comparison to previous studies of a different forest. The authors sampled groundwater from a transect of wells, and used a Br- tracer to confirm that groundwater moved laterally along the transect through the forest. As groundwater flowed through the forest, NO3- concentrations decreased from about 8 mg/L at the edge of the corn field to <0.4 mg/L halfway through the forest. Dissolved organic N and NH4+ increased by less than 0.1 mg/L, and dissolved organic C did not change with distance. Sulfate remained constant with distance until midway through the forest, where it began to increase. Chloride concentration rose until midway through the forest, then fell, Values of pH increased from under 5 at the edge of the corn field to over 7 at the stream bank, perhaps as a result of the NO3- consumption. Most of the change in NO3- occurred abruptly at the edge of a floodplain within the forest. There the water table was closest to the surface and soil Eh below the water table was less than -90 mV. Such strongly reducing conditions may have promoted denitrification in the floodplain. In contrast, soil Eh on the adjacent hill slope was above 500 mV, to high to support denitrification. There were only slight seasonal changes in groundwater chemistry. The authors also studied the net annual accretion of sediment in the riparian forest by measuring changes in the elevation of the soil surface. There was little or no accretion in the forest, but along a path of overland storm flow there was net erosion. Thus, nutrient retention by this forest, in contrast with the previously studied forest, was entirely a below ground process. Functional differences within sections of this forest and among different riparian forests suggest a need for research on the factors that control nutrient retention.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300520201** | **Study Area** | **Centerville** | Area (ha) | -99.00 | Tillage | No Till | Cover Crop | None |
| Practice ID | 248 | Practice Name | Buffer | General Practice | Riparian Buffer | | | Area Type | T |
| Category | Structural | Study Focus | Buffer | Practice Overview | NC-CCN-NT-CO-EB | | | | |
| Irrigation | No | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Pensauken sediments, feldspathic sand, gravelly at the bottom just above the clayey sediments of the Chesapeake Group | | | | | | | | |
| Fertilizer | -999999 | | | | | | | | |
| Comments | This study estimated that riparian forest buffers remove approx. 60 kg NO3N/ha-yr from groundwater. The area above the buffer was in a no-till corn/soybean rotation. The buffer was 60 meters wide. | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 1 | corn | Yield | -999999 | NA |

| Test Site ID | Test Site Name |
|---|---|
| 2013005545 | Kaluli, J. W., 1999 |

| | | | | |
|---|---|---|---|---|
| Location | | Quebec (Soulanges) | XX | CA |
| Study Citation | 1999 | | | |
| | Kaluli, J. W., C. A. Madramootoo, X. Zhou, A. F. MacKenzie and D. L. Smith. | | | |
| | Subirrigation systems to minimize nitrate leaching. | | | |
| | J. Irrig. Drain. Eng. 125(2):52-58. | | | |
| NRCS LRR | Canada | | | |
| NRCS MLRA | Canada | | | |
| HUC_10 | -999999 | Test Site Scale | Plot | |
| Experimental Design Type/ Description | Multiple Treatments w/ Control and Replication | | | |
| | plot study: complete randomized block | | | |
| Crops | Corn, grass | | | |
| Study Duration | 2 years | | | |

Summary

In field plots 75 m long by 15 m wide, the authors tested the hypothesis that subirrigation and intercropping will reduce nitrate leaching losses from cultivated corn and minimize water pollution. Nitrate leaching under subirrigation at a depth of either 0.7 m or 0.8 m below the soil surface was compared with leaching under free drainage. The cropping systems investigated were corn (Zea mays L.) monoculture and corn intercropped with annual Italian ryegrass (Lolium multiflorum Lam. cv. Barmultra). The effects of three fertilizer application rates (0, 180, and 270 kg N ha-1) on leaching were investigated in the freely drained plots. The greatest annual loss of NO3--N in tile drainage water (21.9 kg N ha-1) occurred in freely draining, monocropped plots fertilized with 270 kg N ha-1. Monocropped plots fertilized with 270 kg N ha-1, with subirrigation at 0.7 m depth, resulted in annual nitrate losses into tile drainage of 6.6 kg N ha-1, 70% less than under free drainage. Annual soil denitrification rates (60 kg N ha-1) with subirrigation at 0.7 m were about three-fold greater than under free drainage. Intercropping under free drainage resulted in a 50% reduction in tile drainage loss of NO3--N compared with monocropping. Off-season (November 1, 1993, to May 31, 1994) tile drainage losses of NO3--N (7.8 kg N ha-1) from freely draining monocropped plots accounted for 30% of the annual tile drainage losses.

| Study ID | 201300554501 | Study Area | F1.0MN0 | Area (ha) | 0.11 | Tillage | Not specified | Cover Crop | None |
|---|---|---|---|---|---|---|---|---|---|
| Practice ID | 1 | Practice Name | F1.0MN0 | General Practice | Control | | | Area Type | C |
| Category | Management | Study Focus | Controlled Drainage, Fertilizer, Cover Crop | Practice Overview | NM-CCN-CN-CO-EN | | | | |
| Irrigation | No | Irrig. Descrip. | Not irrigated | | | | | | |
| Soils | Soulanges sandy loam (fine, silty, mixed, nonacid, frigid Humaquept) | | | | | | | | |
| Fertilizer | At planting, all plots received 141 kg K/ha (supplied as K20) and 52 kg P/ha, based on prior soil testing. In plots to receive no N, phosphorus was supplied as triple superphosphate. | | | | | | | | |
| Comments | This study investigated 3 drainage methods, 3 fertilization levels, and 2 cropping systems using 24 plots, each 75-m x 15-m in size. Drainage effluent was collected in tiles where flow and pollutants were monitored. | | | | | | | | |

| | | | | |
|---|---|---|---|---|
| Crop | 1 | Monocropped corn | Yield | -999999 |
| Crop | 2 | Monocropped corn | Yield | -999999 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300554502** | **Study Area** | **F1.0MN180** | Area (ha) | 0.11 | Tillage | Not specified | Cover Crop | None |
| Practice ID | 2 | Practice Name | F1.0MN180 | General Practice | Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Controlled Drainage, Fertilizer, Cover Crop | Practice Overview | NM-CCN-CN-CO-ED | | | | |
| Irrigation | No | Irrig. Descrip. | Not irrigated | | | | | | |
| Soils | Soulanges sandy loam (fine, silty, mixed, nonacid, frigid Humaquept) | | | | | | | | |
| Fertilizer | At planting, all plots received 141 kg K/ha (supplied as K20) and 52 kg P/ha, based on prior soil testing. In plots designed to receive N fertilizer, the P was supplied as ammonium phosphate (18-46-0), thus also providing 47 kg N/ha. 133 kg N/ha was applied broadcast as ammonium nitrate (34-0-0) two weeks after planting. | | | | | | | | |
| Comments | This study investigated 3 drainage methods, 3 fertilization levels, and 2 cropping systems using 24 plots, each 75-m x 15-m in size. Drainage effluent was collected in tiles where flow and pollutants were monitored. | | | | | | | | |

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|---|---|---|---|---|
| **Crop** | 1 | Monocropped corn | Yield | -999999 |
| **Crop** | 2 | Monocropped corn | Yield | -999999 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300554503** | **Study Area** | **F1.0MN270** | Area (ha) | 0.11 | Tillage | Not specified | Cover Crop | None |
| Practice ID | 3 | Practice Name | F1.0MN270 | General Practice | Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Controlled Drainage, Fertilizer, Cover Crop | Practice Overview | NC-CCN-CN-CO-ED | | | | |
| Irrigation | No | Irrig. Descrip. | Not irrigated | | | | | | |
| Soils | Soulanges sandy loam (fine, silty, mixed, nonacid, frigid Humaquept) | | | | | | | | |
| Fertilizer | At planting, all plots received 141 kg K/ha (supplied as K20) and 52 kg P/ha, based on prior soil testing. In plots designed to receive N fertilizer, the P was supplied as ammonium phosphate (18-46-0), thus also providing 47 kg N/ha. 233 kg N/ha was applied broadcast as ammonium nitrate (34-0-0) two weeks after planting. | | | | | | | | |
| Comments | This study investigated 3 drainage methods, 3 fertilization levels, and 2 cropping systems using 24 plots, each 75-m x 15-m in size. Drainage effluent was collected in tiles where flow and pollutants were monitored. | | | | | | | | |

| | | | | |
|---|---|---|---|---|
| **Crop** | 1 | Monocropped corn | Yield | -999999 |
| **Crop** | 2 | Monocropped corn | Yield | -999999 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300554504** | **Study Area** | **F1.0IN270** | Area (ha) | 0.11 | Tillage | Not specified | Cover Crop | annual Italian ryegrass (Lolium multiflorum Lam. cv. Barmultra) |
| Practice ID | 4 | Practice Name | F1.0IN270 | General Practice | Nutrient Management, Cover Crop | | | Area Type | T |
| Category | Management | Study Focus | Controlled Drainage, Fertilizer, Cover Crop | Practice Overview | NC-CCY-CN-CO-ED | | | | |
| Irrigation | No | Irrig. Descrip. | Not irrigated | | | | | | |
| Soils | Soulanges sandy loam (fine, silty, mixed, nonacid, frigid Humaquept) | | | | | | | | |
| Fertilizer | At planting, all plots received 141 kg K/ha (supplied as K20) and 52 kg P/ha, based on prior soil testing. In plots designed to receive N fertilizer, the P was supplied as ammonium phosphate (18-46-0), thus also providing 47 kg N/ha. 233 kg N/ha was applied broadcast as ammonium nitrate (34-0-0) two weeks after planting. | | | | | | | | |
| Comments | This study investigated 3 drainage methods, 3 fertilization levels, and 2 cropping systems using 24 plots, each 75-m x 15-m in size. Drainage effluent was collected in tiles where flow and pollutants were monitored. | | | | | | | | |

| | | | | |
|---|---|---|---|---|
| **Crop** | 1 | Intercropped corn | Yield | -999999 |
| **Crop** | 2 | Ryegrass | Yield | -999999 |
| **Crop** | 3 | Intercropped corn | Yield | -999999 |
| **Crop** | 4 | Ryegrass | Yield | -999999 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300554505** | **Study Area** | **S0.8MN270** | Area (ha) | 0.11 | Tillage | Not specified | Cover Crop | None |
| Practice ID | 5 | Practice Name | S0.8MN270 | General Practice | Drainage Water Management, Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Controlled Drainage, Fertilizer, Cover Crop | Practice Overview | NC-CCN-CN-CO-ED | | | | |
| Irrigation | Yes | Irrig. Descrip. | Sub-irrigated | | | | | | |
| Soils | Soulanges sandy loam (fine, silty, mixed, nonacid, frigid Humaquept) | | | | | | | | |
| Fertilizer | At planting, all plots received 141 kg K/ha (supplied as K20) and 52 kg P/ha, based on prior soil testing. In plots designed to receive N fertilizer, the P was supplied as ammonium phosphate (18-46-0), thus also providing 47 kg N/ha. 233 kg N/ha was applied broadcast as ammonium nitrate (34-0-0) two weeks after planting. | | | | | | | | |
| Comments | This study investigated 3 drainage methods, 3 fertilization levels, and 2 cropping systems using 24 plots, each 75-m x 15-m in size. Drainage effluent was collected in tiles where flow and pollutants were monitored. | | | | | | | | |

| | | | | |
|---|---|---|---|---|
| **Crop** | 1 | Monocropped corn | Yield | -999999 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Crop** | 2 | Monocropped corn | | Yield | -999999 | | | | |
| **Study ID** | **201300554506** | **Study Area** | **S0.8IN270** | Area (ha) | 0.11 | Tillage | Not specified | Cover Crop | annual Italian ryegrass (Lolium multiflorum Lam. cv. Barmultra) |
| Practice ID | 6 | Practice Name | S0.8IN270 | General Practice | Drainage Water Management, Cover Crop, Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Controlled Drainage, Fertilizer, Cover Crop | Practice Overview | NC-CCY-CN-CO-ED | | | | |
| Irrigation | Yes | Irrig. Descrip. | Sub-irrigated | | | | | | |
| Soils | Soulanges sandy loam (fine, silty, mixed, nonacid, frigid Humaquept) | | | | | | | | |
| Fertilizer | At planting, all plots received 141 kg K/ha (supplied as K20) and 52 kg P/ha, based on prior soil testing. In plots designed to receive N fertilizer, the P was supplied as ammonium phosphate (18-46-0), thus also providing 47 kg N/ha. 233 kg N/ha was applied broadcast as ammonium nitrate (34-0-0) two weeks after planting. | | | | | | | | |
| Comments | This study investigated 3 drainage methods, 3 fertilization levels, and 2 cropping systems using 24 plots, each 75-m x 15-m in size. Drainage effluent was collected in tiles where flow and pollutants were monitored. | | | | | | | | |
| **Crop** | 1 | Intercropped corn | | Yield | -999999 | | | | |
| **Crop** | 2 | Ryegrass | | Yield | -999999 | | | | |
| **Crop** | 3 | Intercropped corn | | Yield | -999999 | | | | |
| **Crop** | 4 | Ryegrass | | Yield | -999999 | | | | |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300554507** | **Study Area** | **S0.7MN270** | Area (ha) | 0.11 | Tillage | Not specified | Cover Crop | None |
| Practice ID | 7 | Practice Name | S0.7MN270 | General Practice | Drainage Water Management, Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Controlled Drainage, Fertilizer, Cover Crop | Practice Overview | NC-CCN-CN-CO-ED | | | | |
| Irrigation | Yes | Irrig. Descrip. | Sub-irrigated | | | | | | |
| Soils | Soulanges sandy loam (fine, silty, mixed, nonacid, frigid Humaquept) | | | | | | | | |
| Fertilizer | At planting, all plots received 141 kg K/ha (supplied as K20) and 52 kg P/ha, based on prior soil testing. In plots designed to receive N fertilizer, the P was supplied as ammonium phosphate (18-46-0), thus also providing 47 kg N/ha. 233 kg N/ha was applied broadcast as ammonium nitrate (34-0-0) two weeks after planting. | | | | | | | | |
| Comments | This study investigated 3 drainage methods, 3 fertilization levels, and 2 cropping systems using 24 plots, each 75-m x 15-m in size. Drainage effluent was collected in tiles where flow and pollutants were monitored. | | | | | | | | |

| | | | | |
|---|---|---|---|---|
| **Crop** | 1 | Monocropped corn | Yield | -999999 |
| **Crop** | 2 | Monocropped corn | Yield | -999999 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300554508** | **Study Area** | **S0.7IN270** | Area (ha) | 0.11 | Tillage | Not specified | Cover Crop | annual Italian ryegrass (Lolium multiflorum Lam. cv. Barmultra) |
| Practice ID | 8 | Practice Name | S0.7IN270 | General Practice | Drainage Water Management, Cover Crop, Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Controlled Drainage, Fertilizer, Cover Crop | Practice Overview | NC-CCY-CN-CO-ED | | | | |
| Irrigation | Yes | Irrig. Descrip. | Sub-irrigated | | | | | | |
| Soils | Soulanges sandy loam (fine, silty, mixed, nonacid, frigid Humaquept) | | | | | | | | |
| Fertilizer | At planting, all plots received 141 kg K/ha (supplied as K20) and 52 kg P/ha, based on prior soil testing. In plots designed to receive N fertilizer, the P was supplied as ammonium phosphate (18-46-0), thus also providing 47 kg N/ha. 233 kg N/ha was applied broadcast as ammonium nitrate (34-0-0) two weeks after planting. | | | | | | | | |
| Comments | This study investigated 3 drainage methods, 3 fertilization levels, and 2 cropping systems using 24 plots, each 75-m x 15-m in size. Drainage effluent was collected in tiles where flow and pollutants were monitored. | | | | | | | | |

| | | | | |
|---|---|---|---|---|
| **Crop** | 1 | Intercropped corn | Yield | -999999 |
| **Crop** | 2 | Ryegrass | Yield | -999999 |

| | | | | |
|---|---|---|---|---|
| **Crop** | 3 | Intercropped corn | Yield | -999999 |
| **Crop** | 4 | Ryegrass | Yield | -999999 |


Acknowledgement: Study summaries may be directly quoted from original author's abstract.

| Test Site ID | Test Site Name |
|---|---|
| **2013005546** | **Kanwar, R. S. , 2000** |
| Location | Nashua, Chickasaw, IA, US |
| Study Citation | 2000 |
| | Kanwar, R. S., A. Bakhsh, C. Pederson, D. L. Karlen, and C. A. Cambardella. |
| | N-management effects on residual soil nitrate-N, NO3-N concentrations in subsurface drain water, and crop yields. |
| | Paper No. 00-2204. 2000 ASAE International Meeting. American Society of Agricultural Engineers: St. Joseph, Michigan. |
| NRCS LRR | Central Feed Grains and Livestock Region |
| NRCS MLRA | Till Plains |
| HUC_10 | 0708020112 |
| Test Site Scale | Plot |
| Experimental Design Type/ Description | Multiple Treatments w/ Control and Replication |
| | plot study with replications |
| Crops | Corn, soybean |
| Study Duration | 6 years |

Summary

Nutrient management systems, for the corn-soybean production system, has the potential to reduce NO3-N leaching to groundwater and increase crop yields. A six year (1993-98) study was conducted to evaluate the effects of late spring soil nitrate test on residual soil NO3-N levels and NO3-N concentrations in subsurface drain water under corn-soybean rotation. The tillage and N management treatments included the use of late spring soil nitrate test and a reduced application of N at a rate of 112 kg/ha to corn frown in rotation with soybeans with either no-till or chisel plowing as the primary tillage practice. Experimental data were collected in Iowa using 24, 0.4 ha plots. Each plot was drained with a single tile drain which was intercepted at the end of the plot for monitoring tile slows and collecting tile water samples for NO3-N analyses. Results of this study clearly show that the use of late spring soil nitrate test and single N application resulted in almost similar six year average NO3-N concentrations in tile water. No-till system with single N application resulted in significantly (P=0.05) higher NO3-N losses with tile water in comparison with the late spring soil nitrate test under both no-till and chisel plow systems.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300554601** | **Study Area** | **CP-LSNT-corn** | Area (ha) | 0.40 | Tillage | Chisel plow | Cover Crop | None |
| Practice ID | 759 | Practice Name | CP-LSNT-corn | General Practice | Conservation Tillage and Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NM-CCN-CT-CS-EN | | | | |
| Irrigation | No | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Kenyon silty-clay loam soil with 3 to 4 % organic matter | | | | | | | | |
| Fertilizer | The N fertilizer (UAN, liquid urea-ammonium nitrate solution) was applied in the spring of each year. UAN was applied with the spoke injector but application rates were calculated by using the late spring nitrate test (LSNT). The amount of side-dress nitrogen applied on LSNT treatments was determined by taking sixteen, 1-foot deep soil cores from each plot when corn was at the 6th leaf stage. Nitrogen fertilizer was added, if needed, to increase soil nitrate-N to 25 ppm. | | | | | | | | |
| Comments | This plot study investigated the impacts of late spring soil nitrate tests (LSNT) and no-till (NT) on NPS pollutants and corn yield. Twenty four plots - each 59 x 69m in size (1.0 ac) - were used with two treatments and two controls of 6 replications each. The controls were single N application pre-plant (S) and conventional chisel plow tillage (CP). The N fertilizer was applied using two different N management systems: single N application at a rate of 112 kg/ha as pre-plant; and application rates calculated by using the late spring nitrate test (LSNT). The amount of sidedress N applied on LSNT treatments was determined by taking 16, 1-foot deep soil cores from each plot when corn was at the 6th leaf stage. N fertilizer was added, if needed, to increase soil nitrate-N to 25 ppm. The average amount of N applied to LSNT plots ranged from 93-193 kg N/ha, with the no-till system typically requiring more nitrogen than the chisel plow system. The first year of the study (1993) was extremely wet, receiving 35% more rainfall than in a normal year. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Corn | Yield | 7.7 | Mg/ha |
| **Crop** | 3 | Corn | Yield | 8.2 | Mg/ha |
| **Crop** | 5 | Corn | Yield | 6.1 | Mg/ha |
| **Crop** | 7 | Corn | Yield | 9.2 | Mg/ha |
| **Crop** | 9 | Corn | Yield | 10.1 | Mg/ha |
| **Crop** | 11 | Corn | Yield | 10.7 | Mg/ha |


Acknowledgement: Study summaries may be directly quoted from original author's abstract.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300554602** | **Study Area** | **CP-S-corn** | Area (ha) | 0.40 | Tillage | Chisel plow | Cover Crop | None |
| Practice ID | 762 | Practice Name | CP-S-corn | General Practice | Conservation Tillage | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NC-CCN-CT-CS-EN | | | | |
| Irrigation | No | Irrig. Descrip. | N/A (rainfall) | | | | | | |

| | |
|---|---|
| Soils | Kenyon silty-clay loam soil with 3 to 4 % organic matter |
| Fertilizer | The N fertilizer (UAN, liquid urea-ammonium nitrate solution) was applied in the spring of each year. UAN was applied as a single N application at a rate of 112 kg/ha as pre-plant using a spoke injector. |
| Comments | This plot study investigated the impacts of late spring soil nitrate tests (LSNT) and no-till (NT) on NPS pollutants and corn yield. Twenty four plots - each 59 x 69m in size (1.0 ac) - were used with two treatments and two controls of 6 replications each. The controls were single N application pre-plant (S) and conventional chisel plow tillage (CP). The N fertilizer was applied using two different N management systems: single N application at a rate of 112 kg/ha as pre-plant; and application rates calculated by using the late spring nitrate test (LSNT). The amount of sidedress N applied on LSNT treatments was determined by taking 16, 1-foot deep soil cores from each plot when corn was at the 6th leaf stage. N fertilizer was added, if needed, to increase soil nitrate-N to 25 ppm. The average amount of N applied to LSNT plots ranged from 93-193 kg N/ha, with the no-till system typically requiring more nitrogen than the chisel plow system. The first year of the study (1993) was extremely wet, receiving 35% more rainfall than in a normal year. |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Corn | Yield | 5.1 | Mg/ha |
| **Crop** | 3 | Corn | Yield | 7.9 | Mg/ha |
| **Crop** | 5 | Corn | Yield | 6 | Mg/ha |
| **Crop** | 7 | Corn | Yield | 8.8 | Mg/ha |
| **Crop** | 9 | Corn | Yield | 9.8 | Mg/ha |
| **Crop** | 11 | Corn | Yield | 9.7 | Mg/ha |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300554603** | **Study Area** | **NT-LSNT-corn** | Area (ha) | 0.40 | Tillage | No Till | Cover Crop | None |
| Practice ID | 760 | Practice Name | NT-LSNT-corn | General Practice | Conservation Tillage and Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NM-CCN-NT-CS-EN | | | | |
| Irrigation | No | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Kenyon silty-clay loam soil with 3 to 4 % organic matter | | | | | | | | |
| Fertilizer | The N fertilizer (UAN, liquid urea-ammonium nitrate solution) was applied in the spring of each year. UAN was applied with the spoke injector but application rates were calculated by using the late spring nitrate test (LSNT). The amount of side-dress nitrogen applied on LSNT treatments was determined by taking sixteen, 1-foot deep soil cores from each plot when corn was at the 6th leaf stage. Nitrogen fertilizer was added, if needed, to increase soil nitrate-N to 25 ppm. | | | | | | | | |
| Comments | This plot study investigated the impacts of late spring soil nitrate tests (LSNT) and no-till (NT) on NPS pollutants and corn yield. Twenty four plots - each 59 x 69m in size (1.0 ac) - were used with two treatments and two controls of 6 replications each. The controls were single N application pre-plant (S) and conventional chisel plow tillage (CP). The N fertilizer was applied using two different N management systems: single N application at a rate of 112 kg/ha as pre-plant; and application rates calculated by using the late spring nitrate test (LSNT). The amount of sidedress N applied on LSNT treatments was determined by taking 16, 1-foot deep soil cores from each plot when corn was at the 6th leaf stage. N fertilizer was added, if needed, to increase soil nitrate-N to 25 ppm. The average amount of N applied to LSNT plots ranged from 93-193 kg N/ha, with the no-till system typically requiring more nitrogen than the chisel plow system. The first year of the study (1993) was extremely wet, receiving 35% more rainfall than in a normal year. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Corn | Yield | 7.3 | Mg/ha |
| **Crop** | 3 | Corn | Yield | 7.3 | Mg/ha |
| **Crop** | 5 | Corn | Yield | 5.3 | Mg/ha |
| **Crop** | 7 | Corn | Yield | 9.1 | Mg/ha |
| **Crop** | 9 | Corn | Yield | 9.9 | Mg/ha |
| **Crop** | 11 | Corn | Yield | 9.6 | Mg/ha |


Acknowledgement: Study summaries may be directly quoted from original author's abstract.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300554604** | **Study Area** | **NT-S-corn** | Area (ha) | 0.40 | Tillage | No Till | Cover Crop | None |
| Practice ID | 761 | Practice Name | NT-S-corn | General Practice | Conservation Tillage | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NC-CCN-NT-CS-EN | | | | |
| Irrigation | No | Irrig. Descrip. | N/A (rainfall) | | | | | | |

| | |
|---|---|
| Soils | Kenyon silty-clay loam soil with 3 to 4 % organic matter |
| Fertilizer | The N fertilizer (UAN, liquid urea-ammonium nitrate solution) was applied in the spring of each year. UAN was applied as a single N application at a rate of 112 kg/ha as pre-plant using a spoke injector. |
| Comments | This plot study investigated the impacts of late spring soil nitrate tests (LSNT) and no-till (NT) on NPS pollutants and corn yield. Twenty four plots - each 59 x 69m in size (1.0 ac) - were used with two treatments and two controls of 6 replications each. The controls were single N application pre-plant (S) and conventional chisel plow tillage (CP). The N fertilizer was applied using two different N management systems: single N application at a rate of 112 kg/ha as pre-plant; and application rates calculated by using the late spring nitrate test (LSNT). The amount of sidedress N applied on LSNT treatments was determined by taking 16, 1-foot deep soil cores from each plot when corn was at the 6th leaf stage. N fertilizer was added, if needed, to increase soil nitrate-N to 25 ppm. The average amount of N applied to LSNT plots ranged from 93-193 kg N/ha, with the no-till system typically requiring more nitrogen than the chisel plow system. The first year of the study (1993) was extremely wet, receiving 35% more rainfall than in a normal year. |

| | | | | |
|---|---|---|---|---|
| **Crop** | 1 | Corn | Yield | 4.3 Mg/ha |
| **Crop** | 3 | Corn | Yield | 6.3 Mg/ha |
| **Crop** | 5 | Corn | Yield | 5.1 Mg/ha |
| **Crop** | 7 | Corn | Yield | 8.4 Mg/ha |
| **Crop** | 9 | Corn | Yield | 9.5 Mg/ha |
| **Crop** | 11 | Corn | Yield | 8.1 Mg/ha |

| Test Site ID | Test Site Name |
|---|---|
| **2013005208** | **Kanwar, R. S., 1997** |
| Location | Nashua, Floyd, IA, US |
| Study Citation | 1997 |
| | Kanwar, R. S., T. S. Colvin and D. L. Karlen. |
| | Ridge, moldboard, chisel, and no-till effects on tile water quality beneath two cropping systems. |
| | J. Prod. Agric. 10:227-234. |
| NRCS LRR | Central Feed Grains and Livestock Region |
| NRCS MLRA | Eastern Iowa and Minnesota Till Prairies |
| HUC_10 | 0708020112 |
| Test Site Scale | Plot |
| Experimental Design Type/ Description | Multiple Treatments w/ Control and Replication |
| | Randomized Complete Block. Field study to quantify the effects of four tillage practice |
| Crops | Corn, Soybeans |
| Study Duration | 3 years |

Summary

Soil conservation tillage systems, including ridge-tillage, often reduce surface water contamination by pesticides because soil erosion and surface runoff are reduced. However, the effects on losses through subsurface drainage tile are somewhat uncertain. Our field study quantified the effects of four tillage practices in continuous corn (Zea Mays L.) and corn-soybean [Glycine max (L.) Merr] rotations on herbicide and nitrate N losses in tile drainage water. Fertilizer and pesticide application methods were uniform for ridge, moldboard, chisel, and no-till systems. Pesticide and nitrate N leaching losses were significantly affected by crop rotation. Tillage practice had little influence on nitrate N and pesticide losses to the subsurface drainage water within a corn-soybean rotation. However, ridge-till and no-till resulted in larger losses of atrazine than the moldboard plow and chisel based systems under continuous corn. Tillage system did not affect the timings of peak tile flow occurrences, although peak tile flow volume was affected by tillage, presumably because each system had its own macropore system related to preservation or annual destruction of biopores by tillage. Corn yields were significantly higher under corn-soybean rotation than with continuous-corn for all tillage practices. These results indicate that continuous corn production is not an environmentally sustainable practice for this area because it resulted in higher nitrate N leaching losses to groundwater, received higher N-applications, and resulted in lower corn yields than the corn-soybean rotation. The results also reinforce the need for studies on chemical placement, rate, and timing for various tillage practices to reduce tile drainage losses of agricultural chemicals.



Acknowledgement: Study summaries may be directly quoted from original author's abstract.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300520801** | **Study Area** | **CP-CC** | Area (ha) | 14.57 | Tillage | Chisel Plow | Cover Crop | None |
| Practice ID | 1 | Practice Name | CP-CC | General Practice | Reduced Tillage | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Crop Rotation | Practice Overview | NC-CCN-CT-CS-EN | | | | |
| Irrigation | NR | Irrig. Descrip. | natural rainfall | | | | | | |

Soils: Floyd loam (fine-loamy, mixed, mesic Aquic Hapludolls),Kenyon silty-clay loam (fine loamy, mixed, mesic Aquic Hapludolls), and Readlyn loam (fine-loamy, mixed, mesic Aquic Hapludolls). These silty soils are moderately well to poorly drained, lie over loam

Fertilizer: All crops were cultivated during the season for weed control. Continuous corn plots received 180 lb N/acre each year, while corn-soybean rotation plots received 150 lb N/acre when corn was planted. No N was applied to soybeans. All herbicides were broadcast full width on all tillage plots.

Comments: This study quantifies the effects of four tillage practices - ridge, moldboard, chisel, and no-till; in two different crop rotations - continuous corn, and corn-soybean rotations. Three replications of each treatment combination were used in a randomized complete block design for a total of 36 1-acre plots. Each plot has a tile line passing through the middle of the plot, connected to a sump, and at each of the two borders. Tile lines are monitored continuously for flow. In addition to composite samples, tile water samples from each plot were manually collected for nitrate N analysis 3x per week when tile lines were flowing to observe time base variations in concentration. All tillage systems, including no-till received 1 or 2 passes of cultivation for weed control and aeration.

**Crop** 1 Continuous Corn — Yield 133 corn bu/acre

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300520802** | **Study Area** | **CP-CS** | Area (ha) | 14.57 | Tillage | Chisel Plow | Cover Crop | None |
| Practice ID | 2 | Practice Name | CP-CS | General Practice | Reduced Tillage, Crop Rotation | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Crop Rotation | Practice Overview | NC-CCN-CT-CS-EN | | | | |
| Irrigation | NR | Irrig. Descrip. | | | | | | | |

Soils: Floyd loam (fine-loamy, mixed, mesic Aquic Hapludolls),Kenyon silty-clay loam (fine loamy, mixed, mesic Aquic Hapludolls), and Readlyn loam (fine-loamy, mixed, mesic Aquic Hapludolls). These silty soils are moderately well to poorly drained, lie over loam

Fertilizer: All crops were cultivated during the season for weed control. Continuous corn plots received 180 lb N/acre each year, while corn-soybean rotation plots received 150 lb N/acre when corn was planted. No N was applied to soybeans. All herbicides were broadcast full width on all tillage plots.

Comments: This study quantifies the effects of four tillage practices - ridge, moldboard, chisel, and no-till; in two different crop rotations - continuous corn, and corn-soybean rotations. Three replications of each treatment combination were used in a randomized complete block design for a total of 36 1-acre plots. Each plot has a tile line passing through the middle of the plot, connected to a sump, and at each of the two borders. Tile lines are monitored continuously for flow. In addition to composite samples, tile water samples from each plot were manually collected for nitrate N analysis 3x per week when tile lines were flowing to observe time base variations in concentration. All tillage systems, including no-till received 1 or 2 passes of cultivation for weed control and aeration.

**Crop** 2 corn soybean rotation — Yield 146 corn bu/acre

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300520803** | **Study Area** | **CP-SC** | Area (ha) | 14.57 | Tillage | Chisel Plow | Cover Crop | None |
| Practice ID | 3 | Practice Name | CP-SC | General Practice | Reduced Tillage, Crop Rotation | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Crop Rotation | Practice Overview | NC-CCN-CT-CS-EN | | | | |
| Irrigation | NR | Irrig. Descrip. | | | | | | | |

Soils: Floyd loam (fine-loamy, mixed, mesic Aquic Hapludolls),Kenyon silty-clay loam (fine loamy, mixed, mesic Aquic Hapludolls), and Readlyn loam (fine-loamy, mixed, mesic Aquic Hapludolls). These silty soils are moderately well to poorly drained, lie over loam

Fertilizer: All crops were cultivated during the season for weed control. Continuous corn plots received 180 lb N/acre each year, while corn-soybean rotation plots received 150 lb N/acre when corn was planted. No N was applied to soybeans. All herbicides were broadcast full width on all tillage plots.

Comments: This study quantifies the effects of four tillage practices - ridge, moldboard, chisel, and no-till; in two different crop rotations - continuous corn, and corn-soybean rotations. Three replications of each treatment combination were used in a randomized complete block design for a total of 36 1-acre plots. Each plot has a tile line passing through the middle of the plot, connected to a sump, and at each of the two borders. Tile lines are monitored continuously for flow. In addition to composite samples, tile water samples from each plot were manually collected for nitrate N analysis 3x per week when tile lines were flowing to observe time base variations in concentration. All tillage systems, including no-till received 1 or 2 passes of cultivation for weed control and aeration.

**Crop** 3 soybean-corn rotation Yield -999999 corn bu/acre

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300520804** | **Study Area** | **MP-CC** | Area (ha) | 14.57 | Tillage | Conventional (Moldboard Plow) | Cover Crop | None |
| Practice ID | 4 | Practice Name | MP-CC | General Practice | Conventional Tillage | | | Area Type | C |
| Category | Management | Study Focus | Tillage, Crop Rotation | Practice Overview | NC-CCN-CN-CS-EN | | | | |
| Irrigation | NR | Irrig. Descrip. | | | | | | | |

Soils: Floyd loam (fine-loamy, mixed, mesic Aquic Hapludolls),Kenyon silty-clay loam (fine loamy, mixed, mesic Aquic Hapludolls), and Readlyn loam (fine-loamy, mixed, mesic Aquic Hapludolls). These silty soils are moderately well to poorly drained, lie over loam

Fertilizer: All crops were cultivated during the season for weed control. Continuous corn plots received 180 lb N/acre each year, while corn-soybean rotation plots received 150 lb N/acre when corn was planted. No N was applied to soybeans. All herbicides were broadcast full width on all tillage plots.

Comments: This study quantifies the effects of four tillage practices - ridge, moldboard, chisel, and no-till; in two different crop rotations - continuous corn, and corn-soybean rotations. Three replications of each treatment combination were used in a randomized complete block design for a total of 36 1-acre plots. Each plot has a tile line passing through the middle of the plot, connected to a sump, and at each of the two borders. Tile lines are monitored continuously for flow. In addition to composite samples, tile water samples from each plot were manually collected for nitrate N analysis 3x per week when tile lines were flowing to observe time base variations in concentration. All tillage systems, including no-till received 1 or 2 passes of cultivation for weed control and aeration.

**Crop** 4 Continuous Corn Yield 133 corn bu/acre

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300520805** | **Study Area** | **MP-CS** | Area (ha) | 14.57 | Tillage | Conventional (Moldboard Plow) | Cover Crop | None |
| Practice ID | 5 | Practice Name | MP-CS | General Practice | Conventional Tillage, Crop Rotation | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Crop Rotation | Practice Overview | NC-CCN-CN-CS-EN | | | | |
| Irrigation | NR | Irrig. Descrip. | natural rainfall | | | | | | |
| Soils | Floyd loam (fine-loamy, mixed, mesic Aquic Hapludolls),Kenyon silty-clay loam (fine loamy, mixed, mesic Aquic Hapludolls), and Readlyn loam (fine-loamy, mixed, mesic Aquic Hapludolls). These silty soils are moderately well to poorly drained, lie over loam | | | | | | | | |
| Fertilizer | All crops were cultivated during the season for weed control. Continuous corn plots received 180 lb N/acre each year, while corn-soybean rotation plots received 150 lb N/acre when corn was planted. No N was applied to soybeans. All herbicides were broadcast full width on all tillage plots. | | | | | | | | |
| Comments | This study quantifies the effects of four tillage practices - ridge, moldboard, chisel, and no-till; in two different crop rotations - continuous corn, and corn-soybean rotations. Three replications of each treatment combination were used in a randomized | | | | | | | | |

**Crop** 5 corn soybean rotation Yield 140 corn bu/acre

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300520806** | **Study Area** | **MP-SC** | Area (ha) | 14.57 | Tillage | Conventional (Moldboard Plow) | Cover Crop | None |
| Practice ID | 6 | Practice Name | MP-SC | General Practice | Conventional Tillage, Crop Rotation | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Crop Rotation | Practice Overview | NC-CCN-CN-CS-EN | | | | |
| Irrigation | NR | Irrig. Descrip. | | | | | | | |
| Soils | Floyd loam (fine-loamy, mixed, mesic Aquic Hapludolls),Kenyon silty-clay loam (fine loamy, mixed, mesic Aquic Hapludolls), and Readlyn loam (fine-loamy, mixed, mesic Aquic Hapludolls). These silty soils are moderately well to poorly drained, lie over loam | | | | | | | | |
| Fertilizer | All crops were cultivated during the season for weed control. Continuous corn plots received 180 lb N/acre each year, while corn-soybean rotation plots received 150 lb N/acre when corn was planted. No N was applied to soybeans. All herbicides were broadcast full width on all tillage plots. | | | | | | | | |
| Comments | This study quantifies the effects of four tillage practices - ridge, moldboard, chisel, and no-till; in two different crop rotations - continuous corn, and corn-soybean rotations. Three replications of each treatment combination were used in a randomized | | | | | | | | |

**Crop** 6 soybean-corn rotation Yield -999999 corn bu/acre

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300520807** | **Study Area** | **RT-CC** | Area (ha) | 14.57 | Tillage | Ridge Till | Cover Crop | None |
| Practice ID | 7 | Practice Name | RT-CC | General Practice | Conservation Tillage | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Crop Rotation | Practice Overview | NC-CCN-CT-CS-EN | | | | |
| Irrigation | NR | Irrig. Descrip. | | | | | | | |
| Soils | Floyd loam (fine-loamy, mixed, mesic Aquic Hapludolls),Kenyon silty-clay loam (fine loamy, mixed, mesic Aquic Hapludolls), and Readlyn loam (fine-loamy, mixed, mesic Aquic Hapludolls). These silty soils are moderately well to poorly drained, lie over loam | | | | | | | | |
| Fertilizer | All crops were cultivated during the season for weed control. Continuous corn plots received 180 lb N/acre each year, while corn-soybean rotation plots received 150 lb N/acre when corn was planted. No N was applied to soybeans. All herbicides were broadcast full width on all tillage plots. | | | | | | | | |
| Comments | This study quantifies the effects of four tillage practices - ridge, moldboard, chisel, and no-till; in two different crop rotations - continuous corn, and corn-soybean rotations. Three replications of each treatment combination were used in a randomized | | | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Crop** | 7 | Continuous Corn | | Yield | 123 | corn bu/acre | | | |
| **Study ID** | **201300520808** | **Study Area** | **RT-CS** | Area (ha) | 14.57 | Tillage | Ridge Till | Cover Crop | None |
| Practice ID | 8 | Practice Name | RT-CS | General Practice | Conservation Tillage, Crop Rotation | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Crop Rotation | Practice Overview | NC-CCN-CT-CS-EN | | | | |
| Irrigation | NR | Irrig. Descrip. | | | | | | | |
| Soils | Floyd loam (fine-loamy, mixed, mesic Aquic Hapludolls),Kenyon silty-clay loam (fine loamy, mixed, mesic Aquic Hapludolls), and Readlyn loam (fine-loamy, mixed, mesic Aquic Hapludolls). These silty soils are moderately well to poorly drained, lie over loam | | | | | | | | |
| Fertilizer | All crops were cultivated during the season for weed control. Continuous corn plots received 180 lb N/acre each year, while corn-soybean rotation plots received 150 lb N/acre when corn was planted. No N was applied to soybeans. All herbicides were broadcast full width on all tillage plots. | | | | | | | | |
| Comments | This study quantifies the effects of four tillage practices - ridge, moldboard, chisel, and no-till; in two different crop rotations - continuous corn, and corn-soybean rotations. Three replications of each treatment combination were used in a randomized | | | | | | | | |
| **Crop** | 8 | corn soybean rotation | | Yield | 142 | corn bu/acre | | | |
| **Study ID** | **201300520809** | **Study Area** | **RT-SC** | Area (ha) | 14.57 | Tillage | Ridge Till | Cover Crop | None |
| Practice ID | 9 | Practice Name | RT-SC | General Practice | Conservation Tillage, Crop Rotation | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Crop Rotation | Practice Overview | NC-CCN-CT-CS-EN | | | | |
| Irrigation | NR | Irrig. Descrip. | natural rainfall | | | | | | |
| Soils | Floyd loam (fine-loamy, mixed, mesic Aquic Hapludolls),Kenyon silty-clay loam (fine loamy, mixed, mesic Aquic Hapludolls), and Readlyn loam (fine-loamy, mixed, mesic Aquic Hapludolls). These silty soils are moderately well to poorly drained, lie over loam | | | | | | | | |
| Fertilizer | All crops were cultivated during the season for weed control. Continuous corn plots received 180 lb N/acre each year, while corn-soybean rotation plots received 150 lb N/acre when corn was planted. No N was applied to soybeans. All herbicides were broadcast full width on all tillage plots. | | | | | | | | |
| Comments | This study quantifies the effects of four tillage practices - ridge, moldboard, chisel, and no-till; in two different crop rotations - continuous corn, and corn-soybean rotations. Three replications of each treatment combination were used in a randomized | | | | | | | | |
| **Crop** | 9 | soybean-corn rotation | | Yield | -999999 | corn bu/acre | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300520810** | **Study Area** | **NT-CC** | Area (ha) | 14.57 | Tillage | No Till | Cover Crop | None |
| Practice ID | 10 | Practice Name | NT-CC | General Practice | No Tillage | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Crop Rotation | Practice Overview | NC-CCN-NT-CS-EN | | | | |
| Irrigation | NR | Irrig. Descrip. | | | | | | | |

Soils: Floyd loam (fine-loamy, mixed, mesic Aquic Hapludolls),Kenyon silty-clay loam (fine loamy, mixed, mesic Aquic Hapludolls), and Readlyn loam (fine-loamy, mixed, mesic Aquic Hapludolls). These silty soils are moderately well to poorly drained, lie over loam

Fertilizer: All crops were cultivated during the season for weed control. Continuous corn plots received 180 lb N/acre each year, while corn-soybean rotation plots received 150 lb N/acre when corn was planted. No N was applied to soybeans. All herbicides were broadcast full width on all tillage plots.

Comments: This study quantifies the effects of four tillage practices - ridge, moldboard, chisel, and no-till; in two different crop rotations - continuous corn, and corn-soybean rotations. Three replications of each treatment combination were used in a randomized

**Crop** 10 Continuous Corn Yield 116 corn bu/acre

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300520811** | **Study Area** | **NT-CS** | Area (ha) | 14.57 | Tillage | No Till | Cover Crop | None |
| Practice ID | 11 | Practice Name | NT-CS | General Practice | No Tillage, Crop Rotation | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Crop Rotation | Practice Overview | NC-CCN-NT-CS-EN | | | | |
| Irrigation | NR | Irrig. Descrip. | | | | | | | |

Soils: Floyd loam (fine-loamy, mixed, mesic Aquic Hapludolls),Kenyon silty-clay loam (fine loamy, mixed, mesic Aquic Hapludolls), and Readlyn loam (fine-loamy, mixed, mesic Aquic Hapludolls). These silty soils are moderately well to poorly drained, lie over loam

Fertilizer: All crops were cultivated during the season for weed control. Continuous corn plots received 180 lb N/acre each year, while corn-soybean rotation plots received 150 lb N/acre when corn was planted. No N was applied to soybeans. All herbicides were broadcast full width on all tillage plots.

Comments: This study quantifies the effects of four tillage practices - ridge, moldboard, chisel, and no-till; in two different crop rotations - continuous corn, and corn-soybean rotations. Three replications of each treatment combination were used in a randomized

**Crop** 11 corn soybean rotation Yield 143 corn bu/acre

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300520812** | **Study Area** | **NT-SC** | Area (ha) | 14.57 | Tillage | No Till | Cover Crop | None |
| Practice ID | 12 | Practice Name | NT-SC | General Practice | No Tillage, Crop Rotation | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Crop Rotation | Practice Overview | NC-CCN-NT-CS-EN | | | | |
| Irrigation | NR | Irrig. Descrip. | | | | | | | |

Soils: Floyd loam (fine-loamy, mixed, mesic Aquic Hapludolls),Kenyon silty-clay loam (fine loamy, mixed, mesic Aquic Hapludolls), and Readlyn loam (fine-loamy, mixed, mesic Aquic Hapludolls). These silty soils are moderately well to poorly drained, lie over loam

Fertilizer: All crops were cultivated during the season for weed control. Continuous corn plots received 180 lb N/acre each year, while corn-soybean rotation plots received 150 lb N/acre when corn was planted. No N was applied to soybeans. All herbicides were broadcast full width on all tillage plots.

Comments: This study quantifies the effects of four tillage practices - ridge, moldboard, chisel, and no-till; in two different crop rotations - continuous corn, and corn-soybean rotations. Three replications of each treatment combination were used in a randomized

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 12 | soybean-corn rotation | Yield | -999999 | corn bu/acre |


Acknowledgement: Study summaries may be directly quoted from original author's abstract.

| Test Site ID | Test Site Name |
|---|---|
| **2014002001** | **Kimmel 2001** |

| | | | | |
|---|---|---|---|---|
| Location | Ottawa | Franklin | KS | US |
| Study Citation | 2001 | | | |
| | R. J. Kimmell, G. M. Pierzynski, K. A. Janssen, P.L. Barnes | | | |
| | Effects of Tillage and Phosphorous Placement on Phosphorous Runoff Losses in a Grain Sorghum-Soybean Rotation | | | |
| | J. Environmental Quality 30:1324-1330 (2001) | | | |
| NRCS LRR | Central Feed Grains and Livestock Region | | | |
| NRCS MLRA | Cherokee Prairies | | | |
| HUC_10 | 1029010104 | Test Site Scale | Plot | |
| Experimental Design Type/ Description | Multiple Treatments w/ Control, No Replication | | | |
| | plot study: complete randomized block | | | |
| Crops | Sorghum, Soybeans | | | |
| Study Duration | 2 years | | | |

Summary

Phosphorous enhances eutrophication of fresh water bodies. This study was conducted to determine the influence of tillage and P placement on P losses in runoff water from a somewhat poorly drained soil (Woodson silt loam [fine, smectitic, thermic Abruptic Argiaquoll], 1.0-1.5% slope) in a grain sorghum [Sorghum bicolor (L.) Moench]-soybean [Glycine max (L.) Merr] rotation. Chisel-disk-field cultivate (ChT), ridge-till (RT), and no-till (NT) in combination with 0 kg P ha-1 or 24 kg P ha-1 broadcast or knifed (applied prior to planting grain sorghum) were studied. runoff volume and losses of sediment and P were summed over the growing season. Significant interactions between tillage and P placement for soluble P losses were found. For example, soluble P loss in 1999 for NT-broadcast in grain sorghum 358 g/ha; significantly greater than 31 g ha21 for NT-knife or 23 g ha21 for NT-check. Similar results were found for RT but no such differences were found for ChT. Bioavailable P losses were generally highest with broadcast P placement and for NT and RT. Total P losses were significantly higher at 959 g ha21 with broadcast P on grain sorghum in 1998, compared with 521 g ha21 for the check and 659 g ha21 for the knifed P applications. Total P losses in 1999 for soybeans were only 18 g ha21 for NT, which was significantly lower than 75 g ha21 for ChT and 66 g ha21 for RT. The results indicate that broadcast P applications on RT and NT will increase P losses, but the influence of tillage was not consistent.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201400200101** | **Study Area** | **ChT-Broadcast SB** | Area (ha) | 0.01 | Tillage | Chisel Plow | Cover Crop | None |
| Practice ID | 1 | Practice Name | ChT-Broadcast SB | General Practice | Conservation Tillage, Fertilizer | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NC-CCN-CT-SB-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Woodson silt loam [fine, smectitic, thermic Abruptic Argiaquoll], 1.0-1.5% slope | | | | | | | | |
| Fertilizer | Not applied on soybean plots. | | | | | | | | |
| Comments | | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Soybean, for grain | Yield | -999999 | NA |
| **Crop** | 19 | Soybean, for grain | Yield | -999999 | NA |



Acknowledgement: Study summaries may be directly quoted from original author's abstract.

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201400200102** | **Study Area** | **ChT-Broadcast SG** | Area (ha) | 0.00 | Tillage | Chisel Plow | Cover Crop | None |
| Practice ID | 2 | Practice Name | ChT-Broadcast SG | General Practice | Conservation Tillage, Fertilizer | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NC-CCN-CT-SG-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Woodson silt loam [fine, smectitic, thermic Abruptic Argiaquoll], 1.0-1.5% slope | | | | | | | | |
| Fertilizer | In spring: 24 kg P/ha surface-broadcast. Phosphorus was applied as a liquid product containing 70 g N/kg, 95 g P /kg, and 58 g K /kg. Nitrogen was balanced at 112 kg/ha across all treatments using liquid ammonium nitrate solution containing 280 g N/ha. | | | | | | | | |
| Comments | | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 2 | Sorghum, for grain | Yield | -999999 | NA |
| **Crop** | 20 | Sorghum, for grain | Yield | -999999 | NA |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201400200103** | **Study Area** | **ChT-Check SB** | Area (ha) | 0.01 | Tillage | Chisel Plow | Cover Crop | None |
| Practice ID | 3 | Practice Name | ChT-Check SB | General Practice | Conservation Tillage, Fertilizer | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NM-CCN-CT-SB-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Woodson silt loam [fine, smectitic, thermic Abruptic Argiaquoll], 1.0-1.5% slope | | | | | | | | |
| Fertilizer | Not applied on soybean plots. | | | | | | | | |
| Comments | | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 3 | Soybean, for grain | Yield | -999999 | NA |
| **Crop** | 21 | Soybean, for grain | Yield | -999999 | NA |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201400200104** | **Study Area** | **ChT-Check SG** | Area (ha) | 0.00 | Tillage | Chisel Plow | Cover Crop | None |
| Practice ID | 4 | Practice Name | ChT-Check SG | General Practice | Conservation Tillage, Fertilizer | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NM-CCN-CT-SG-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Woodson silt loam [fine, smectitic, thermic Abruptic Argiaquoll], 1.0-1.5% slope | | | | | | | | |
| Fertilizer | no P applied | | | | | | | | |
| Comments | | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 4 | Sorghum, for grain | Yield | -999999 | NA |
| **Crop** | 22 | Sorghum, for grain | Yield | -999999 | NA |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201400200105** | **Study Area** | **ChT-Knifed SB** | Area (ha) | 0.01 | Tillage | Chisel Plow | Cover Crop | None |
| Practice ID | 5 | Practice Name | ChT-Knifed SB | General Practice | Conservation Tillage, Fertilizer | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NM-CCN-CT-SB-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Woodson silt loam [fine, smectitic, thermic Abruptic Argiaquoll], 1.0-1.5% slope | | | | | | | | |
| Fertilizer | Not applied on soybean plots. | | | | | | | | |
| Comments | | | | | | | | | |

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|---|---|---|---|---|
| **Crop** | 5 | Soybean, for grain | Yield | -999999 NA |
| **Crop** | 23 | Soybean, for grain | Yield | -999999 NA |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201400200106** | **Study Area** | **ChT-Knifed SG** | Area (ha) | 0.00 | Tillage | Chisel Plow | Cover Crop | None |
| Practice ID | 6 | Practice Name | ChT-Knifed SG | General Practice | Conservation Tillage, Fertilizer | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NM-CCN-CT-SG-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Woodson silt loam [fine, smectitic, thermic Abruptic Argiaquoll], 1.0-1.5% slope | | | | | | | | |
| Fertilizer | In spring: 24 kg P/ha knifed into the soil approximately 10 cm deep on 38-cm centers.Phosphorus was applied as a liquid product containing 70 g N/kg, 95 g P /kg, and 58 g K /kg. Nitrogen was balanced at 112 kg/ha across all treatments using liquid ammonium nitrate solution containing 280 g N/ha. | | | | | | | | |
| Comments | | | | | | | | | |

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| **Crop** | 6 | Sorghum, for grain | Yield | -999999 NA |
| **Crop** | 24 | Sorghum, for grain | Yield | -999999 NA |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201400200107** | **Study Area** | **NT-Broadcast SB** | Area (ha) | 0.01 | Tillage | No Till | Cover Crop | None |
| Practice ID | 7 | Practice Name | NT-Broadcast SB | General Practice | Conservation Tillage, Fertilizer | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NC-CCN-NT-SB-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Woodson silt loam [fine, smectitic, thermic Abruptic Argiaquoll], 1.0-1.5% slope | | | | | | | | |
| Fertilizer | Not applied on soybean plots. | | | | | | | | |
| Comments | | | | | | | | | |

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|---|---|---|---|---|
| **Crop** | 7 | Soybean, for grain | Yield | -999999 NA |
| **Crop** | 25 | Soybean, for grain | Yield | -999999 NA |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201400200108** | **Study Area** | **NT-Broadcast SG** | Area (ha) | 0.00 | Tillage | No Till | Cover Crop | None |
| Practice ID | 8 | Practice Name | NT-Broadcast SG | General Practice | Conservation Tillage, Fertilizer | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NC-CCN-NT-SG-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Woodson silt loam [fine, smectitic, thermic Abruptic Argiaquoll], 1.0-1.5% slope | | | | | | | | |
| Fertilizer | In spring: 24 kg P/ha surface-broadcast.Phosphorus was applied as a liquid product containing 70 g N/kg, 95 g P /kg, and 58 g K /kg. Nitrogen was balanced at 112 kg/ha across all treatments using liquid ammonium nitrate solution containing 280 g N/ha. | | | | | | | | |
| Comments | | | | | | | | | |

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| **Crop** | 8 | Sorghum, for grain | Yield | -999999 | NA |
| **Crop** | 26 | Sorghum, for grain | Yield | -999999 | NA |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201400200109** | **Study Area** | **NT-Check SB** | Area (ha) | 0.01 | Tillage | No Till | Cover Crop | None |
| Practice ID | 9 | Practice Name | NT-Check SB | General Practice | Conservation Tillage, Fertilizer | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NM-CCN-NT-SB-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Woodson silt loam [fine, smectitic, thermic Abruptic Argiaquoll], 1.0-1.5% slope | | | | | | | | |
| Fertilizer | Not applied on soybean plots. | | | | | | | | |
| Comments | | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 9 | Soybean, for grain | Yield | -999999 | NA |
| **Crop** | 27 | Soybean, for grain | Yield | -999999 | NA |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201400200110** | **Study Area** | **NT-Check SG** | Area (ha) | 0.00 | Tillage | No Till | Cover Crop | None |
| Practice ID | 10 | Practice Name | NT-Check SG | General Practice | Conservation Tillage, Fertilizer | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NM-CCN-NT-SG-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Woodson silt loam [fine, smectitic, thermic Abruptic Argiaquoll], 1.0-1.5% slope | | | | | | | | |
| Fertilizer | no P applied | | | | | | | | |
| Comments | | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 10 | Sorghum, for grain | Yield | -999999 | NA |
| **Crop** | 28 | Sorghum, for grain | Yield | -999999 | NA |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201400200111** | **Study Area** | **NT-Knifed SB** | Area (ha) | 0.01 | Tillage | No Till | Cover Crop | None |
| Practice ID | 11 | Practice Name | NT-Knifed SB | General Practice | | Conservation Tillage, Fertilizer | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | | NM-CCN-NT-SB-EN | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Woodson silt loam [fine, smectitic, thermic Abruptic Argiaquoll], 1.0-1.5% slope | | | | | | | | |
| Fertilizer | Not applied on soybean plots. | | | | | | | | |
| Comments | | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 11 | Soybean, for grain | Yield | -999999 | NA |
| **Crop** | 29 | Soybean, for grain | Yield | -999999 | NA |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201400200112** | **Study Area** | **NT-Knifed SG** | Area (ha) | 0.00 | Tillage | No Till | Cover Crop | None |
| Practice ID | 12 | Practice Name | NT-Knifed SG | General Practice | | Conservation Tillage, Fertilizer | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | | NM-CCN-NT-SG-EN | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Woodson silt loam [fine, smectitic, thermic Abruptic Argiaquoll], 1.0-1.5% slope | | | | | | | | |
| Fertilizer | In spring: 24 kg P/ha knifed into the soil approximately 10 cm deep on 38-cm centers.Phosphorus was applied as a liquid product containing 70 g N/kg, 95 g P /kg, and 58 g K /kg. Nitrogen was balanced at 112 kg/ha across all treatments using liquid ammonium nitrate solution containing 280 g N/ha. | | | | | | | | |
| Comments | | | | | | | | | |

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| **Crop** | 12 | Sorghum, for grain | Yield | -999999 | NA |
| **Crop** | 30 | Sorghum, for grain | Yield | -999999 | NA |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201400200113** | **Study Area** | **RT-Broadcast SB** | Area (ha) | 0.01 | Tillage | Ridge Till | Cover Crop | None |
| Practice ID | 13 | Practice Name | RT-Broadcast SB | General Practice | | Conservation Tillage, Fertilizer | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | | NC-CCN-CT-SB-EN | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Woodson silt loam [fine, smectitic, thermic Abruptic Argiaquoll], 1.0-1.5% slope | | | | | | | | |
| Fertilizer | Not applied on soybean plots. | | | | | | | | |
| Comments | | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 13 | Soybean, for grain | Yield | -999999 | NA |
| **Crop** | 31 | Soybean, for grain | Yield | -999999 | NA |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201400200114** | **Study Area** | **RT-Broadcast SG** | Area (ha) | 0.00 | Tillage | Ridge Till | Cover Crop | None |
| Practice ID | 14 | Practice Name | RT-Broadcast SG | General Practice | Conservation Tillage, Fertilizer | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NC-CCN-CT-SG-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Woodson silt loam [fine, smectitic, thermic Abruptic Argiaquoll], 1.0-1.5% slope | | | | | | | | |
| Fertilizer | In spring: 24 kg P/ha surface-broadcast. Phosphorus was applied as a liquid product containing 70 g N/kg, 95 g P /kg, and 58 g K /kg. Nitrogen was balanced at 112 kg/ha across all treatments using liquid ammonium nitrate solution containing 280 g N/ha. | | | | | | | | |
| Comments | | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 14 | Sorghum, for grain | Yield | -999999 | NA |
| **Crop** | 32 | Sorghum, for grain | Yield | -999999 | NA |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201400200115** | **Study Area** | **RT-Check SB** | Area (ha) | 0.01 | Tillage | Ridge Till | Cover Crop | None |
| Practice ID | 15 | Practice Name | RT-Check SB | General Practice | Conservation Tillage, Fertilizer | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NM-CCN-CT-SB-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Woodson silt loam [fine, smectitic, thermic Abruptic Argiaquoll], 1.0-1.5% slope | | | | | | | | |
| Fertilizer | Not applied on soybean plots. | | | | | | | | |
| Comments | | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 15 | Soybean, for grain | Yield | -999999 | NA |
| **Crop** | 33 | Soybean, for grain | Yield | -999999 | NA |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201400200116** | **Study Area** | **RT-Check SG** | Area (ha) | 0.00 | Tillage | Ridge Till | Cover Crop | None |
| Practice ID | 16 | Practice Name | RT-Check SG | General Practice | Conservation Tillage, Fertilizer | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NM-CCN-CT-SG-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Woodson silt loam [fine, smectitic, thermic Abruptic Argiaquoll], 1.0-1.5% slope | | | | | | | | |
| Fertilizer | no P applied | | | | | | | | |
| Comments | | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 16 | Sorghum, for grain | Yield | -999999 | NA |
| **Crop** | 34 | Sorghum, for grain | Yield | -999999 | NA |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201400200117** | **Study Area** | **RT-Knifed SB** | Area (ha) | 0.01 | Tillage | Ridge Till | Cover Crop | None |
| Practice ID | 17 | Practice Name | RT-Knifed SB | General Practice | Conservation Tillage, Fertilizer | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NM-CCN-CT-SB-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Woodson silt loam [fine, smectitic, thermic Abruptic Argiaquoll], 1.0-1.5% slope | | | | | | | | |
| Fertilizer | Not applied on soybean plots. | | | | | | | | |
| Comments | | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 17 | Soybean, for grain | Yield | -999999 | NA |
| **Crop** | 35 | Soybean, for grain | Yield | -999999 | NA |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201400200118** | **Study Area** | **RT-Knifed SG** | Area (ha) | 0.00 | Tillage | Ridge Till | Cover Crop | None |
| Practice ID | 18 | Practice Name | RT-Knifed SG | General Practice | Conservation Tillage, Fertilizer | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Fertilizer | Practice Overview | NM-CCN-CT-SG-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Woodson silt loam [fine, smectitic, thermic Abruptic Argiaquoll], 1.0-1.5% slope | | | | | | | | |
| Fertilizer | In spring: 24 kg P/ha knifed into the soil approximately 10 cm deep on 38-cm centers. Phosphorus was applied as a liquid product containing 70 g N/kg, 95 g P /kg, and 58 g K /kg. Nitrogen was balanced at 112 kg/ha across all treatments using liquid ammonium nitrate solution containing 280 g N/ha. | | | | | | | | |
| Comments | | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 18 | Sorghum, for grain | Yield | -999999 | NA |
| **Crop** | 36 | Sorghum, for grain | Yield | -999999 | NA |

| Test Site ID | Test Site Name |
|---|---|
| **2013005224** | **LaLonde, V., 1996** |

| | | | | |
|---|---|---|---|---|
| Location | Bainesville | Ontario | XX | CA |
| Study Citation | 1996 | | | |
| | LaLonde, V., C. A. Madramootoo, L. Trenholm and R. S. Broughton. | | | |
| | Effects of controlled drainage on nitrate concentrations in subsurface drain discharge. | | | |
| | Agric. Water Manage. 29:187-199. | | | |
| NRCS LRR | Canada | | | |
| NRCS MLRA | Canada | | | |
| HUC_10 | -999999 | Test Site Scale | Plot | |
| Experimental Design Type/ Description | Multiple Treatments w/ Control and Replication | | | |
| | Randomized Complete Block with Replication. A water table management field study. | | | |
| Crops | Corn, Soybeans | | | |
| Study Duration | 2 years | | | |


Summary

A water table management field study was conducted on a Bainsville silt loam soil during 1992 and 1993. The water table levels studied were conventional free outlet subsurface drainage (FD), and controlled water tables (CWT) of 0.50 and 0.25 m above the drain level. The three treatments were replicated thrice resulting in nine plots, each measuring 115 m long by 18.69 m wide. A subsurface drain was installed 1.0 m deep in the center of each plot. Drain discharge, nitrate concentrations in drainage effluent, rainfall and water table elevations were measured during the two growing seasons. The plots were cropped with grain corn (Zea mays L.) in 1992 and soybean (Glycine max (L.) Mill.) in 1993. Controlled drainage had a significant effect on drain discharge quantity and quality. In 1992, the 0.25 and 0.50 c CWT treatments reduced drain flow by 58.7% and 65.3% respectively; and in 1993, by 40.9% and 95%, respectively, compared with the FD treatment. In 1992, there was a 75.9% and 68.9% reduction of nitrate concentration in drain flow with the 0.25 and 0.50 m CWT, respectively. While it was impossible to maintain the water tables consistently at 0.5 and 0.25 m throughout the growing season, these results show that there are significant environmental benefits with controlled drainage.


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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300522401** | **Study Area** | **CWT-0.25** | Area (ha) | 0.64 | Tillage | Ridge Till | Cover Crop | None |
| Practice ID | 386 | Practice Name | CWT-0.25 | General Practice | Drainage Water Management | | | Area Type | T |
| Category | Management | Study Focus | Controlled Drainage | Practice Overview | NM-CCN-CT-CS-ED | | | | |
| Irrigation | Yes | Irrig. Descrip. | No irrigation in 1993. | | | | | | |

Soils: The upper 1 m soil profile was comprised of three distinct layers: The upper zone (O-0.30 m) was a sandy loam, the 0.30-0.60 m zone was a loam, and there was a clay loam at 0.6-1.0 m overlying a marine clay. Measurements of the in-situ saturated hydraulic

Fertilizer: No fertilizer was applied, as soybean is a nitrogen fixing crop.

Comments: Three treatments with three replications were used in this study, each plot being 115 x 18.69m in size. A subsurface drain was installed 1.0 m deep along the center of each plot at a 0.1% slope. Plots were all cropped with corn in 1992 and with soybeans in 1993. The water table did not remain at the desired level due to evapotranspiration and deep seepage. Water samples were taken daily for one week in each of three months during the growing season each year. 1993 was considerably drier than 1992.

| | | | | |
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| **Crop** | 1 | grain corn (Zea mays L.) | Yield | -999999 |
| **Crop** | 2 | soybean (Glycine mux (L.) Merr.) | Yield | -999999 |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300522402** | **Study Area** | **CWT-0.50** | Area (ha) | 0.64 | Tillage | Ridge Till | Cover Crop | None |
| Practice ID | 387 | Practice Name | CWT-0.50 | General Practice | Drainage Water Management | | | Area Type | T |
| Category | Management | Study Focus | Controlled Drainage | Practice Overview | NM-CCN-CT-CS-ED | | | | |
| Irrigation | Yes | Irrig. Descrip. | Due to early dry summer/low water table, sprinkler irrigation in early July to raise water table. Irrigation occurred in three blocks. On 13 and 14 July, 72.3 mm applied to Block 1. Blocks 2 and 3 each received 75.5 mm on 15 and 16 July. 3X/day during irrigation, water samples were collected from flowing drains, and water table elevations were measured. Rain on 12/ 13 July 1992 raised both the 0.25 m CWT and FD over the 0.25 m WTD above the drain lines. On 13 July, the 31.5 mm applied on Block 1 raised the water table an average of 0.05 m, so all drain laterals on the FD and 0.25 m CWT plots flowed. The next day, 40.8 mm applied and raised water table an average of 0.20 m, as the soil moisture level was closer to field capacity after the first irrigation application. | | | | | | | |
| Soils | The upper 1 m soil profile was comprised of three distinct layers: The upper zone (O-0.30 m) was a sandy loam, the 0.30-0.60 m zone was a loam, and there was a clay loam at 0.6-1.0 m overlying a marine clay. Measurements of the in-situ saturated hydraulic | | | | | | | | |
| Fertilizer | Corn was planted on 13 May 1992 and side-dressed with 73 kg N/ha of liquid 6-24-6 fertilizer (anhydrous ammonia). Six weeks later, on 1 July, the ridges were reformed around the young corn stalks and another 168 kg/ha of liquid N fertilizer were applied. | | | | | | | | |
| Comments | Three treatments with three replications were used in this study, each plot being 115 x 18.69m in size. A subsurface drain was installed 1.0 m deep along the center of each plot at a 0.1% slope. Plots were all cropped with corn in 1992 and with soybeans in 1993. The water table did not remain at the desired level due to evapotranspiration and deep seepage. Water samples were taken daily for one week in each of three months during the growing season each year. 1993 was considerably drier than 1992. | | | | | | | | |

| | | | | |
|---|---|---|---|---|
| **Crop** | 1 | grain corn (Zea mays L.) | Yield | -999999 |
| **Crop** | 2 | soybean (Glycine mux (L.) Merr.) | Yield | -999999 |


Acknowledgement: Study summaries may be directly quoted from original author's abstract.

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300522403** | **Study Area** | **FD** | Area (ha) | 0.64 | Tillage | Ridge Till | Cover Crop | None |
| Practice ID | 385 | Practice Name | FD | General Practice | Control | | | Area Type | C |
| Category | Management | Study Focus | Controlled Drainage | Practice Overview | NM-CCN-CT-CS-EN | | | | |
| Irrigation | Yes | Irrig. Descrip. | Due to early dry summer/low water table, sprinkler irrigation in early July to raise water table. Irrigation occurred in three blocks. On 13 and 14 July, 72.3 mm applied to Block 1. Blocks 2 and 3 each received 75.5 mm on 15 and 16 July. 3X/day during irrigation, water samples were collected from flowing drains, and water table elevations were measured. Rain on 12/ 13 July 1992 raised both the 0.25 m CWT and FD over the 0.25 m WTD above the drain lines. On 13 July, the 31.5 mm applied on Block 1 raised the water table an average of 0.05 m, so all drain laterals on the FD and 0.25 m CWT plots flowed. The next day, 40.8 mm applied and raised water table an average of 0.20 m, as the soil moisture level was closer to field capacity after the first irrigation application. | | | | | | |
| Soils | The upper 1 m soil profile was comprised of three distinct layers: The upper zone (O-0.30 m) was a sandy loam, the 0.30-0.60 m zone was a loam, and there was a clay loam at 0.6-1.0 m overlying a marine clay. Measurements of the in-situ saturated hydraulic | | | | | | | | |
| Fertilizer | Corn was planted on 13 May 1992 and side-dressed with 73 kg N/ha of liquid 6-24-6 fertilizer (anhydrous ammonia). Six weeks later, on 1 July, the ridges were reformed around the young corn stalks and another 168 kg/ha of liquid N fertilizer were applied. | | | | | | | | |
| Comments | Three treatments with three replications were used in this study, each plot being 115 x 18.69m in size. A subsurface drain was installed 1.0 m deep along the center of each plot at a 0.1% slope. Plots were all cropped with corn in 1992 and with soybeans in 1993. The water table did not remain at the desired level due to evapotranspiration and deep seepage. Water samples were taken daily for one week in each of three months during the growing season each year. 1993 was considerably drier than 1992. | | | | | | | | |

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|---|---|---|---|---|
| **Crop** | 1 | grain corn (Zea mays L.) | Yield | -999999 |
| **Crop** | 2 | soybean (Glycine mux (L.) Merr.) | Yield | -999999 |


Acknowledgement: Study summaries may be directly quoted from original author's abstract.

| Test Site ID | Test Site Name |
|---|---|
| **2013005228** | **Langland, M. J., 1995** |
| Location | Fawn Grove, York, PA, US |
| Study Citation | 1995 |
| | Langland, M. J. and D. K. Fishel. |
| | Hydrology and the effects of selected agricultural best management practices in the Bald Eagle Creek watershed, York County, Pennsylvania, prior to and during nutrient management. |
| | U. S. Geological Survey. Water-Resources Investigations Report 93-4069. Lemoyne, Pennsylvania. |
| NRCS LRR | Northern Atlantic Slope Diversified Farming Region |
| NRCS MLRA | Northern Appalachian Ridges and Valleys |
| HUC_10 | 0205030613 — Test Site Scale: Subwatershed |
| Experimental Design Type/ Description | Before-After |
| | pre- and post-BMP |
| Crops | Corn, alfalfa, barley, oats/alfalfa, potatoes, rye, soybeans, wheat |
| Study Duration | 5 years |

Summary

The U.S. Geological Survey, in cooperation with the Susquehanna River Basin Commission and the Pennsylvania Department of Environmental Resources, conducted a study as part of the U.S. Environmental Protection Agency's Chesapeake Bay Program to determine the effects of nutrient management on surface-water quality by reducing animal units in a 0.43 square-mile agricultural watershed in York County. The study was conducted primarily from October 1985 through September 1990 prior to and during the implementation of nutrient-management practices designed to reduce nutrient and sediment discharges. Intermittent sampling continued until August 1991. The Bald Eagle Creek Basin is underlain by schist and quartzite. About 87 percent of the watershed is cropland and pasture. Nearly 33 percent of the cropland was planted in corn prior to nutrient management, whereas 22 percent of the cropland was planted in corn during the nutrient-management phase. The animal population was reduced by 49 percent during nutrient management. Average annual applications of nitrogen and phosphorus from manure to cropland were reduced by 3,940 pounds (39 percent) and 910 pounds (46 percent), respectively, during nutrient management. A total of 94,560 pounds of nitrogen (538 pounds per acre) and 26,400 pounds of phosphorus (150 pounds per acre) were applied to the cropland as commercial fertilizer and manure during the 5-year study. Core samples from the top 4 feet of soil were collected prior to and during nutrient management and analyzed for concentrations of nitrogen and phosphorus. The average amount of nitrate nitrogen in the soil ranged from 36 to 135 pounds per acre, and soluble phosphorus ranged from 0.39 to 2.5 pounds per acre, prior to nutrient management. During nutrient management, nitrate nitrogen in the soil ranged from 21 to 291 pounds per acre and soluble phosphorus ranged from 0.73 to 1.7 pounds per acre. Precipitation was about 18 percent below normal and streamflow was 35 percent below normal prior to nutrient management, whereas precipitation was 4 percent above normal and streamflow was 3 percent below normal during the first two years of nutrient management. Eighty-four percent of the 20.44 inches of streamflow was base flow prior to nutrient management and 54 percent of the 31.14 inches of streamflow was base flow during the first 2 years of the nutrient-management phase. About 31 percent of the measured precipitation during the first 4 years of the study was discharged as surface water; the remaining 69 percent was removed as

evapotranspiration or remained in groundwater storage. Median concentrations of total nitrogen and dissolved nitrate plus nitrate in base flow increased from 4.9 and 4.1 milligrams per liter as nitrogen, respectively, prior to nutrient management to 5.8 and 5.0 milligrams per liter, respectively, during nutrient management. Median concentrations of ammonia nitrogen and organic nitrogen did not change significantly in base flow. Median concentrations of total and dissolved phosphorus in base flow did not change significantly and were 0.05 and 0.03 milligrams per liter as phosphorus, respectively, prior to the management phase, and 0.05 and 0.04 milligrams per liter, respectively, during the management phase. Concentrations and loads of dissolved nitrate plus nitrate in base flow increased following wet periods after crops were harvested and manure was applied. During the growing season, concentrations and loads decreased as nutrient utilization and evapotranspiration by corn increased. About 4,550 pounds of sustained sediment, 5,300 pounds of nitrogen, and 70.4 pounds of phosphorus discharged in base flow in the 2 years prior to nutrient management. During the first 2 years of nutrient management about 2,860 pounds of sustained sediment, 5,700 pounds of nitrogen, and 46.6 pounds of phosphorus discharged in base flow. Prior to nutrient management, about 260,000 pounds of sustained sediment, about 2,180 pounds of nitrogen, and about 235 pounds of phosphorus discharged in stormflow. During the first two years of nutrient management about 464,000 pounds of suspended sediment, 6,120 pounds of nitrogen, and 912 pounds of phosphorus discharged in stormflow. The seasonal rank-sum test indicated that significant differences were detected in the medians of total nitrogen and dissolved nitrate plus nitrate in base flow prior to and during nutrient management. The seasonal Kendall test indicated significant upwards trends in concentrations and loads of total nitrogen and dissolved-nitrate plus nitrate measured in base flow during the entire study. Neither significant decreases nor trends were detected in the concentrations and loads for ammonia, ammonia plus organic nitrogen, phosphorus, or suspended sediment in base flow.

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300522801** | **Study Area** | **Fawn Grove** | Area (ha) | 111.29 | Tillage | Not specified | Cover Crop | |
| Practice ID | 465 | Practice Name | WY8687 | General Practice | | Control | | Area Type | C |
| Category | Management | Study Focus | Fertilizer | Practice Overview | | NC-CCN-CN-CO-EN | | | |
| Irrigation | No | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Glenelg channery and Elioak silt loam | | | | | | | | |
| Fertilizer | Farmers reported that approximately 61,740 lb of nitrogen and 16,610 lb of phosphorus where applied as manure and commercial fertilizer to cropland during the 2 years prior to the management phase | | | | | | | | |
| Comments | This study compares pre-BMP data (water years 1986 and 1987) with post-BMP data (water years 1988 and 1989) on a 275 acre agricultural watershed, where reductions were made in the number of animal units and applied nutrients. This watershed is underlain by non-carbonate rock. Average annual applied N and P were reduced from 30,870 and 8,305 lbs/yr in the pre-BMP period, to 10,940 and 3,263 lbs/yr, respectively, in the post-BMP period. The percent of streamflow due to baseflow changed from 83-85% in the pre-BMP years to 43-68% in the post-BMP years, due to increased rainfall in the post-BMP period. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Alfalfa | Yield | -999999 | NA |
| **Crop** | 2 | Barley | Yield | -999999 | NA |
| **Crop** | 3 | Corn | Yield | -999999 | NA |
| **Crop** | 4 | Oats/alfalfa | Yield | -999999 | NA |
| **Crop** | 5 | Soybeans | Yield | -999999 | NA |
| **Crop** | 6 | Wheat | Yield | -999999 | NA |
| **Crop** | 7 | Alfalfa | Yield | -999999 | NA |
| **Crop** | 8 | Corn | Yield | -999999 | NA |
| **Crop** | 9 | Oats/alfalfa | Yield | -999999 | NA |
| **Crop** | 10 | Potatoes | Yield | -999999 | NA |
| **Crop** | 11 | Soybeans | Yield | -999999 | NA |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300522802** | **Study Area** | **Fawn Grove** | Area (ha) | 111.29 | Tillage | Not specified | Cover Crop | Rye |
| Practice ID | 466 | Practice Name | WY8889 | General Practice | | Nutrient Management | | Area Type | T |
| Category | Management | Study Focus | Fertilizer | Practice Overview | | NM-CCY-CN-CO-EN | | | |
| Irrigation | No | Irrig. Descrip. | N/A (rainfall) | | | | | | |

| | |
|---|---|
| Soils | Glenelg channery and Elioak silt loam |
| Fertilizer | 32,820 lb of nitrogen and 9,790 lb of phosphorus were applied during the 3-year management phase |
| Comments | This study compares pre-BMP data (water years 1986 and 1987) with post-BMP data (water years 1988 and 1989) on a 275 acre agricultural watershed, where reductions were made in the number of animal units and applied nutrients. This watershed is underlain by non-carbonate rock. Average annual applied N and P were reduced from 30,870 and 8,305 lbs/yr in the pre-BMP period, to 10,940 and 3,263 lbs/yr, respectively, in the post-BMP period. The percent of streamflow due to baseflow changed from 83-85% in the pre-BMP years to 43-68% in the post-BMP years, due to increased rainfall in the post-BMP period. |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Alfalfa | Yield | -999999 | NA |
| **Crop** | 2 | Corn | Yield | -999999 | NA |
| **Crop** | 3 | Potatoes | Yield | -999999 | NA |
| **Crop** | 4 | Soybeans | Yield | -999999 | NA |
| **Crop** | 5 | Wheat | Yield | -999999 | NA |
| **Crop** | 6 | Alfalfa | Yield | -999999 | NA |
| **Crop** | 7 | Corn | Yield | -999999 | NA |
| **Crop** | 8 | Rye | Yield | -999999 | NA |
| **Crop** | 9 | Soybeans | Yield | -999999 | NA |
| **Crop** | 10 | Wheat | Yield | -999999 | NA |

| Test Site ID | Test Site Name |
|---|---|
| **2013007061** | **Lee et al. 2003** |

| | | | | |
|---|---|---|---|---|
| Location | | Story | IA | US |
| Study Citation | 2003 | | | |
| | Lee, K.H., T.M. Isenhart, and R.C. Schultz. | | | |
| | Sediment and Nutrient Removal in an Established Multi-Species Riparian Buffer | | | |
| | J. Soil Water Conserv. 58(1): 1-8. | | | |
| NRCS LRR | Central Feed Grains and Livestock Region | | | |
| NRCS MLRA | Central Iowa and Minnesota Till Prairies | | | |
| HUC_10 | 0708010504 | Test Site Scale | Plot | |
| Experimental Design Type/ Description | Multiple Treatments w/ Control and Replication | | | |
| | A field plot study; Triplicate plots | | | |
| Crops | Corn, Soybeans | | | |
| Study Duration | 19 months | | | |

Summary

A field plot study was conducted to determine the effectiveness of an established multi-species buffer in trapping sediment, nitrogen, and phosphorus from cropland runoff during natural rainfall events. Triplicate plots were installed in a previously established buffer with a 4.1 by 22.1 m (14 x 73 ft.) cropland source area paired with either no buffer, a 7.1 m (23 ft) switchgrass (Panicurn virgatum L. cv. Cave-n-Rock) buffer, or a 16.3 m (53.5 ft) switchgrass/woody buffer (7.1 m switchgrass/9.2 m woody) located at the lower end of each plot. The switchgrass buffer removed 95% of the sediment, 80% of the total-nitrogen (N), 62% of the nitrate-nitrogen (NO3-N), 78% of the total phosphorus (P), and 58% of the phosphate-phosphorus (PO,-P). The switchgrass/woody buffer removed 97% of the sediment, 94% of the total-N, 85% of the NO3-N, 91% of the total-P, and 80% of the PO,-P in the runoff. There was a significant negative correlation between the trapping effectiveness of the buffers and the intensity and total rainfall of individual storms. While the 7 m (23 ft) switchgrass buffer was effective in removing sediment and sediment-bound nutrients, the added width of the 16.3 m (53.5 ft) switchgrass/woody buffer increased the removal efficiency of soluble nutrients by over 20%. Similar or even greater reductions might have been found if the 16.3 m (53.5 ft) buffer had been planted completely to native warm-season grasses. In this buffer, combinations of the dense, stiff, native warm-season grass and woody vegetation improved the removal effectiveness for the nonpoint source pollutants from agricultural areas.

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300706101** | **Study Area** | **No Buffer** | Area (ha) | 0.01 | Tillage | Not specified | Cover Crop | Not specified |
| Practice ID | 1 | Practice Name | NB | General Practice | Control | | | Area Type | C |
| Category | Management | Study Focus | Buffer | Practice Overview | NC-CCN-CN-CS-EN | | | | |
| Irrigation | NR | Irrig. Descrip. | not reported | | | | | | |
| Soils | Soil of the adjacent crop field source area was a Clarion (fine-loamy, mixed, mesic typic Hapludoll) with an average slope of 8% (Dewitt, 1984). | | | | | | | | |
| Fertilizer | not reported | | | | | | | | |
| Comments | | | | | | | | | |

| | | | | |
|---|---|---|---|---|
| **Crop** | 1 | soybean | Yield | -999999 |
| **Crop** | 2 | corn | Yield | -999999 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300706102** | **Study Area** | **Switchgrass** | Area (ha) | 0.01 | Tillage | Not specified | Cover Crop | Not specified |
| Practice ID | 2 | Practice Name | SG | General Practice | Buffer | | | Area Type | T |
| Category | Structural | Study Focus | Buffer | Practice Overview | NC-CCN-CN-CS-EB | | | | |
| Irrigation | NR | Irrig. Descrip. | not reported | | | | | | |
| Soils | The soil under the multi-species riparian buffer was a Coland (fine-loamy, mixed, mesic cumulic Haplaquoll), with an average natural slope of 5%. Soil of the adjacent crop field source area was a Clarion (fine-loamy, mixed, mesic typic Hapludoll) with an | | | | | | | | |
| Fertilizer | not reported | | | | | | | | |
| Comments | | | | | | | | | |

| | | | | |
|---|---|---|---|---|
| **Crop** | 1 | soybean | Yield | -999999 |
| **Crop** | 2 | corn | Yield | -999999 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300706103** | **Study Area** | **Switchgrass/Woody** | Area (ha) | 0.02 | Tillage | Not specified | Cover Crop | Not specified |
| Practice ID | 3 | Practice Name | SGW | General Practice | Buffer | | | Area Type | T |
| Category | Structural | Study Focus | Buffer | Practice Overview | NC-CCN-CN-CS-EB | | | | |
| Irrigation | NR | Irrig. Descrip. | not reported | | | | | | |
| Soils | The soil under the multi-species riparian buffer was a Coland (fine-loamy, mixed, mesic cumulic Haplaquoll), with an average natural slope of 5%. Soil of the adjacent crop field source area was a Clarion (fine-loamy, mixed, mesic typic Hapludoll) with an | | | | | | | | |
| Fertilizer | not reported | | | | | | | | |
| Comments | Filter Strip/Riparian Buffer | | | | | | | | |

| | | | | |
|---|---|---|---|---|
| **Crop** | 1 | soybean | Yield | -999999 |
| **Crop** | 2 | corn | Yield | -999999 |

| Test Site ID | Test Site Name |
|---|---|
| **2013005238** | **Lietman, P. L., 1997a** |
| Location | Churchtown and Morga, Lancaster/Berks, PA, US |
| Study Citation | 1997<br>Lietman, P. L.<br>Evaluation of agricultural best management practices in the Conestoga River Headwaters, Pennsylvania: A summary report, 1982-90.<br>U. S. Geological Survey. Water-Supply Paper 2493. Denver, Colorado. |
| NRCS LRR | Northern Atlantic Slope Diversified Farming Region |
| NRCS MLRA | Conestoga Headwaters RCWP S |
| HUC_10 | 0205030611 Test Site Scale Watershed |
| Experimental Design Type/ Description | Before-After<br>pre- and post-BMP |
| Crops | Corn, alfalfa |
| Study Duration | |

Summary

The USGS studied BMPs in the Conestoga River Headwaters, Pa. for 9 years. (This report incorporates Lietman et al. 1997b)Surface water and groundwater were characterized at three scales – regional (188 sq. mi.), small watershed (5 sq. mi.), and field (22 and 47.5 acres). Only field-scale studies are entered into this BMP database. At the small watershed and field scales, water-quantity and water-quality data collected during the characterization phase were compared with similar data collected after implementation of BMPs. In carbonate parts of the study area, water and associated contaminants move rapidly from the land surface to the groundwater through highly permeable soils and fractured bedrock. Changes in groundwater level and chemistry were frequently found within 1 day of the onset of precipitation. Elevated concentrations of sediment, nutrients, and herbicides in surface water and groundwater reflect the intensive agricultural land use in the carbonate valleys. Pipe-outlet terracing, installed at a 22 acre field site underlain by carbonate rock, was effective in reducing sediment losses from the site, but total nitrogen and phosphorus losses with runoff were not significantly different before and after terracing. Although no measurable overall change in the relative amounts of runoff and recharge resulted from terracing, median concentrations of dissolved nitrate at 4 of 6 groundwater sampling locations increased after terrace installation. Nutrient applications were reduced at a 47.5 acre field site and a 1.4 sq. mi. subbasin of the small watershed after implementation of nutrient-management practices. At the field site, where discharge of dissolved nitrate in groundwater was 98% of the total nitrogen leaving the site with water, dissolved nitrate concentrations in groundwater from most of the sampled wells decreased significantly after implementation of nutrient management. In the 1.4 sq. mi. subbasin, nutrient management was beneficial in preventing increased concentration of dissolved nitrate plus nitrate in the base flow of streams in the subbasin. Findings include that BMPs are most effective if their overall effects on surface and groundwater systems are considered in their design. This consideration is particularly important in areas underlain by carbonate rock, in which groundwater is highly susceptible to contamination by agricultural chemicals applied to the land surface.

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300523801** | **Study Area** | **Field Site 1** | Area (ha) | 9.35 | Tillage | Conventional | Cover Crop | |
| Practice ID | 560 | Practice Name | Field Site 1-Terr | General Practice | | Terrace | | Area Type | T |
| Category | Structural | Study Focus | Terrace | Practice Overview | | NC-CCN-CN-CO-ET | | | |
| Irrigation | No | Irrig. Descrip. | N/A (rainfall) | | | | | | |

Soils: Underlain by weathered and fractured carbonate bedrcok. Hagerstown and Duffield silt-clay loams, weathered from limestone. Underlain by dolomitic rocks of Zooks Corner Formation.

Fertilizer: 320 lbs/acre/yr Nitrogen and 82 lbs/acre/yr Phosphorus. A variety of animal manures and some commercial fertilizer. Manures either surface-spread or injected.

Comments: Six pipe-outlet terraces, designed to accommodate a 5-in., 24-hour storm, were constructed in October and November 1984. Terraces were designed to trap runoff in ponds behind each terrace. The ponded runoff slowly drained into a perforated standpipe in each terrace and left the field through a solid outlet pipe, which extended from the most upgradient terrace to the base of the site. Part of the terracing BMP planned for the site was the establishment of an alfalfa field on the steep slope downgradient from the first terrace. This alfalfa field became established 2 years after terrace construction.

**Crop** 1 Corn Yield -999999

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300523802** | **Study Area** | **Field Site 2** | Area (ha) | 19.22 | Tillage | No-till/Minimum Till | Cover Crop | |
| Practice ID | 561 | Practice Name | Field Site 2-NM | General Practice | | Nutrient Management | | Area Type | T |
| Category | Management | Study Focus | Terrace, Fertilizer | Practice Overview | | NM-CCN-NT-CO-ET | | | |
| Irrigation | No | Irrig. Descrip. | N/A (rainfall) | | | | | | |

Soils: Underlain by weathered and fractured carbonate bedrcok. Hagerstown and Duffield silt-clay loams, weathered from limestone. Underlain by Milbach Formation and Snitz Creek Formation.

Fertilizer: 470 lbs/acre/yr Nitrogen and 100 lbs/acre/yr Phosphorus. A variety of animal manures and some commercial fertilizer. Manures either surface-spread or injected.

Comments: Terraces had been in place for almost 20 years before this study. Nutrient management resulted in decreased nutrient applications. At Field-Site 2, the average annual nitrogen applications decreased 22%, and phosphorus application decreased 29% from the pre- to the post-BMP period. Nutrient management was generally defined as limiting the application of nitrogen to match expected crop requirements for nitrogen. The nutrient-management recommendations were based on the nitrogen content of manure. Nutrient management plans took into account nutrients available from manure (on the basis of manure analysis), history of manure applications (for estimation of residual nitrogen), and estimated crop yields. Although reduction in manure applications commonly resulted in reduced inputs of phosphorus to the cropland, the phosphorus inputs generally continued to exceed crop requirements.

**Crop** 1 Corn Yield -999999

| Test Site ID | Test Site Name |
|---|---|
| **2013001001** | **Padova University Farm** |
| Location | XX IT |
| Study Citation | 2005 |
| | Borina, Maurizio; Monica Vianelloa, Francesco Moraria, Giuseppe Zanin |
| | Effectiveness of buffer strips in removing pollutants in runoff from a cultivated field in North-East Italy |
| NRCS LRR | Italy |
| NRCS MLRA | Italy |
| HUC_10 | -999999 Test Site Scale Plot |
| Experimental Design Type/ Description | Multiple Treatments w/ Control and Replication |
| | Plot/Control Study; field experiment |
| Crops | Corn, Soybeans, Wheat |
| Study Duration | 4 years |

Summary

The effect of a 6 m buffer strip (BS) in reducing runoff, suspended solids and nutrients from a field growing maize, winter wheat and soybean was assessed in a field experiment conducted in North-East Italy during 1998–2001. The BS was composed of two rows of regularly alternating trees (Platanus hybrida Brot.) and shrubs (Viburnum opulus L.), with grass (Festuca arundinacea L.) in the inter-rows. The BS reduced total runoff by 78% compared to no-BS, in which cumulative runoff depth was 231 mm over 4 years. With no-BS, runoff appeared to be influenced mostly by total rainfall, while with BS maximum rainfall intensity was more important.Thee BS reduced TSS, particularly after the second year, when the median yearly concentrations ranged from 0.28 to 0.99 mg/L and were smaller than 0.14 mg/L, with no-BS and with BS respectively. The combination of lower concentrations and runoff volumes significantly reduced TSS losses from 6.9 to 0.4 t/ha over the entire period. A tendency to increased concentrations of all forms of N (total, nitrate and ammonium) while passing through the BS was observed, but total N losses were reduced from 17.3 to 4.5 kg/ha in terms of mass balance. On the contrary, P concentrations were unmodified (soluble P), or lowered (total P) by the BS, reducing total losses by about 80%. The effect on total P, composed mainly of sediment-bound forms, was related to particulate settling when passing through the BS. A numerical index (Eutrophic Load Index), integrating water quality and runoff volumes, was created to evaluate the eutrophication risk of runoff with or without the BS. It showed that the BS effect was mostly due to a reduction of runoff volumes rather than improving the overall water quality.


Acknowledgement: Study summaries may be directly quoted from original author's abstract.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Study ID** | **201300100101** | **Study Area** | **Field with BS** | Area (ha) | -99.00 | Tillage | Not specified | Cover Crop | None |
| Practice ID | 1 | Practice Name | Buffer Strip | General Practice | Filter Strip | Area Type | T |
| Category | Structural | Study Focus | Buffer | Practice Overview | NC-CCN-CN-CS-EB | | |
| Irrigation | No | Irrig. Descrip. | Not applicable | | | | |
| Soils | Per FAO-UNESCO (1990): soil is fulvi-calcaric Cambisol, with loamy texture in upper 80 cm; sand percentage gradually increases with depth, reaching 50–60% at 1–1.4 m. Soil infiltration rates varied from 2.8x10^-3 cm/s in avg. conditions to 2.7x10^-4 cm/s | | | | | | |
| Fertilizer | Fertilizer treatment (kg/ha) 6 November 1997: 32 N, 20 P5 March 1998: 150 N14 April 1999: 32 N, 20 P31 May 1999: 150 N27 April 2000: 32 N, 20 P24 May 2000: 150 N25 October 2000 : 32 N, 20 P19 February 2001: 100 N3 July 2001: 16 N, 10 P | | | | | | |
| Comments | The experimental site is a rectangular field, with a 35 m long 1.8% slope downwards to a ditch. The BS studied in this paper was composed of two rows of regularly alternating trees (Platanus hybrida Brot.) and shrubs (Viburnum opulus L.) planted in spring 1997. The two rows were 1.5 and 4.5 m from the ditch, planted 2 m apart in the center of 1.2 m wide ethylenevinyl acetate (EVA) film. Festuca arundinacea L. was sown at a density of 30 kg/ha on the remaining area to form grass cover. Each treatment had two replicates. | | | | | | |

| | | | | |
|---|---|---|---|---|
| **Crop** | 1 | Winter Wheat | Yield | -999999 |
| **Crop** | 2 | Maize | Yield | -999999 |
| **Crop** | 3 | Maize | Yield | -999999 |
| **Crop** | 4 | Winter Wheat | Yield | -999999 |
| **Crop** | 5 | Soybean | Yield | -999999 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Study ID** | **201300100102** | **Study Area** | **Field without BS** | Area (ha) | -99.00 | Tillage | Not specified | Cover Crop | None |
| Practice ID | 2 | Practice Name | Control | General Practice | Control | Area Type | C |
| Category | Structural | Study Focus | Buffer | Practice Overview | NC-CCN-CN-CS-EN | | |
| Irrigation | No | Irrig. Descrip. | Not applicable | | | | |
| Soils | Per FAO-UNESCO (1990): soil is fulvi-calcaric Cambisol, with loamy texture in upper 80 cm; sand percentage gradually increases with depth, reaching 50–60% at 1–1.4 m. Soil infiltration rates varied from 2.8x10^-3 cm/s in avg. conditions to 2.7x10^-4 cm/s | | | | | | |
| Fertilizer | Fertilizer treatment (kg/ha) 6 November 1997: 32 N, 20 P5 March 1998: 150 N14 April 1999: 32 N, 20 P31 May 1999: 150 N27 April 2000: 32 N, 20 P24 May 2000: 150 N25 October 2000 : 32 N, 20 P19 February 2001: 100 N3 July 2001: 16 N, 10 P | | | | | | |
| Comments | | | | | | | |

| | | | | |
|---|---|---|---|---|
| **Crop** | 6 | Winter Wheat | Yield | -999999 |
| **Crop** | 7 | Maize | Yield | -999999 |
| **Crop** | 8 | Maize | Yield | -999999 |
| **Crop** | 9 | Winter Wheat | Yield | -999999 |

| | | | | |
|---|---|---|---|---|
| **Crop** | 10 | Soybean | Yield | -999999 |

| Test Site ID | Test Site Name |
|---|---|
| **2013005334** | **Peterjohn, W. T., 1996** |

| | | | | |
|---|---|---|---|---|
| Location | Edgewater | Anne Arundel | MD | US |
| Study Citation | 1986 | | | |
| | Peterjohn, W.T. and D.L. Correll. | | | |
| | The effect of riparian forest on the volume and chemical composition of baseflow in an agricultural watershed. | | | |
| | In: D. L. Correll (ed.) Watershed research perspectives. Smithsonian Institution Press: Washington, DC. | | | |
| NRCS LRR | Northern Atlantic Slope Diversified Farming Region | | | |
| NRCS MLRA | Northern Appalachian Ridges and Valleys | | | |
| HUC_10 | 0206000403 | Test Site Scale | Farm | |
| Experimental Design Type/ Description | Inflow-Outflow (Downstream) | | | |
| | Groundwater inflow through a riparian buffer compared to instream water quality downstream of buffer. Groundwater compared to downstream water quality. | | | |
| Crops | Corn, tobacco | | | |
| Study Duration | 2 years | | | |


Summary

For two years the nutrient, chloride, and hydronium ion concentrations in groundwater leaving agricultural fields and entering an adjacent riparian forest were compared to the chemical concentrations in stream water draining the riparian forest under baseflow conditions. Yearly mean nitrate-N concentrations decreased by approximately 4 mg/L whereas the chloride concentration increased by 3 mg/L due to evapotranspiration. The yearly mean pH increased by approximately one pH unit. The volumes of precipitation and baseflow were used in conjunction to estimate an annual water budget for the riparian forest. The water budget, in turn, was used with the chemical compositions of precipitation, groundwater, and baseflow to calculate the change in the chemical load in groundwater moving through the riparian forest. From this study, a riparian forest in a coastal plain agricultural watershed: (a) acted as a important sink for nitrate-N; (b) significantly reduced the acidity of the groundwater and precipitation which enters it.


| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300533401** | **Study Area** | **Lamberton** | Area (ha) | 16.31 | Tillage | Not specified | Cover Crop | None |
| Practice ID | 704 | Practice Name | Rip Buffer | General Practice | Riparian Buffer | | | Area Type | T |
| Category | Structural | Study Focus | Buffer | Practice Overview | NC-CCN-CN-CEX-EB | | | | |
| Irrigation | No | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | non-calcareous fine sandy loam | | | | | | | | |
| Fertilizer | | | | | | | | | |
| Comments | This 40.3-ac watershed has an average basin slope of 5.44%, and includes 14.6-ac of hedgerows and riparian forest, which completely surround the stream draining the watershed. Stream water discharge was measured and weekly volume-integrated stream samples were taken at a v-notch weir. Seven wells in two clusters in the first year and 10 wells in two clusters in the second year were sampled to calculate inflow to the forest buffer. The first year was 03/81 through 02/82, while the second year was measured as 03/84 through 02/85. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | corn, tobacco | Yield | -999999 | NA |
| **Crop** | 2 | corn, tobacco | Yield | -999999 | NA |

| Test Site ID | Test Site Name |
|---|---|
| **2013005352** | **Randall, G. W., 1990** |

| | | | | |
|---|---|---|---|---|
| Location | Waseca | Waseca | MN | US |
| Study Citation | 1990 | | | |
| | Randall, G. W. | | | |
| | Nitrate-N in the soil profile and tile drainage water as influenced by tillage. | | | |
| | Am. J. Ind. Med. 18:457-460. | | | |
| NRCS LRR | Central Feed Grains and Livestock Region | | | |
| NRCS MLRA | Till Plains | | | |
| HUC_10 | 0704000202 | Test Site Scale | Plot | |
| Experimental Design Type/ Description | Multiple Treatments w/ Control | | | |
| | plot study with replications | | | |
| Crops | Corn | | | |
| Study Duration | 5 years | | | |


Summary

Conservation tillage systems facilitate the infiltration of greater amounts of precipitation into the soil profile by reducing surface runoff. Some scientists are concerned that higher infiltration and percolation rates are often linked to potentially higher leaching losses of agricultural chemicals. Soil samples were taken in 1 ft increments to a depth of 5 ft to ascertain the accumulation and distribution of nitrate nitrogen (NO3-N) in the soil profile as influenced by tillage. Two long-term tillage studies on fine-textured, clay loam soils were sampled in July and November 1977 following 2 years of limited rainfall. Nitrate-N accumulation in the 0 to 3 ft profile in late July was reduced by 75% (no tillage) to 38% (chisel plow) compared with the conventional moldboard tillage system in this 8-year study. Accumulation in the 0 to 5 ft profile after harvest was 751, 546, 345, and 198 lb NO3-N/A for the moldboard plow, chisel-plow, disk-, and no-tillage systems, respectively. Another 3 year study showed accumulations of 625, 619, 468, and 391 pounds NO3-N/A after harvest with the moldboard plow, ridge-plant, chisel-plow, and no-tillage systems, respectively. These data indicate that tillage can have substantial effects on the accumulation of NO3 in soils and that additional research is needed to determine the mechanisms responsible for these differences.


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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300535201** | **Study Area** | **Waseca-MB** | Area (ha) | -99.00 | Tillage | Conventional | Cover Crop | None |
| Practice ID | 721 | Practice Name | Mbplow | General Practice | | Control | | Area Type | C |
| Category | Management | Study Focus | Tillage | Practice Overview | | NC-CCN-CN-CO-EN | | | |
| Irrigation | No | Irrig. Descrip. | natural rainfall | | | | | | |
| Soils | Webster clay loam | | | | | | | | |
| Fertilizer | Nitrogen applied at 180 pounds N/A as ammonium nitrate was spring-applied annually to continuous corn on this clay loam site. | | | | | | | | |
| Comments | This tile drainage plot study reports results for four different treatments over 15 years at the Southern Minnesota Research Station. The data included in this database was for only two of those treatments - moldboard plowing and no-tillage over the 5-year period from 1982-1986. Nitrogen was spring-applied at 180 lbs of N/ac as ammonium nitrate annually to continuous corn on these plots. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | continuous corn | Yield | 134 | bushels/acre |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300535202** | **Study Area** | **Waseca_NT** | Area (ha) | -99.00 | Tillage | No Till | Cover Crop | None |
| Practice ID | 722 | Practice Name | NT | General Practice | Conservation Tillage | | | Area Type | T |
| Category | Management | Study Focus | Tillage | Practice Overview | NC-CCN-NT-CO-EN | | | | |
| Irrigation | No | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Webster clay loam | | | | | | | | |
| Fertilizer | Nitrogen applied at 180 pounds N/A as ammonium nitrate was spring-applied annually to continuous corn on this clay loam site. | | | | | | | | |
| Comments | This tile drainage plot study reports results for four different treatments over 15 years at the Southern Minnesota Research Station. The data included in this database was for only two of those treatments - moldboard plowing and no-tillage over the 5-year period from 1982-1986. Nitrogen was spring-applied at 180 lbs of N/ac as ammonium nitrate annually to continuous corn on these plots. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | continuous corn | Yield | 128 | bushels/acre |

| Test Site ID | Test Site Name |
|---|---|
| **2013005353** | **Randall, G. W., 1995** |
| Location | Waseca, Waseca, MN, US |
| Study Citation | 1995<br>Randall, G. W. and T. K. Iragavarapu.<br>Impact of long-term tillage systems for continuous corn on nitrate leaching to tile drainage.<br>J. Environ. Qual. 24:360-366. |
| NRCS LRR | Central Feed Grains and Livestock Region |
| NRCS MLRA | Till Plains |
| HUC_10 | 0704000202 Test Site Scale Plot |
| Experimental Design Type/ Description | Multiple Treatments w/ Control and Replication<br>plot study: complete randomized block; subsurface |
| Crops | Corn |
| Study Duration | 11 years |

Summary

An 11 year study was conducted to assess the long term nitrate losses to subsurface tile drainage for corn with continuous conventional tillage and no-till. Information is lacking on the long-term impact of tillage systems on NO3 losses to surface and groundwater. An 11-yr (1982-1992) study was conducted to assess NO3 losses to subsurface, tile drainage for corn (Zea mays L.) grown with continuous conventional tillage (CT) and no tillage (NT) on a poorly drained Webster clay loam soil (fine-loamy, mixed, mesic Typic Haplaquoll) at Waseca, MN. Nitrogen was applied at an annual application rate of 200 kg/ha. Mean annual subsurface drain flow during the 11-yr period was 35 mm higher for NT (315 mm) compared with CT (280 mm). Flow-weighted nitrate-nitrogen (NO3-N) concentrations increased dramatically in the wet years (1990 and 1991) following the dry period of 1987 to 1989. Flow-weighted NO3-N concentrations during the 11-yr period averaged 13.4 and 12.0 mg/L for CT and NT, respectively. Although subsurface drain flow was 12% higher with NT, NO3-N losses were about 5% higher with CT mainly due to higher NO3-N concentrations with CT in the last 2 yr. Corn grain yields and N removal were significantly higher in 6 out of 11 yr with CT compared with NT with no difference between tillage systems in the other 5 yr. Grain yields averaged 8.6 Mg/Ha with CT and 7.3 Mg/ha with NT during the 11-yr period. Multiple regression equations showed that annual flow-weighted NO3-N concentration is best predicted from residual soil NO3 in the 0- to 1.2-m profile and spring rainfall while NO3-N flux can be predicted well from May to June rainfall. Results from this long-term study indicate that on this poorly drained soil, CT had a positive effect on corn grain yield and N removal compared with NT, but tillage systems had minimal impact on NO3 losses to subsurface drain flow. Higher drain flow with NT does not necessarily result in higher NO3-N fluxes lost via subsurface drainage.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300535301** | **Study Area** | **CT** | Area (ha) | 0.02 | Tillage | Conventional | Cover Crop | None |
| Practice ID | 723 | Practice Name | CT | General Practice | | Control | | Area Type | C |
| Category | Management | Study Focus | Tillage | Practice Overview | | NM-CCN-CN-CO-EN | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |

Soils: Webster clay loam (Typic Haplaquoll)

Fertilizer: Fertilizer N as ammonium nitrate was broadcast-applied at a rate of 200 kg N/ha (the recommended N rate for continuous corn on this soil) each spring before planting. Fertilizer P and K were not applied due to the high soil test levels of these nutrients. Insecticide was applied in a band over the corn row to control soil-borne insects. Weeds were controlled extremely well with a preemergence broadcast-application of herbicides.

Comments: Eight tile-drained plots - each 13.5 x 15m - were used in this study to compare the nitrate loading impacts of conventional tillage (CT) with no-tillage (NT). Corn was planted annually on the entire experimental area. The two treatments were replicated 4 times each, with tillage treatments assigned within each replication to minimize the effect of spatial hydrologic flow variation on drainage flow from the two systems. Fertilizer N was broadcast applied at the recommended rate ( 200 kg N/ ha) annually. Daily flow rates were determined each weekday by measuring the amount of water flowing in each tile drain during a 1-min interval and converting to L/day. Water quality samples were taken up to 3 times a week (Mon, Wed, and Fri) so long as tile flow exceeded 30 mL/min. Flow-weighted mean NO3-N concentrations were calculated on a daily and annual basis.

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Continuous Corn | Yield | 9.2 | Mg/ha |
| **Crop** | 2 | Continuous Corn | Yield | 6.6 | Mg/ha |
| **Crop** | 3 | Continuous Corn | Yield | 7.4 | Mg/ha |
| **Crop** | 4 | Continuous Corn | Yield | 10.1 | Mg/ha |
| **Crop** | 5 | Continuous Corn | Yield | 9 | Mg/ha |
| **Crop** | 6 | Continuous Corn | Yield | 9.9 | Mg/ha |
| **Crop** | 7 | Continuous Corn | Yield | 6.3 | Mg/ha |
| **Crop** | 8 | Continuous Corn | Yield | 9.6 | Mg/ha |
| **Crop** | 9 | Continuous Corn | Yield | 9.2 | Mg/ha |
| **Crop** | 10 | Continuous Corn | Yield | 10.2 | Mg/ha |
| **Crop** | 11 | Continuous Corn | Yield | 7.6 | Mg/ha |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300535302** | **Study Area** | **NT** | Area (ha) | 0.02 | Tillage | No Till | Cover Crop | None |
| Practice ID | 724 | Practice Name | NT | General Practice | Conservation Tillage | | | Area Type | T |
| Category | Management | Study Focus | Tillage | Practice Overview | NM-CCN-NT-CO-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |

Soils: Webster clay loam (Typic Haplaquoll)

Fertilizer: Fertilizer N as ammonium nitrate was broadcast-applied at a rate of 200 kg N/ha (the recommended N rate for continuous corn on this soil) each spring before planting. Fertilizer P and K were not applied due to the high soil test levels of these nutrients. Insecticide was applied in a band over the corn row to control soil-borne insects. Weeds were controlled extremely well with a preemergence broadcast-application of herbicides.

Comments: Eight tile-drained plots - each 13.5 x 15m - were used in this study to compare the nitrate loading impacts of conventional tillage (CT) with no-tillage (NT). Corn was planted annually on the entire experimental area. The two treatments were replicated 4 times each, with tillage treatments assigned within each replication to minimize the effect of spatial hydrologic flow variation on drainage flow from the two systems. Fertilizer N was broadcast applied at the recommended rate ( 200 kg N/ ha) annually. Daily flow rates were determined each weekday by measuring the amount of water flowing in each tile drain during a 1-min interval and converting to L/day. Water quality samples were taken up to 3 times a week (Mon, Wed, and Fri) so long as tile flow exceeded 30 mL/min. Flow-weighted mean NO3-N concentrations were calculated on a daily and annual basis.

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Continuous Corn | Yield | 9 | Mg/ha |
| **Crop** | 2 | Continuous Corn | Yield | 6.4 | Mg/ha |
| **Crop** | 3 | Continuous Corn | Yield | 6.7 | Mg/ha |
| **Crop** | 4 | Continuous Corn | Yield | 9.1 | Mg/ha |
| **Crop** | 5 | Continuous Corn | Yield | 8.5 | Mg/ha |
| **Crop** | 6 | Continuous Corn | Yield | 9.6 | Mg/ha |
| **Crop** | 7 | Continuous Corn | Yield | 5.2 | Mg/ha |
| **Crop** | 8 | Continuous Corn | Yield | 8 | Mg/ha |
| **Crop** | 9 | Continuous Corn | Yield | 6.6 | Mg/ha |
| **Crop** | 10 | Continuous Corn | Yield | 7.6 | Mg/ha |
| **Crop** | 11 | Continuous Corn | Yield | 4 | Mg/ha |


Acknowledgement: Study summaries may be directly quoted from original author's abstract.

| Test Site ID | Test Site Name |
|---|---|
| **2013005354** | **Randall, G. W., 1997** |
| Location | Lamberton, Redwood, MN, US |
| Study Citation | 1997 |
| | Randall, G. W., D. R. Huggins, M. P. Russelle, D. J. Fuchs, W. W. Nelson and J. L. Anderson. |
| | Nitrate losses through subsurface tile drainage in Conservation Reserve Program, alfalfa, and row crop systems. |
| | J. Environ. Qual. 26:1240-1247. |
| NRCS LRR | Central Feed Grains and Livestock Region |
| NRCS MLRA | Till Plains |
| HUC_10 | 0702000804 Test Site Scale Plot |
| Experimental Design Type/ Description | Multiple Treatments w/ Control and Replication |
| | plot study: complete randomized block; edge of field |
| Crops | Continuous Corn, Corn-Soybean Rotation, Alfalfa, CRP |
| Study Duration | 6 years |

Summary

A 6 year study to determine the NO3 losses to subsurface tile drainage under different cropping systems, focusing on perennial crops used in CRP. Four cropping systems were: continuous corn, corn-soybean, alfalfa, and CRP. The four cropping systems were established in 1988 to determine aboveground biomass yields, N uptake, residual soil N (RSN), soil water content, and NO3 losses to subsurface tile drainage water as influenced by cropping system. Hydrologic year rainfall during the 6-yr study ranged from 23% below normal to 66% above normal. In dry years, yields were limited, RSN accumulated at elevated levels in all crop systems but especially in the row-crop systems, soil water reserves and RSN were reduced to as deep as 2.7 m in the alfalfa (Medicago sativa L.) and CRP systems, and tile drainage did not occur. Drainage occurred only in the corn (Zea mays L.) and soybean [Glycine max (L.) Merr.] systems in the year of normal rainfall. In years of excess precipitation, drainage from the row-crop systems exceeded that from the perennial crops by 1.1 to 5.3X. Flow-weighted average NO3-N concentrations in the water during the flow period of this study ere continuous corn = 32, corn-soybean rotation = 24, alfalfa = 3 and CRP = 2 mg/L. Nitrate losses in the subsurface drainage water for the continuous corn and corn-soybean systems were about 37X and 35X higher, respectively, than from the alfalfa and CRP systems due primarily to greater season-long ET resulting in less drainage and greater uptake and/or immobilization of N by the perennial crops.Descp. From MN Dbase: Corn was planted annually in the entire study area starting in 1973. Nitrogen was not applied to corn in the 8 years prior to the study. In the spring of 1988 after secondary tillage, the cropping systems (continuous corn (CC), corn after soybean (C_Sb), soybean after corn (Sb_C), alfalfa, and CRP) were established and replicated three times in a randomized complete block design. Annual N application rates for corn were determined from the nitrate-nitrogen content in soil samples, previous crop (corn or soy), and a yield goal of 8800 kg/ha.


Acknowledgement: Study summaries may be directly quoted from original author's abstract.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300535401** | **Study Area** | **Continuous Corn** | Area (ha) | 0.02 | Tillage | Conventional (Moldboard plow) | Cover Crop | None |
| Practice ID | 1 | Practice Name | Continuous Corn | General Practice | Control | | | Area Type | C |
| Category | Management | Study Focus | CRP, Crop Rotations | Practice Overview | NC-CCN-CN-CO-EN | | | | |
| Irrigation | NR | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Normania clay loam (Aquic Haplustoll) | | | | | | | | |
| Fertilizer | Annual N application rates for corn were determined from the NO3-N content in soil samples taken to a 1.2 m depth in April, previous crop (corn or soybean), and a yield goal of 8800 kg/ha. Urea was broadcast applied for corn each spring and incorporated within 24h by cultivation. Fertilizer P and K were not applied to the corn, soybean, or CRP plots because of very high soil tests for the nutrients. | | | | | | | | |
| Comments | Subsurface tile drainage systems were used on 15 individual 13.7 x 15.3 m plots with separate drain outlets in this study. Four different treatments were used in this study. Two of these were applicable to this database - continuous corn (CC) and areas planted to the Conservation Reserve Program (CRP). Three replicates of each treatment were used. After a single disking, the CRP plots were planted to a mixture of alfalfa, smooth bromegrass, orchardgrass, and timothy, interseeded with a companion crop of oats. Annual N application rates for corn were determined from soil N tests, the previous crop and a yield goal of 8800 kg/ha. No N was applied to the CRP plots. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Continuous Corn | Yield | 2730 | dry matter, kg/ |
| **Crop** | 2 | Continuous Corn | Yield | 5880 | dry matter, kg/ |
| **Crop** | 3 | Continuous Corn | Yield | 6370 | dry matter, kg/ |
| **Crop** | 4 | Continuous Corn | Yield | 7780 | dry matter, kg/ |
| **Crop** | 5 | Continuous Corn | Yield | 8280 | dry matter, kg/ |
| **Crop** | 6 | Continuous Corn | Yield | 5180 | dry matter, kg/ |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300535402** | **Study Area** | **Corn after soybean** | Area (ha) | 0.02 | Tillage | Conventional (Moldboard plow) | Cover Crop | None |
| Practice ID | 2 | Practice Name | Corn after soybean | General Practice | Control | | | Area Type | C |
| Category | Management | Study Focus | CRP, Crop Rotations | Practice Overview | NC-CCN-CN-CS-EN | | | | |
| Irrigation | NR | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Normania clay loam (Aquic Haplustoll) | | | | | | | | |
| Fertilizer | Annual N application rates for corn were determined from the NO3-N content in soil samples taken to a 1.2 m depth in April, previous crop (corn or soybean), and a yield goal of 8800 kg/ha. Urea was broadcast applied for corn each spring and incorporated within 24h by cultivation. Fertilizer P and K were not applied to the corn, soybean, or CRP plots because of very high soil tests for the nutrients. | | | | | | | | |
| Comments | Subsurface tile drainage systems were used on 15 individual 13.7 x 15.3 m plots with separate drain outlets in this study. Four different treatments were used in this study. Two of these were applicable to this database - continuous corn (CC) and areas planted to the Conservation Reserve Program (CRP). Three replicates of each treatment were used. After a single disking, the CRP plots were planted to a mixture of alfalfa, smooth bromegrass, orchardgrass, and timothy, interseeded with a companion crop of oats. Annual N application rates for corn were determined from soil N tests, the previous crop and a yield goal of 8800 kg/ha. No N was applied to the CRP plots. | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 1 | Corn after soybean | Yield | 2410 | dry matter, kg/ |
| **Crop** | 2 | Corn after soybean | Yield | 5710 | dry matter, kg/ |
| **Crop** | 3 | Corn after soybean | Yield | 6520 | dry matter, kg/ |
| **Crop** | 4 | Corn after soybean | Yield | 9040 | dry matter, kg/ |
| **Crop** | 5 | Corn after soybean | Yield | 7090 | dry matter, kg/ |
| **Crop** | 6 | Corn after soybean | Yield | 5590 | dry matter, kg/ |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300535403** | **Study Area** | **Soybean after corn** | Area (ha) | 0.02 | Tillage | Field Cultivated | Cover Crop | None |
| Practice ID | 3 | Practice Name | Soybean after corn | General Practice | | Control | | Area Type | C |
| Category | Management | Study Focus | CRP, Crop Rotations | Practice Overview | | NM-CCN-CT-CS-EN | | | |
| Irrigation | NR | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Normania clay loam (Aquic Haplustoll) | | | | | | | | |
| Fertilizer | -999999 | | | | | | | | |
| Comments | Subsurface tile drainage systems were used on 15 individual 13.7 x 15.3 m plots with separate drain outlets in this study. Four different treatments were used in this study. Two of these were applicable to this database - continuous corn (CC) and areas planted to the Conservation Reserve Program (CRP). Three replicates of each treatment were used. After a single disking, the CRP plots were planted to a mixture of alfalfa, smooth bromegrass, orchardgrass, and timothy, interseeded with a companion crop of oats. Annual N application rates for corn were determined from soil N tests, the previous crop and a yield goal of 8800 kg/ha. No N was applied to the CRP plots. | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 1 | Soybean after corn | Yield | 1270 | dry matter, kg/ |
| **Crop** | 2 | Soybean after corn | Yield | 2690 | dry matter, kg/ |
| **Crop** | 3 | Soybean after corn | Yield | 2720 | dry matter, kg/ |
| **Crop** | 4 | Soybean after corn | Yield | 2540 | dry matter, kg/ |
| **Crop** | 5 | Soybean after corn | Yield | 2120 | dry matter, kg/ |
| **Crop** | 6 | Soybean after corn | Yield | 1990 | dry matter, kg/ |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300535404** | **Study Area** | **Alfalfa** | Area (ha) | 0.02 | Tillage | Disked | Cover Crop | None |
| Practice ID | 4 | Practice Name | Alfalfa | General Practice | Control | | | Area Type | C |
| Category | Management | Study Focus | CRP, Crop Rotations | Practice Overview | NC-CCN-CT-GHP-EN | | | | |
| Irrigation | NR | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Normania clay loam (Aquic Haplustoll) | | | | | | | | |
| Fertilizer | Potash was applied annually (1990-1993) to alfalfa after the first cutting at a rate of 112 kg K/ha. | | | | | | | | |
| Comments | Subsurface tile drainage systems were used on 15 individual 13.7 x 15.3 m plots with separate drain outlets in this study. Four different treatments were used in this study. Two of these were applicable to this database - continuous corn (CC) and areas planted to the Conservation Reserve Program (CRP). Three replicates of each treatment were used. After a single disking, the CRP plots were planted to a mixture of alfalfa, smooth bromegrass, orchardgrass, and timothy, interseeded with a companion crop of oats. Annual N application rates for corn were determined from soil N tests, the previous crop and a yield goal of 8800 kg/ha. No N was applied to the CRP plots. | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 1 | Alfalfa | Yield | 3090 | dry matter, kg/ |
| **Crop** | 2 | Alfalfa | Yield | 3780 | dry matter, kg/ |
| **Crop** | 3 | Alfalfa | Yield | 11610 | dry matter, kg/ |
| **Crop** | 4 | Alfalfa | Yield | 11900 | dry matter, kg/ |
| **Crop** | 5 | Alfalfa | Yield | 11480 | dry matter, kg/ |
| **Crop** | 6 | Alfalfa | Yield | 10270 | dry matter, kg/ |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300535405** | **Study Area** | **CRP - Grass** | Area (ha) | 0.02 | Tillage | Disked | Cover Crop | None |
| Practice ID | 5 | Practice Name | CRP - Grass | General Practice | CRP | | | Area Type | T |
| Category | Management | Study Focus | CRP, Crop Rotations | Practice Overview | NM-CCN-CT-GHP-EN | | | | |
| Irrigation | NR | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Normania clay loam (Aquic Haplustoll) | | | | | | | | |
| Fertilizer | No N applied. | | | | | | | | |
| Comments | Subsurface tile drainage systems were used on 15 individual 13.7 x 15.3 m plots with separate drain outlets in this study. Four different treatments were used in this study. Two of these were applicable to this database - continuous corn (CC) and areas planted to the Conservation Reserve Program (CRP). Three replicates of each treatment were used. After a single disking, the CRP plots were planted to a mixture of alfalfa, smooth bromegrass, orchardgrass, and timothy, interseeded with a companion crop of oats. Annual N application rates for corn were determined from soil N tests, the previous crop and a yield goal of 8800 kg/ha. No N was applied to the CRP plots. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Grass | Yield | 2230 | dry matter, kg/ |
| **Crop** | 2 | Grass | Yield | -999999 | dry matter, kg/ |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 3 | Grass | Yield | 2960 | dry matter, kg/ |
| **Crop** | 4 | Grass | Yield | 3600 | dry matter, kg/ |
| **Crop** | 5 | Grass | Yield | 5250 | dry matter, kg/ |
| **Crop** | 6 | Grass | Yield | 5120 | dry matter, kg/ |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300535406** | **Study Area** | **CRP - Alfalfa** | Area (ha) | 0.02 | Tillage | Disked | Cover Crop | None |
| Practice ID | 6 | Practice Name | CRP - Alfalfa | General Practice | CRP | | | Area Type | T |
| Category | Management | Study Focus | CRP, Crop Rotations | Practice Overview | NM-CCN-CT-GHP-EN | | | | |
| Irrigation | NR | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Normania clay loam (Aquic Haplustoll) | | | | | | | | |
| Fertilizer | No N applied. | | | | | | | | |
| Comments | Subsurface tile drainage systems were used on 15 individual 13.7 x 15.3 m plots with separate drain outlets in this study. Four different treatments were used in this study. Two of these were applicable to this database - continuous corn (CC) and areas planted to the Conservation Reserve Program (CRP). Three replicates of each treatment were used. After a single disking, the CRP plots were planted to a mixture of alfalfa, smooth bromegrass, orchardgrass, and timothy, interseeded with a companion crop of oats. Annual N application rates for corn were determined from soil N tests, the previous crop and a yield goal of 8800 kg/ha. No N was applied to the CRP plots. | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 1 | Alfalfa | Yield | 390 | dry matter, kg/ |
| **Crop** | 2 | Alfalfa | Yield | -999999 | dry matter, kg/ |
| **Crop** | 3 | Alfalfa | Yield | 2490 | dry matter, kg/ |
| **Crop** | 4 | Alfalfa | Yield | 390 | dry matter, kg/ |
| **Crop** | 5 | Alfalfa | Yield | -999999 | |
| **Crop** | 6 | Alfalfa | Yield | -999999 | |

| Test Site ID | Test Site Name |
|---|---|
| **2013005366** | **Ritter, W. F., 1998** |

| | | | | |
|---|---|---|---|---|
| Location | Georgetown | Sussex | DE | US |
| Study Citation | 1998 | | | |
| | Ritter, W. F., R. W. Scarborough and A. E. M. Chirnside. | | | |
| | Winter cover crops as a best management practice for reducing nitrogen leaching. | | | |
| | J. Contam. Hydrol. 34:1-15. | | | |
| NRCS LRR | Atlantic and Gulf Coast Lowland Forest and Crop Region | | | |
| NRCS MLRA | Atlantic Coast Flatwoods | | | |
| HUC_10 | 0208010901 | Test Site Scale | Plot | |
| Experimental Design Type/ Description | Multiple Treatments w/ Control, and Replication | | | |
| | plot study: complete randomized block; | | | |
| Crops | Corn, rye | | | |
| Study Duration | 3 years | | | |

Summary

The role of rye as a winter cover crop to reduce nitrate leaching was investigated over a 3-year period for a loamy sand soil. A cover crop was planted after corn in the early fall and tilled in late March or early April the following spring. No-tillage and conventional tillage systems were compared on large plots with irrigated corn. A replicated randomized block design experiment was conducted on small plots to evaluate a rye cover crop under no-tillage and conventional tillage and with commercial fertilizer, poultry manure and composted poultry manure as nitrogen fertilizer sources. Nitrogen uptake by the cover crop along with nitrate concentrations in groundwater and the soil profile (0-150 cm) were measured on the larger plots. There was no significant difference in nitrate concentrations in the groundwater or soil profile with and without a cover crop in either no-tillage or conventional tillage. Annual nitrate-N leached to the water-table varied from 136.0 to 190.1 kg/ha in 1989 and from 82.4 to 116.2 kg/ha in 1991. Nitrate leaching rates were somewhat lower with a cover crop in 1989, but not in 1990. There was no statistically significant differences in corn grain yields between the cover crop and non-cover crop treatment, The planting date and adequate rainfall are very important in maximizing nitrogen uptake in the fall with a rye cover crop. In the Delmara Peninsula, the cover crop should probably be planted by October 1 to maximize nitrogen uptake rates in the fall. On loamy sand soils, rye winter cover crops cannot be counted on as a BMP for reducing nitrate leaching in the Mid-Atlantic states.

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300536601** | **Study Area** | **C-NT** | Area (ha) | 0.25 | Tillage | No Till | Cover Crop | Rye |
| Practice ID | 1 | Practice Name | Tillage, Cover Crop | General Practice | Cover Crop and Conservation Tillage | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Cover Crop | Practice Overview | NM-CCY-NT-CO-EN | | | | |
| Irrigation | Yes | Irrig. Descrip. | Solid-set sprinkler irrigation at 9.1 x 9.1 spacing. No irrigation applied to the small plots in 1989 due to adequate rainfall. In 1990 and 1991, the small plots received 324 and 210 mm of irrigation, respectively. | | | | | | |
| Soils | Evesboro loamy sand (Typic Quartzipssament) | | | | | | | | |
| Fertilizer | 30% Urea-ammonia-nitrate (UAN) liquid nitrogen fertilizer was used for the commercial fertilizer. A total of 56 kg/ha of nitrogen was applied at planting, 67 kg/ha was side-dressed when the corn was 15 cm high and 101 kg/ha was side-dressed when the corn was 60 cm high. | | | | | | | | |
| Comments | | | | | | | | | |

**Crop** 1 corn, rye Yield -999999 NA

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300536602** | **Study Area** | **NC-NT** | Area (ha) | 0.25 | Tillage | No Till | Cover Crop | None |
| Practice ID | 2 | Practice Name | Tillage, Cover Crop | General Practice | Conservation Tillage | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Cover Crop | Practice Overview | NM-CCN-NT-CO-EN | | | | |
| Irrigation | Yes | Irrig. Descrip. | Solid-set sprinkler irrigation at 9.1 x 9.1 spacing. No irrigation applied to the small plots in 1989 due to adequate rainfall. In 1990 and 1991, the small plots received 324 and 210 mm of irrigation, respectively. | | | | | | |
| Soils | Evesboro loamy sand (Typic Quartzipssament) | | | | | | | | |
| Fertilizer | 30% Urea-ammonia-nitrate (UAN) liquid nitrogen fertilizer was used for the commercial fertilizer. A total of 56 kg/ha of nitrogen was applied at planting, 67 kg/ha was side-dressed when the corn was 15 cm high and 101 kg/ha was side-dressed when the corn was 60 cm high. | | | | | | | | |
| Comments | | | | | | | | | |

**Crop** 1 corn Yield -999999 NA

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300536603** | **Study Area** | **C-CT** | Area (ha) | 0.25 | Tillage | Conventional | Cover Crop | Rye |
| Practice ID | 3 | Practice Name | Cover Crop-Conventional Tillage | General Practice | Cover Crop | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Cover Crop | Practice Overview | NM-CCY-CN-CO-EN | | | | |
| Irrigation | Yes | Irrig. Descrip. | Solid-set sprinkler irrigation at 9.1 x 9.1 spacing. No irrigation applied to the small plots in 1989 due to adequate rainfall. In 1990 and 1991, the small plots received 324 and 210 mm of irrigation, respectively. | | | | | | |
| Soils | Evesboro loamy sand (Typic Quartzipssament) | | | | | | | | |
| Fertilizer | 30% Urea-ammonia-nitrate (UAN) liquid nitrogen fertilizer was used for the commercial fertilizer. A total of 56 kg/ha of nitrogen was applied at planting, 67 kg/ha was side-dressed when the corn was 15 cm high and 101 kg/ha was side-dressed when the corn was 60 cm high. | | | | | | | | |
| Comments | | | | | | | | | |

**Crop** 1 corn, rye Yield -999999 NA

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300536604** | **Study Area** | **NC-CT** | Area (ha) | 0.25 | Tillage | Conventional | Cover Crop | None |
| Practice ID | 4 | Practice Name | No Cover Crop-Conventional Tillage | General Practice | Control | | | Area Type | C |
| Category | Management | Study Focus | Tillage, Cover Crop | Practice Overview | NM-CCN-CN-CO-EN | | | | |
| Irrigation | Yes | Irrig. Descrip. | Solid-set sprinkler irrigation at 9.1 x 9.1 spacing. No irrigation applied to the small plots in 1989 due to adequate rainfall. In 1990 and 1991, the small plots received 324 and 210 mm of irrigation, respectively. | | | | | | |
| Soils | Evesboro loamy sand (Typic Quartzipssament) | | | | | | | | |
| Fertilizer | 30% Urea-ammonia-nitrate (UAN) liquid nitrogen fertilizer was used for the commercial fertilizer. A total of 56 kg/ha of nitrogen was applied at planting, 67 kg/ha was side-dressed when the corn was 15 cm high and 101 kg/ha was side-dressed when the corn was 60 cm high. | | | | | | | | |
| Comments | | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 1 | corn | Yield | -999999 | NA |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300536605** | **Study Area** | **C-CT-P** | Area (ha) | 0.01 | Tillage | Conventional | Cover Crop | Rye |
| Practice ID | 5 | Practice Name | Cover Crop-Conventional Tillage-Poultry Manure | General Practice | Cover Crop and Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Cover Crop, Fertilizer | Practice Overview | NC-CCY-CN-CO-EN | | | | |
| Irrigation | Yes | Irrig. Descrip. | Solid-set sprinkler irrigation at 9.1 x 9.1 spacing. The large plots received 133, 342 and 269 mm of irrigation water in 1989, 1990 and 1991, respectively. | | | | | | |
| Soils | Matawan loamy sand soil (fine-loamy, siliceous, mesic, aquic hapludults) | | | | | | | | |
| Fertilizer | Poultry manure from a complete cleanout of a broiler house and the composted poultry manure were applied shortly before planting at a rate of 280 kg/ha total nitrogen based upon a manure analysis on the small plots. Lime and phosphorus and potassium fertilizer were applied according to soil tests. | | | | | | | | |
| Comments | | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 1 | corn, rye | Yield | 8517 | kg/ha |
| **Crop** | 2 | corn, rye | Yield | 7323 | kg/ha |
| **Crop** | 3 | corn, rye | Yield | 8106 | kg/ha |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300536606** | **Study Area** | **C-NT-CP** | Area (ha) | 0.01 | Tillage | No Till | Cover Crop | Rye |
| Practice ID | 6 | Practice Name | Cover Crop-No-Till-Composted Poultry Manure | General Practice | Cover Crop, Conservation Tillage, and Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Cover Crop, Fertilizer | Practice Overview | NM-CCY-NT-CO-EN | | | | |
| Irrigation | Yes | Irrig. Descrip. | Solid-set sprinkler irrigation at 9.1 x 9.1 spacing. The large plots received 133, 342 and 269 mm of irrigation water in 1989, 1990 and 1991, respectively. | | | | | | |
| Soils | Matawan loamy sand soil (fine-loamy, siliceous, mesic, aquic hapludults) | | | | | | | | |
| Fertilizer | Poultry manure from a complete cleanout of a broiler house and the composted poultry manure were applied shortly before planting at a rate of 280 kg/ha total nitrogen based upon a manure analysis on the small plots. Lime and phosphorus and potassium fertilizer were applied according to soil tests. | | | | | | | | |
| Comments | | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 1 | corn, rye | Yield | 8210 | kg/ha |
| **Crop** | 2 | corn, rye | Yield | 7025 | kg/ha |
| **Crop** | 3 | corn, rye | Yield | 8467 | kg/ha |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300536607** | **Study Area** | **C-NT-F** | Area (ha) | 0.01 | Tillage | No Till | Cover Crop | Rye |
| Practice ID | 7 | Practice Name | Cover Crop-No-Till-Commercial Fertilizer | General Practice | Cover Crop, Conservation Tillage, and Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Cover Crop, Fertilizer | Practice Overview | NM-CCY-NT-CO-EN | | | | |
| Irrigation | Yes | Irrig. Descrip. | Solid-set sprinkler irrigation at 9.1 x 9.1 spacing. The large plots received 133, 342 and 269 mm of irrigation water in 1989, 1990 and 1991, respectively. | | | | | | |
| Soils | Matawan loamy sand soil (fine-loamy, siliceous, mesic, aquic hapludults) | | | | | | | | |
| Fertilizer | 30% Urea-ammonia-nitrate (UAN) liquid nitrogen fertilizer was used for the commercial fertilizer. A total of 56 kg/ha of nitrogen was applied at planting, 67 kg/ha was side-dressed when the corn was 15 cm high and 101 kg/ha was side-dressed when the corn was 60 cm high. | | | | | | | | |
| Comments | | | | | | | | | |

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|---|---|---|---|---|
| **Crop** | 1 | corn, rye | Yield | 8391 kg/ha |
| **Crop** | 2 | corn, rye | Yield | 7291 kg/ha |
| **Crop** | 3 | corn, rye | Yield | 8294 kg/ha |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300536608** | **Study Area** | **NC-NT-P** | Area (ha) | 0.01 | Tillage | No Till | Cover Crop | None |
| Practice ID | 8 | Practice Name | No Cover Crop-No-Till-Poultry Manure | General Practice | Conservation Tillage and Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Cover Crop, Fertilizer | Practice Overview | NC-CCN-NT-CO-EN | | | | |
| Irrigation | Yes | Irrig. Descrip. | Solid-set sprinkler irrigation at 9.1 x 9.1 spacing. The large plots received 133, 342 and 269 mm of irrigation water in 1989, 1990 and 1991, respectively. | | | | | | |
| Soils | Matawan loamy sand soil (fine-loamy, siliceous, mesic, aquic hapludults) | | | | | | | | |
| Fertilizer | Poultry manure from a complete cleanout of a broiler house and the composted poultry manure were applied shortly before planting at a rate of 280 kg/ha total nitrogen based upon a manure analysis on the small plots. Lime and phosphorus and potassium fertilizer were applied according to soil tests. | | | | | | | | |
| Comments | | | | | | | | | |

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|---|---|---|---|---|
| **Crop** | 1 | corn | Yield | 8568 kg/ha |
| **Crop** | 2 | corn | Yield | 7009 kg/ha |
| **Crop** | 3 | corn | Yield | 8216 kg/ha |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300536609** | **Study Area** | **NC-NT-CP** | Area (ha) | 0.01 | Tillage | No Till | Cover Crop | None |
| Practice ID | 9 | Practice Name | No Cover Crop-No-Till-Composted Poultry Manure | General Practice | Conservation Tillage and Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Cover Crop, Fertilizer | Practice Overview | NM-CCN-NT-CO-EN | | | | |
| Irrigation | Yes | Irrig. Descrip. | Solid-set sprinkler irrigation at 9.1 x 9.1 spacing. The large plots received 133, 342 and 269 mm of irrigation water in 1989, 1990 and 1991, respectively. | | | | | | |
| Soils | Matawan loamy sand soil (fine-loamy, siliceous, mesic, aquic hapludults) | | | | | | | | |
| Fertilizer | Poultry manure from a complete cleanout of a broiler house and the composted poultry manure were applied shortly before planting at a rate of 280 kg/ha total nitrogen based upon a manure analysis on the small plots. Lime and phosphorus and potassium fertilizer were applied according to soil tests. | | | | | | | | |
| Comments | | | | | | | | | |

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|---|---|---|---|---|
| **Crop** | 1 | corn | Yield | 8517 kg/ha |
| **Crop** | 2 | corn | Yield | 6475 kg/ha |
| **Crop** | 3 | corn | Yield | 7243 kg/ha |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300536610** | **Study Area** | **NC-NT-F** | Area (ha) | 0.01 | Tillage | No Till | Cover Crop | None |
| Practice ID | 10 | Practice Name | No Cover Crop-No-Till-Commercial Fertilizer | General Practice | Conservation Tillage and Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Cover Crop, Fertilizer | Practice Overview | NM-CCN-NT-CO-EN | | | | |
| Irrigation | Yes | Irrig. Descrip. | Solid-set sprinkler irrigation at 9.1 x 9.1 spacing. The large plots received 133, 342 and 269 mm of irrigation water in 1989, 1990 and 1991, respectively. | | | | | | |
| Soils | Matawan loamy sand soil (fine-loamy, siliceous, mesic, aquic hapludults) | | | | | | | | |
| Fertilizer | 30% Urea-ammonia-nitrate (UAN) liquid nitrogen fertilizer was used for the commercial fertilizer. A total of 56 kg/ha of nitrogen was applied at planting, 67 kg/ha was side-dressed when the corn was 15 cm high and 101 kg/ha was side-dressed when the corn was 60 cm high. | | | | | | | | |
| Comments | | | | | | | | | |

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|---|---|---|---|---|
| **Crop** | 1 | corn | Yield | 7764 kg/ha |
| **Crop** | 2 | corn | Yield | 6617 kg/ha |
| **Crop** | 3 | corn | Yield | 8060 kg/ha |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300536611** | **Study Area** | **C-CT-P** | Area (ha) | 0.01 | Tillage | Conventional | Cover Crop | Rye |
| Practice ID | 11 | Practice Name | Cover Crop-Conventional Tillage-Poultry Manure | General Practice | Cover Crop and Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Cover Crop, Fertilizer | Practice Overview | NC-CCY-CN-CO-EN | | | | |
| Irrigation | Yes | Irrig. Descrip. | Solid-set sprinkler irrigation at 9.1 x 9.1 spacing. The large plots received 133, 342 and 269 mm of irrigation water in 1989, 1990 and 1991, respectively. | | | | | | |
| Soils | Matawan loamy sand soil (fine-loamy, siliceous, mesic, aquic hapludults) | | | | | | | | |
| Fertilizer | Poultry manure from a complete cleanout of a broiler house and the composted poultry manure were applied shortly before planting at a rate of 280 kg/ha total nitrogen based upon a manure analysis on the small plots. Lime and phosphorus and potassium fertilizer were applied according to soil tests. | | | | | | | | |
| Comments | | | | | | | | | |

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|---|---|---|---|---|
| **Crop** | 1 | corn, rye | Yield | 7539 kg/ha |
| **Crop** | 2 | corn, rye | Yield | 8059 kg/ha |
| **Crop** | 3 | corn, rye | Yield | 8122 kg/ha |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300536612** | **Study Area** | **C-CT-CP** | Area (ha) | 0.01 | Tillage | Conventional | Cover Crop | Rye |
| Practice ID | 12 | Practice Name | Cover Crop-Conventional Tillage-Composted Poultry Manure | General Practice | Cover Crop and Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Cover Crop, Fertilizer | Practice Overview | NM-CCY-CN-CO-EN | | | | |
| Irrigation | Yes | Irrig. Descrip. | Solid-set sprinkler irrigation at 9.1 x 9.1 spacing. The large plots received 133, 342 and 269 mm of irrigation water in 1989, 1990 and 1991, respectively. | | | | | | |
| Soils | Matawan loamy sand soil (fine-loamy, siliceous, mesic, aquic hapludults) | | | | | | | | |
| Fertilizer | Poultry manure from a complete cleanout of a broiler house and the composted poultry manure were applied shortly before planting at a rate of 280 kg/ha total nitrogen based upon a manure analysis on the small plots. Lime and phosphorus and potassium fertilizer were applied according to soil tests. | | | | | | | | |
| Comments | | | | | | | | | |

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|---|---|---|---|---|
| **Crop** | 1 | corn, rye | Yield | 8109 kg/ha |
| **Crop** | 2 | corn, rye | Yield | 7401 kg/ha |
| **Crop** | 3 | corn, rye | Yield | 8091 kg/ha |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300536613** | **Study Area** | **C-CT-F** | Area (ha) | 0.01 | Tillage | Conventional | Cover Crop | Rye |
| Practice ID | 13 | Practice Name | Cover Crop-Conventional Tillage-Commercial Fertilizer | General Practice | Cover Crop and Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Cover Crop, Fertilizer | Practice Overview | NM-CCY-CN-CO-EN | | | | |
| Irrigation | Yes | Irrig. Descrip. | Solid-set sprinkler irrigation at 9.1 x 9.1 spacing. The large plots received 133, 342 and 269 mm of irrigation water in 1989, 1990 and 1991, respectively. | | | | | | |
| Soils | Matawan loamy sand soil (fine-loamy, siliceous, mesic, aquic hapludults) | | | | | | | | |
| Fertilizer | 30% Urea-ammonia-nitrate (UAN) liquid nitrogen fertilizer was used for the commercial fertilizer. A total of 56 kg/ha of nitrogen was applied at planting, 67 kg/ha was side-dressed when the corn was 15 cm high and 101 kg/ha was side-dressed when the corn was 60 cm high. | | | | | | | | |
| Comments | This study investigated the role of winter cover crops in reducing nitrate leaching. At this study site, four large plots - 0.25 ha in size - were used to assess the nitrate leaching. | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 1 | corn, rye | Yield | 8379 | kg/ha |
| **Crop** | 2 | corn, rye | Yield | 7605 | kg/ha |
| **Crop** | 3 | corn, rye | Yield | 8372 | kg/ha |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300536614** | **Study Area** | **NC-CT-P** | Area (ha) | 0.01 | Tillage | Conventional | Cover Crop | None |
| Practice ID | 14 | Practice Name | No Cover Crop-Conventional Tillage-Poultry Manure | General Practice | Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Cover Crop, Fertilizer | Practice Overview | NC-CCN-CN-CO-EN | | | | |
| Irrigation | Yes | Irrig. Descrip. | Solid-set sprinkler irrigation at 9.1 x 9.1 spacing. The large plots received 133, 342 and 269 mm of irrigation water in 1989, 1990 and 1991, respectively. | | | | | | |
| Soils | Matawan loamy sand soil (fine-loamy, siliceous, mesic, aquic hapludults) | | | | | | | | |
| Fertilizer | Poultry manure from a complete cleanout of a broiler house and the composted poultry manure were applied shortly before planting at a rate of 280 kg/ha total nitrogen based upon a manure analysis on the small plots. Lime and phosphorus and potassium fertilizer were applied according to soil tests. | | | | | | | | |
| Comments | This study investigated the role of winter cover crops in reducing nitrate leaching. At this study site, four large plots - 0.25 ha in size - were used to assess the nitrate leaching. | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 1 | corn | Yield | 8210 | kg/ha |
| **Crop** | 2 | corn | Yield | 8593 | kg/ha |
| **Crop** | 3 | corn | Yield | 8060 | kg/ha |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300536615** | **Study Area** | **NC-CT-CP** | Area (ha) | 0.01 | Tillage | Conventional | Cover Crop | None |
| Practice ID | 15 | Practice Name | No Cover Crop-Conventional Tillage-Composted Poultry Manure | General Practice | Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Cover Crop, Fertilizer | Practice Overview | NM-CCN-CN-CO-EN | | | | |
| Irrigation | Yes | Irrig. Descrip. | Solid-set sprinkler irrigation at 9.1 x 9.1 spacing. The large plots received 133, 342 and 269 mm of irrigation water in 1989, 1990 and 1991, respectively. | | | | | | |
| Soils | Matawan loamy sand soil (fine-loamy, siliceous, mesic, aquic hapludults) | | | | | | | | |
| Fertilizer | Poultry manure from a complete cleanout of a broiler house and the composted poultry manure were applied shortly before planting at a rate of 280 kg/ha total nitrogen based upon a manure analysis on the small plots. Lime and phosphorus and potassium fertilizer were applied according to soil tests. | | | | | | | | |
| Comments | This study investigated the role of winter cover crops in reducing nitrate leaching. At this study site, four large plots - 0.25 ha in size - were used to assess the nitrate leaching. | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 1 | corn | Yield | 8963 | kg/ha |
| **Crop** | 2 | corn | Yield | 7558 | kg/ha |
| **Crop** | 3 | corn | Yield | 7871 | kg/ha |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300536616** | **Study Area** | **NC-CT-F** | Area (ha) | 0.01 | Tillage | Conventional | Cover Crop | None |
| Practice ID | 16 | Practice Name | No Cover Crop-Conventional Tillage-Commercial Fertilizer | General Practice | Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Cover Crop, Fertilizer | Practice Overview | NM-CCN-CN-CO-EN | | | | |
| Irrigation | Yes | Irrig. Descrip. | Solid-set sprinkler irrigation at 9.1 x 9.1 spacing. The large plots received 133, 342 and 269 mm of irrigation water in 1989, 1990 and 1991, respectively. | | | | | | |
| Soils | Matawan loamy sand soil (fine-loamy, siliceous, mesic, aquic hapludults) | | | | | | | | |
| Fertilizer | 30% Urea-ammonia-nitrate (UAN) liquid nitrogen fertilizer was used for the commercial fertilizer. A total of 56 kg/ha of nitrogen was applied at planting, 67 kg/ha was side-dressed when the corn was 15 cm high and 101 kg/ha was side-dressed when the corn was 60 cm high. | | | | | | | | |
| Comments | This study investigated the role of winter cover crops in reducing nitrate leaching. At this study site, four large plots - 0.25 ha in size - were used to assess the nitrate leaching. | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 1 | corn | Yield | 8957 | kg/ha |
| **Crop** | 2 | corn | Yield | 7777 | kg/ha |
| **Crop** | 3 | corn | Yield | 8201 | kg/ha |

| Test Site ID | Test Site Name |
|---|---|
| 2013005380 | Schreiber, J. D., 1998 |

| | | | | |
|---|---|---|---|---|
| Location | Como | Panola | MS | US |
| Study Citation | 1998 | | | |
| | Schreiber, J. D. and R. F. Cullum. | | | |
| | Tillage effects on surface and groundwater quality in loessial upland soybean watersheds. | | | |
| | Trans. ASAE 41:607-614. | | | |
| NRCS LRR | South Atlantic and Gulf Slope Cash Crops, Forest, and Livestock Region | | | |
| NRCS MLRA | Carolina and Georgia Sand Hills | | | |
| HUC_10 | 0803020406 | Test Site Scale | Plot | |
| Experimental Design Type/ Description | Multiple Treatments w/ Control, No Replication | | | |
| | paired watershed study | | | |
| Crops | Soybeans | | | |
| Study Duration | 4 years | | | |


Summary

The objective of this research was to evaluate the water quality of perched groundwater (0.15 to 3.04 m) and surface runoff from a 2.13 ha no-till and a 2.10 ha conventional-till soybean watershed for plant nutrients during the 1990-1993 water years. Mean nitrate-N concentrations for all groundwater depths and sites of the no-till and conventional-till watersheds were 4.81 and 5.98 mg/L, respectively. Shallow groundwater NO3-N concentrations for some storms exceeded U.S. Drinking Water Standards. However, in a forested riparian zone, only 61 m down slope from the conventional-till watersheds, the mean NO3-N concentration in groundwater was only 0.29 mg/L. Higher nutrient concentrations on surface runoff from the no-till watershed reflect the lack of sediment to sorb soluble PO4-P as well as the leaching of crop and weed residues. Despite greater runoff from the conventional-till watershed, soluble nutrient losses were generally similar from the no-till watershed due to the higher nutrient concentrations. Nutrient concentrations in surface runoff from both watersheds peaked a few days after a broadcast application of 0-20-20 and decreased during subsequent storms. Alternative methods of fertilizer application are needed to reduce nutrient concentrations in surface runoff.


| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300538001** | **Study Area** | **Watershed 1** | Area (ha) | 2.13 | Tillage | No Till | Cover Crop | None |
| Practice ID | 614 | Practice Name | No-till | General Practice | | Conservation Tillage | | Area Type | T |
| Category | Management | Study Focus | Tillage | Practice Overview | | NC-CCN-NT-SB-EN | | | |
| Irrigation | No | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Loring-Grenada series | | | | | | | | |
| Fertilizer | In the 1992 and 1993 cropping year, 0-26-26 fertilizer was broadcast applied to both watersheds at an application rate of 174 kg/ha. | | | | | | | | |
| Comments | Paired watersheds were both cropped to minimum-till soybeans for two years prior to the study. This study evaluates the impact of tillage on both surface runoff and shallow groundwater. Watershed1 was planted in no-till soybeans, while Watershed2 was planted in conventional-till soybeans. Both watersheds were monitored at their outlets, as well as with shallow groundwater wells (<3.04 m). Data were collected by Water Year, and are reported as annual average concentrations and total unit area loads. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | corn | Yield | -999999 | NA |
| **Crop** | 2 | soybean | Yield | -999999 | NA |
| **Crop** | 3 | soybean | Yield | -999999 | NA |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Crop** | 4 | soybean | | Yield | -999999 | NA | | | |
| **Study ID** | **201300538002** | **Study Area** | **Watershed 2** | Area (ha) | 2.10 | Tillage | Conventional | Cover Crop | None |
| Practice ID | 613 | Practice Name | Conventional | General Practice | | Control | | Area Type | C |
| Category | Management | Study Focus | Tillage | Practice Overview | | NC-CCN-CN-SB-EN | | | |
| Irrigation | No | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Loring-Grenada series | | | | | | | | |
| Fertilizer | In the 1992 and 1993 cropping year, 0-26-26 fertilizer was broadcast applied to both watersheds at an application rate of 174 kg/ha. | | | | | | | | |
| Comments | Paired watersheds were both cropped to minimum-till soybeans for two years prior to the study. This study evaluates the impact of tillage on both surface runoff and shallow groundwater. Watershed1 was planted in no-till soybeans, while Watershed2 was planted in conventional-till soybeans. Both watersheds were monitored at their outlets, as well as with shallow groundwater wells (<3.04 m). Data were collected by Water Year, and are reported as annual average concentrations and total unit area loads. | | | | | | | | |
| **Crop** | 1 | soybean | | Yield | -999999 | NA | | | |
| **Crop** | 2 | soybean | | Yield | -999999 | NA | | | |
| **Crop** | 3 | soybean | | Yield | -999999 | NA | | | |
| **Crop** | 4 | soybean | | Yield | -999999 | NA | | | |

| Test Site ID | Test Site Name |
|---|---|
| **2013002002** | **Shipitalo, M. J., 2013** |

| | | | | |
|---|---|---|---|---|
| Location | Coshocton | Coshocton | OH | US |
| Study Citation | 2013 | | | |
| | M. J. Shipitalo, L. B. Owens, J. V. Bonta, and W. M. Edwards | | | |
| | Effect of No-Till and Extended Rotation on Nutrient Losses in Surface Runoff | | | |
| | Soil Sci. Soc. Am. J. doi:10.2136/sssaj2013.01.0045 | | | |
| NRCS LRR | East and Central Farming and Forest Region | | | |
| NRCS MLRA | Western Allegheny Plateau | | | |
| HUC_10 | 0504000119 | Test Site Scale | Field | |
| Experimental Design Type/ Description | Multiple Treatments w/ Control, No Replication | | | |
| | 2 no-till sites, 2 chisel till sites | | | |
| Crops | Corn, Soybeans, Wheat | | | |
| Study Duration | 16 years | | | |

Summary

Nutrient and sediment loss were compared from two no-till and two chisel-till small (0.45–0.79 ha) watersheds managed in a 2-yr corn/soybean cover crop rotation for 16 crop years. The effect of replacing some of the mineral N with manure and red clover was investigated by monitoring runoff from three watersheds in a 3-yr corn/soybean/wheat–red clover extended rotation. The reduced-input watersheds were disked in corn and soybean years.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300200201** | **Study Area** | **WS 109** | Area (ha) | 0.68 | Tillage | Conventional | Cover Crop | Rye - Secale cerale L. |
| Practice ID | 1 | Practice Name | Chisel | General Practice | Control | | | Area Type | C |
| Category | Management | Study Focus | Tillage, Cover Crop, Fertilizer | Practice Overview | NC-CCY-CN-CS-EN | | | | |
| Irrigation | No | Irrig. Descrip. | Dryland (none) | | | | | | |
| Soils | Rayne, Fine-loamy, mixed, active, mesic Typic Hapludults | | | | | | | | |
| Fertilizer | In corn years, ammonium nitrate was broadcast applied shortly after planting at a rate bae don Ohio State University Extension recommendations (Vitosh et al., 1995) and moderate yield goals (Table 2). After soybean harvest, cereal rye was planted in these watersheds as a winter cover crop. | | | | | | | | |
| Comments | | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Corn-Field, for grain | Yield | 8.6 | Mg/ha |
| **Crop** | 8 | Soybean, for grain | Yield | 2.4 | Mg/ha |
| **Crop** | 15 | Corn-Field, for grain | Yield | 8.6 | Mg/ha |
| **Crop** | 22 | Soybean, for grain | Yield | 2.4 | Mg/ha |


Acknowledgement: Study summaries may be directly quoted from original author's abstract.

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 29 | Corn-Field, for grain | Yield | 8.6 | Mg/ha |
| **Crop** | 36 | Soybean, for grain | Yield | 2.4 | Mg/ha |
| **Crop** | 43 | Corn-Field, for grain | Yield | 8.6 | Mg/ha |
| **Crop** | 50 | Soybean, for grain | Yield | 2.4 | Mg/ha |
| **Crop** | 57 | Corn-Field, for grain | Yield | 8.6 | Mg/ha |
| **Crop** | 64 | Soybean, for grain | Yield | 2.4 | Mg/ha |
| **Crop** | 71 | Corn-Field, for grain | Yield | 8.6 | Mg/ha |
| **Crop** | 78 | Soybean, for grain | Yield | 2.4 | Mg/ha |
| **Crop** | 85 | Corn-Field, for grain | Yield | 8.6 | Mg/ha |
| **Crop** | 92 | Soybean, for grain | Yield | 2.4 | Mg/ha |
| **Crop** | 99 | Corn-Field, for grain | Yield | 8.6 | Mg/ha |
| **Crop** | 106 | Soybean, for grain | Yield | 2.4 | Mg/ha |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300200202** | **Study Area** | **WS 123** | Area (ha) | 0.55 | Tillage | Conventional | Cover Crop | Rye - Secale cerale L. |
| Practice ID | 2 | Practice Name | Chisel | General Practice | Control | | | Area Type | C |
| Category | Management | Study Focus | Tillage, Cover Crop, Fertilizer | Practice Overview | NC-CCY-CN-CS-EN | | | | |
| Irrigation | No | Irrig. Descrip. | Dryland (none) | | | | | | |
| Soils | Keene, Fine-silty, mixed, superactive, mesic Aquic Hapludalfs | | | | | | | | |
| Fertilizer | In corn years, ammonium nitrate was broadcast applied shortly after planting at a rate bae don Ohio State University Extension recommendations (Vitosh et al., 1995) and moderate yield goals (Table 2). After soybean harvest, cereal rye was planted in these watersheds as a winter cover crop. | | | | | | | | |
| Comments | | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 2 | Soybean, for grain | Yield | 2.4 | Mg/ha |
| **Crop** | 9 | Corn-Field, for grain | Yield | 8.6 | Mg/ha |
| **Crop** | 16 | Soybean, for grain | Yield | 2.4 | Mg/ha |
| **Crop** | 23 | Corn-Field, for grain | Yield | 8.6 | Mg/ha |
| **Crop** | 30 | Soybean, for grain | Yield | 2.4 | Mg/ha |
| **Crop** | 37 | Corn-Field, for grain | Yield | 8.6 | Mg/ha |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 44 | Soybean, for grain | Yield | 2.4 | Mg/ha |
| **Crop** | 51 | Corn-Field, for grain | Yield | 8.6 | Mg/ha |
| **Crop** | 58 | Soybean, for grain | Yield | 2.4 | Mg/ha |
| **Crop** | 65 | Corn-Field, for grain | Yield | 8.6 | Mg/ha |
| **Crop** | 72 | Soybean, for grain | Yield | 2.4 | Mg/ha |
| **Crop** | 79 | Corn-Field, for grain | Yield | 8.6 | Mg/ha |
| **Crop** | 86 | Soybean, for grain | Yield | 2.4 | Mg/ha |
| **Crop** | 93 | Corn-Field, for grain | Yield | 8.6 | Mg/ha |
| **Crop** | 100 | Soybean, for grain | Yield | 2.4 | Mg/ha |
| **Crop** | 107 | Corn-Field, for grain | Yield | 8.6 | Mg/ha |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300200203** | **Study Area** | **WS 113** | Area (ha) | 0.59 | Tillage | No Till | Cover Crop | Rye - Secale cerale L. |
| Practice ID | 3 | Practice Name | No-till | General Practice | | Conservation Tillage | | Area Type | T |
| Category | Management | Study Focus | Tillage, Cover Crop, Fertilizer | Practice Overview | | NC-CCY-NT-CS-EN | | | |
| Irrigation | No | Irrig. Descrip. | Dryland (none) | | | | | | |
| Soils | Coshocton, Fine-loamy, mixed, active, mesic Aquultic Hapludalfs | | | | | | | | |
| Fertilizer | In corn years, ammonium nitrate was broadcast applied shortly after planting at a rate bae don Ohio State University Extension recommendations (Vitosh et al., 1995) and moderate yield goals (Table 2). After soybean harvest, cereal rye was planted in these watersheds as a winter cover crop. | | | | | | | | |
| Comments | | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 3 | Corn-Field, for grain | Yield | 8.1 | Mg/ha |
| **Crop** | 10 | Soybean, for grain | Yield | 2.2 | Mg/ha |
| **Crop** | 17 | Corn-Field, for grain | Yield | 8.1 | Mg/ha |
| **Crop** | 24 | Soybean, for grain | Yield | 2.2 | Mg/ha |
| **Crop** | 31 | Corn-Field, for grain | Yield | 8.1 | Mg/ha |
| **Crop** | 38 | Soybean, for grain | Yield | 2.2 | Mg/ha |
| **Crop** | 45 | Corn-Field, for grain | Yield | 8.1 | Mg/ha |
| **Crop** | 52 | Soybean, for grain | Yield | 2.2 | Mg/ha |

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|---|---|---|---|---|---|
| **Crop** | 59 | Corn-Field, for grain | Yield | 8.1 | Mg/ha |
| **Crop** | 66 | Soybean, for grain | Yield | 2.2 | Mg/ha |
| **Crop** | 73 | Corn-Field, for grain | Yield | 8.1 | Mg/ha |
| **Crop** | 80 | Soybean, for grain | Yield | 2.2 | Mg/ha |
| **Crop** | 87 | Corn-Field, for grain | Yield | 8.1 | Mg/ha |
| **Crop** | 94 | Soybean, for grain | Yield | 2.2 | Mg/ha |
| **Crop** | 101 | Corn-Field, for grain | Yield | 8.1 | Mg/ha |
| **Crop** | 108 | Soybean, for grain | Yield | 2.2 | Mg/ha |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300200204** | **Study Area** | **WS 118** | Area (ha) | 0.79 | Tillage | No Till | Cover Crop | Rye - Secale cerale L. |
| Practice ID | 4 | Practice Name | No-till | General Practice | Conservation Tillage | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Cover Crop, Fertilizer | Practice Overview | NC-CCY-NT-CS-EN | | | | |
| Irrigation | No | Irrig. Descrip. | Dryland (none) | | | | | | |
| Soils | Coshocton, Fine-loamy, mixed, active, mesic Aquultic Hapludalfs | | | | | | | | |
| Fertilizer | In corn years, ammonium nitrate was broadcast applied shortly after planting at a rate bae don Ohio State University Extension recommendations (Vitosh et al., 1995) and moderate yield goals (Table 2). After soybean harvest, cereal rye was planted in these watersheds as a winter cover crop. | | | | | | | | |
| Comments | | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 4 | Soybean, for grain | Yield | 2.2 | Mg/ha |
| **Crop** | 11 | Corn-Field, for grain | Yield | 8.1 | Mg/ha |
| **Crop** | 18 | Soybean, for grain | Yield | 2.2 | Mg/ha |
| **Crop** | 25 | Corn-Field, for grain | Yield | 8.1 | Mg/ha |
| **Crop** | 32 | Soybean, for grain | Yield | 2.2 | Mg/ha |
| **Crop** | 39 | Corn-Field, for grain | Yield | 8.1 | Mg/ha |
| **Crop** | 46 | Soybean, for grain | Yield | 2.2 | Mg/ha |
| **Crop** | 53 | Corn-Field, for grain | Yield | 8.1 | Mg/ha |
| **Crop** | 60 | Soybean, for grain | Yield | 2.2 | Mg/ha |
| **Crop** | 67 | Corn-Field, for grain | Yield | 8.1 | Mg/ha |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 74 | Soybean, for grain | Yield | 2.2 | Mg/ha |
| **Crop** | 81 | Corn-Field, for grain | Yield | 8.1 | Mg/ha |
| **Crop** | 88 | Soybean, for grain | Yield | 2.2 | Mg/ha |
| **Crop** | 95 | Corn-Field, for grain | Yield | 8.1 | Mg/ha |
| **Crop** | 102 | Soybean, for grain | Yield | 2.2 | Mg/ha |
| **Crop** | 109 | Corn-Field, for grain | Yield | 8.1 | Mg/ha |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300200205** | **Study Area** | **WS 111** | Area (ha) | 0.45 | Tillage | Disked | Cover Crop | Red Clover - Trifolium pratense L. |
| Practice ID | 5 | Practice Name | Disked Reduced Input | General Practice | Conservation Tillage | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Cover Crop, Fertilizer | Practice Overview | NM-CCY-CT-CS-EN | | | | |
| Irrigation | No | Irrig. Descrip. | Dryland (none) | | | | | | |
| Soils | Keene, Fine-silty, mixed, superactive, mesic Aquic Hapludalfs | | | | | | | | |
| Fertilizer | Beef cattle manure spread and disked in along with the standing red clover to supply some of the nutrient requirements for the corn crop. Additionally, a mixed starter fertilizer was applied at corn planting in crop years 1990 to 1995. During the corn and soybean crop years, the watersheds were usually cultivated twice between the rows for weed control and a side-dress application of ammonium nitrate was applied to the corn. | | | | | | | | |
| Comments | | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 5 | Corn-Field, for grain | Yield | 8.2 | Mg/ha |
| **Crop** | 12 | Soybean, for grain | Yield | 1.9 | Mg/ha |
| **Crop** | 19 | Wheat, for grain | Yield | 2.1 | Mg/ha |
| **Crop** | 26 | Corn-Field, for grain | Yield | 8.2 | Mg/ha |
| **Crop** | 33 | Soybean, for grain | Yield | 1.9 | Mg/ha |
| **Crop** | 40 | Wheat, for grain | Yield | 2.1 | Mg/ha |
| **Crop** | 47 | Corn-Field, for grain | Yield | 8.2 | Mg/ha |
| **Crop** | 54 | Soybean, for grain | Yield | 1.9 | Mg/ha |
| **Crop** | 61 | Wheat, for grain | Yield | 2.1 | Mg/ha |
| **Crop** | 68 | Corn-Field, for grain | Yield | 8.2 | Mg/ha |
| **Crop** | 75 | Soybean, for grain | Yield | 1.9 | Mg/ha |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 82 | Wheat, for grain | Yield | 2.1 | Mg/ha |
| **Crop** | 89 | Corn-Field, for grain | Yield | 8.2 | Mg/ha |
| **Crop** | 96 | Soybean, for grain | Yield | 1.9 | Mg/ha |
| **Crop** | 103 | Wheat, for grain | Yield | 2.1 | Mg/ha |
| **Crop** | 110 | Corn-Field, for grain | Yield | 8.2 | Mg/ha |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300200206** | **Study Area** | **WS 115** | Area (ha) | 0.65 | Tillage | Disked | Cover Crop | Red Clover - Trifolium pratense L. |
| Practice ID | 6 | Practice Name | Disked Reduced Input | General Practice | Conservation Tillage | Area Type | T | | |
| Category | Management | Study Focus | Tillage, Cover Crop, Fertilizer | Practice Overview | NM-CCY-CT-CS-EN | | | | |
| Irrigation | No | Irrig. Descrip. | Dryland (none) | | | | | | |
| Soils | Coshocton, Fine-loamy, mixed, active, mesic Aquultic Hapludalfs | | | | | | | | |
| Fertilizer | Beef cattle manure spread and disked in along with the standing red clover to supply some of the nutrient requirements for the corn crop. Additionally, a mixed starter fertilizer was applied at corn planting in crop years 1990 to 1995. During the corn and soybean crop years, the watersheds were usually cultivated twice between the rows for weed control and a side-dress application of ammonium nitrate was applied to the corn. | | | | | | | | |
| Comments | | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 6 | Soybean, for grain | Yield | 1.9 | Mg/ha |
| **Crop** | 13 | Wheat, for grain | Yield | 2.1 | Mg/ha |
| **Crop** | 20 | Corn-Field, for grain | Yield | 8.2 | Mg/ha |
| **Crop** | 27 | Soybean, for grain | Yield | 1.9 | Mg/ha |
| **Crop** | 34 | Wheat, for grain | Yield | 2.1 | Mg/ha |
| **Crop** | 41 | Corn-Field, for grain | Yield | 8.2 | Mg/ha |
| **Crop** | 48 | Soybean, for grain | Yield | 1.9 | Mg/ha |
| **Crop** | 55 | Wheat, for grain | Yield | 2.1 | Mg/ha |
| **Crop** | 62 | Corn-Field, for grain | Yield | 8.2 | Mg/ha |
| **Crop** | 69 | Soybean, for grain | Yield | -999999 | Mg/ha |
| **Crop** | 76 | Wheat, for grain | Yield | 2.1 | Mg/ha |
| **Crop** | 83 | Corn-Field, for grain | Yield | 8.2 | Mg/ha |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 90 | Soybean, for grain | Yield | 1.9 | Mg/ha |
| **Crop** | 97 | Wheat, for grain | Yield | 2.1 | Mg/ha |
| **Crop** | 104 | Corn-Field, for grain | Yield | 8.2 | Mg/ha |
| **Crop** | 111 | Soybean, for grain | Yield | 1.9 | Mg/ha |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300200207** | **Study Area** | **WS 127** | Area (ha) | 0.67 | Tillage | Disked | Cover Crop | Red Clover - Trifolium pratense L. |
| Practice ID | 7 | Practice Name | Disked Reduced Input | General Practice | Conservation Tillage | | | Area Type | T |
| Category | Management | Study Focus | Tillage, Cover Crop, Fertilizer | Practice Overview | NM-CCY-CT-CS-EN | | | | |
| Irrigation | No | Irrig. Descrip. | Dryland (none) | | | | | | |
| Soils | Coshocton, Fine-loamy, mixed, active, mesic Aquultic Hapludalfs | | | | | | | | |
| Fertilizer | Beef cattle manure spread and disked in along with the standing red clover to supply some of the nutrient requirements for the corn crop. Additionally, a mixed starter fertilizer was applied at corn planting in crop years 1990 to 1995. During the corn and soybean crop years, the watersheds were usually cultivated twice between the rows for weed control and a side-dress application of ammonium nitrate was applied to the corn. | | | | | | | | |
| Comments | | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 7 | Wheat, for grain | Yield | 2.1 | Mg/ha |
| **Crop** | 14 | Corn-Field, for grain | Yield | 8.2 | Mg/ha |
| **Crop** | 21 | Soybean, for grain | Yield | -999999 | Mg/ha |
| **Crop** | 28 | Wheat, for grain | Yield | 2.1 | Mg/ha |
| **Crop** | 35 | Corn-Field, for grain | Yield | 8.2 | Mg/ha |
| **Crop** | 42 | Soybean, for grain | Yield | 1.9 | Mg/ha |
| **Crop** | 49 | Wheat, for grain | Yield | 2.1 | Mg/ha |
| **Crop** | 56 | Corn-Field, for grain | Yield | 8.2 | Mg/ha |
| **Crop** | 63 | Soybean, for grain | Yield | 1.9 | Mg/ha |
| **Crop** | 70 | Wheat, for grain | Yield | 2.1 | Mg/ha |
| **Crop** | 77 | Corn-Field, for grain | Yield | 8.2 | Mg/ha |
| **Crop** | 84 | Soybean, for grain | Yield | 1.9 | Mg/ha |
| **Crop** | 91 | Wheat, for grain | Yield | 2.1 | Mg/ha |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 98 | Corn-Field, for grain | Yield | 8.2 | Mg/ha |
| **Crop** | 105 | Soybean, for grain | Yield | 1.9 | Mg/ha |
| **Crop** | 112 | Wheat, for grain | Yield | 2.1 | Mg/ha |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300200208** | **Study Area** | **WS 109/123** | Area (ha) | 1.23 | Tillage | Conventional | Cover Crop | |
| Practice ID | 8 | Practice Name | Chisel | General Practice | | Control | | Area Type | C |
| Category | Management | Study Focus | Tillage, Cover Crop, Fertilizer | Practice Overview | | NC-CCN-CN-CS-EN | | | |
| Irrigation | No | Irrig. Descrip. | Dryland (none) | | | | | | |
| Soils | 109: Rayne, Fine-loamy, mixed, active, mesic Typic Hapludults. 123: Keene, Fine-silty, mixed, superactive, mesic Aquic Hapludalfs | | | | | | | | |
| Fertilizer | | | | | | | | | |
| Comments | (practice entered to facilitate data analysis; combines results from WS109 & WS123] | | | | | | | | |

**Crop** Yield

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300200209** | **Study Area** | **WS 113/118** | Area (ha) | 1.38 | Tillage | No Till | Cover Crop | |
| Practice ID | 9 | Practice Name | No-till | General Practice | | Conservation Tillage | | Area Type | T |
| Category | Management | Study Focus | Tillage, Cover Crop, Fertilizer | Practice Overview | | NC-CCN-NT-CS-EN | | | |
| Irrigation | No | Irrig. Descrip. | Dryland (none) | | | | | | |
| Soils | Coshocton, Fine-loamy, mixed, active, mesic Aquultic Hapludalfs | | | | | | | | |
| Fertilizer | | | | | | | | | |
| Comments | Combined watersheds to facilitate data analysis. | | | | | | | | |

**Crop** Yield

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300200210** | **Study Area** | **WS 111/115/127** | Area (ha) | 1.77 | Tillage | Disked | Cover Crop | |
| Practice ID | 10 | Practice Name | Disked Reduced Input | General Practice | | Conservation Tillage | | Area Type | T |
| Category | Management | Study Focus | Tillage, Cover Crop, Fertilizer | Practice Overview | | NM-CCY-CT-CS-EN | | | |
| Irrigation | No | Irrig. Descrip. | Dryland (none) | | | | | | |
| Soils | 115, 127: Coshocton, Fine-loamy, mixed, active, mesic Aquultic Hapludalfs. 111: Keene, Fine-silty, mixed, superactive, mesic Aquic Hapludalfs | | | | | | | | |
| Fertilizer | | | | | | | | | |
| Comments | (combined watershed to facilitate data analysis) | | | | | | | | |

**Crop** Yield

| Test Site ID | Test Site Name |
|---|---|
| **2013005414** | **Snyder, N. J., 1998** |

| | | | | |
|---|---|---|---|---|
| Location | | Westmoreland | VA | US |

| | |
|---|---|
| Study Citation | 1998 |
| | Snyder, N. J., S. Mostaghimi, D. F. Berry, R. B. Reneau, S. Hong, P. W. McClellan and E. P. Smith. |
| | Impact of riparian forest buffers on agricultural nonpoint source pollution. |
| | J. Am. Water Resour. Assoc. 34:385-395. |
| NRCS LRR | South Atlantic and Gulf Slope Cash Crops, Forest, and Livestock Region |
| NRCS MLRA | Southern Coastal Plain |
| HUC_10 | 0207001108 |
| Test Site Scale | Field |
| Experimental Design Type/ Description | Inflow-Outflow |
| | Groundwater samples were collected approximately biweekly from 20 sampling locations at various positions up and down slope of the buffer. The upslope measurements were averaged from the two wells in the agricultural field, and the downslope measurements ere averaged from the two wells just above the stream in the riparian buffer. |
| Crops | Corn, Soybeans |
| Study Duration | 20 months |


Summary

A field monitoring study of a riparian buffer zone was conducted to determine the impact of the riparian ecosystem on reducing the concentration of agricultural nonpoint source pollutants. Groundwater samples were collected from 20 sampling locations between May 1993 and December 1994, and analyzed for NO3-N, PO4, and NH4-N. The study showed that the buffer was effective in reducing nitrate concentrations from upland fields. Instream nitrate concentrations were 48 percent less than those measured in the agricultural field. Reductions in concentrations in sampling locations at the wetland edge ranged from 16 to 70 percent. The mean nitrate concentrations in forested hill slope were 45 percent less than concentrations in a well located in an upland agricultural field. Meanwhile, the concentrations of phosphate and ammonia did not follow any specific spatial trend and were generally higher during the summer season for most sampling locations.


| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300541401** | **Study Area** | **Nomini** | Area (ha) | -99.00 | Tillage | Not specified | Cover Crop | Yes, unnamed |
| Practice ID | 419 | Practice Name | Riparian buffer | General Practice | | Riparian Buffer | | Area Type | T |
| Category | Structural | Study Focus | Buffer | Practice Overview | | NC-CCY-CN-CS-EB | | | |
| Irrigation | NR | Irrig. Descrip. | natural rainfall | | | | | | |

| | |
|---|---|
| Soils | Soils vary with their topographic location. Cultivated upland areas are Suffolk series (coarse-loamy, siliceous, thermic Typic Hapludults) soils. These soils are deep and well drained, forming in coarse to medium textured fluvial sediments. They are susce |
| Fertilizer | February 25, 1992 Liquid 89.7-0-0 (N-P-K) kg/ha/yr. March 2, 1993 Granular/Liquid 131.2-41.5-67.2 (N-P-K) kg/ha/yr. |
| Comments | The riparian buffer was on the order of 100 m in width, half with a slope of 0-6%, the other half with slopes of 10-20%. Groundwater wells were located at various positions up and down slope. |

| | | | | |
|---|---|---|---|---|
| **Crop** | 1 | corn, soybean | Yield | -999999 |

| Test Site ID | Test Site Name |
|---|---|
| **2013007068** | **Steinheimer et al. 1998** |

| | | | | |
|---|---|---|---|---|
| Location | Treynor | Pottawattamie | IA | US |

| | |
|---|---|
| Study Citation | 1998 |
| | Steinheimer, T.R., K.D. Scoggin, and L.A. Kramer. |
| | Agricultural Chemical Movement through a Field-Size Watershed in Iowa: Subsurface Hydrology and Distribution of Nitrate in Groundwater |
| | Environ. Sci. Technol. 32(8): 1039-1047 |
| NRCS LRR | Central Feed Grains and Livestock Region |
| NRCS MLRA | Till Plains |
| HUC_10 | 1024000206 — Test Site Scale: Field |
| Experimental Design Type/ Description | Long-term trend (single site) |
| | Long-term trend study of a 40-ha field to determine the impact of corn production in ridge-tilled soils on the nitrate-nitrogen loading in groundwater. |
| Crops | Corn |
| Study Duration | 23 years |


Summary

An agricultural watershed in the Iowa Loess Hills with a 23-year history of annual corn production with average N fertilization is studied. Headcut seepage is transported through a natural riparian zone and observed as weir baseflow; surface runoff is measured separately. The concentration of nitrate carried from the field in basin drainage steadily increased from <1 mg/L in 1969 to >20 mg/L in 1991. The rate of cumulative increase in the amount of applied N is greater than the rate of removal by the crop. Over the 23-year record, 23% of the mean annual application of N remains stored and available for leaching or chemical conversion by soil microbes. Nitrate removal during early spring snowmelt surface runoff shows a diurnal pattern that corresponds to the daily freezing and thawing of the surface soil in early March. Contribution to the load of nitrate deposited on the soil surface by rainfall is very small in comparison to the amount applied by fertilizer application. Measurable changes in water quality within various hydrogeologic compartments are seldom observed in just a few years of monitoring. The results emphasize the importance of long-term data sets incorporating temporal variability when evaluating the impact of agricultural practices on surface water.


| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300706801** | **Study Area** | **Watershed 3** | Area (ha) | 40.00 | Tillage | Ridge Till | Cover Crop | None |
| Practice ID | 1 | Practice Name | Ridge-tillage | General Practice | | Conservation Tillage | | Area Type | T |
| Category | Management | Study Focus | Tillage | Practice Overview | | NC-CCN-CT-CO-EN | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |

| | |
|---|---|
| Soils | Loess-derived soil, relatively porous, low bulk density, easily eroded |
| Fertilizer | Nitrogen fertilization began in 1968 and has averaged 168 kg/ha as an annual application in the spring (1968-1994). Report provides the 27-year record of annual amount and chemical form of N fertilizer applied. |
| Comments | Imported from MANAGE 2013. This study is more focused on long-term trends than "ridge till", but it is the key conservation practice at the site. Ridge-tillage: 6-10 in. ridges of soil are built up over the seedbed in 38-in. width corn rows. This creates microterraces along the landscape contour, which increase infiltration and decrease erosion. More than half of the plant residue on the field each year. |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Continuous Corn | Yield | -999999 | NA |

| Test Site ID | Test Site Name |
|---|---|
| **2013005426** | **Tan, C. S., 1998** |

| | | | | |
|---|---|---|---|---|
| Location | | Ontario | XX | CA |

| | |
|---|---|
| Study Citation | 1998 |
| | Tan, C. S., C. F. Drury, M. Soultani, I. J. vanWesenbeeck, H. Y. F. Ng, J. D. Gaynor and T. W. Welacky. |
| | Effect of controlled drainage and tillage on soil structure and tile drainage nitrate loss at the field scale. |
| | Water Sci. Tech. 38:103-110. |
| NRCS LRR | Canada |
| NRCS MLRA | Canada |
| HUC_10 | -999999 |
| Test Site Scale | Plot |
| Experimental Design Type/ Description | Multiple Treatments w/ Control, No Replication |
| | Two field sites; one managed by conventional tillage (CT) and the second by no tillage (NT). Each site consisted of two plots, controlled drainage (CD) and free tile drainage (DR). |
| Crops | Soybeans |
| Study Duration | 3 years |


Summary

Conservation tillage had become an attractive form of agricultural management practices for corn and soybean production on heavy textured soil in southern Ontario because of the potential for improving soil quality. A controlled drainage system combined with conservation tillage practices has also been reported to improve water quality. In Southwestern Ontario, field scale on farm demonstration sites were established in a paired watershed (no-tillage vs. conventional tillage) on clay loam soil to study the effect of tillage system on soil structure and water quality. The sites included controlled drainage and free drainage systems to monitor their effect on nitrate in the tile drainage water. Soil structure, organic matter content and water storage in the soil profile were improved with no-tillage (NT) compared to conventional tillage (CT). No-tillage also increased earthworm populations. No-tillage was found to have higher tile drainage volume and nitrate loss which were attributed to an increase in soil macropores from earthworm activity. The controlled drainage system (CD) reduced nitrate loss in tile drainage water by 14% on CT site and 25.5% on NT site compared to corresponding free drainage system (DR) form May, 1985 to April 30, 1997. No-tillage farming practices are definitely enhanced by using a controlled drainage system for preventing excessive nitrate leaching through tile drainage. Average soybean yields for CT site were about 12 to 14% greater than the NT site in 1995 and 1996. However, drainage systems had very little effect on soybean yields in 1995 and 1996 due to extremely dry growing seasons.


| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300542601** | **Study Area** | **CT - CD** | Area (ha) | 2.27 | Tillage | Conventional | Cover Crop | None |
| Practice ID | 718 | Practice Name | CT - CD | General Practice | | Drainage Water Management | | Area Type | T |
| Category | Management | Study Focus | Tillage, Controlled Drainage | Practice Overview | | NC-CCN-CN-SB-ED | | | |
| Irrigation | No | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Brookston clay loam (Typic Argiaquoll) | | | | | | | | |
| Fertilizer | At the CT site, fertilizer (0-18-36) was broadcasted at a rate of 224 kg/ha and incorporated during the fall of 1994 and 1995. | | | | | | | | |
| Comments | Controlled drainage and no-tillage were compared with their conventional alternatives on 2 sets of paired watersheds, each individual watershed being 5.62-ac in size. Each plot was 46 x 494m, and contained 5 subsurface drain tiles. Sample collection was based on flow volume with collection volumes varying by time of year and expected runoff volumes. Flow weighted mean nitrate concentrations were calculated from the sum of the nitrate loss over the period divided by the total flow volume. The 1995 and 1996 growing seasons were very dry, except for the month of September 1996, where 198 mm fell at the conventional tillage (CT) site, with only 74.6 mm at the no-till (NT) site. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | soybean | Yield | -999999 | kg/ha |
| **Crop** | 2 | soybean | Yield | -999999 | kg/ha |
| **Crop** | 3 | soybean | Yield | -999999 | NA |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300542602** | **Study Area** | **CT - DR** | Area (ha) | 2.27 | Tillage | Conventional | Cover Crop | None |
| Practice ID | 715 | Practice Name | CT - DR | General Practice | | Control | | Area Type | C |
| Category | Management | Study Focus | Tillage, Controlled Drainage | Practice Overview | | NC-CCN-CN-SB-EN | | | |
| Irrigation | No | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Brookston clay loam (Typic Argiaquoll) | | | | | | | | |
| Fertilizer | At the CT site, fertilizer (0-18-36) was broadcasted at a rate of 224 kg/ha and incorporated during the fall of 1994 and 1995. | | | | | | | | |
| Comments | Controlled drainage and no-tillage were compared with their conventional alternatives on 2 sets of paired watersheds, each individual watershed being 5.62-ac in size. Each plot was 46 x 494m, and contained 5 subsurface drain tiles. Sample collection was based on flow volume with collection volumes varying by time of year and expected runoff volumes. Flow weighted mean nitrate concentrations were calculated from the sum of the nitrate loss over the period divided by the total flow volume. The 1995 and 1996 growing seasons were very dry, except for the month of September 1996, where 198 mm fell at the conventional tillage (CT) site, with only 74.6 mm at the no-till (NT) site. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | soybean | Yield | -999999 | kg/ha |
| **Crop** | 2 | soybean | Yield | -999999 | kg/ha |
| **Crop** | 3 | soybean | Yield | -999999 | NA |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300542603** | **Study Area** | **NT - CD** | Area (ha) | 2.27 | Tillage | No Till | Cover Crop | None |
| Practice ID | 717 | Practice Name | NT - CD | General Practice | | Conservation Tillage and Drainage Water Management | | Area Type | T |
| Category | Management | Study Focus | Tillage, Controlled Drainage | Practice Overview | | NM-CCN-NT-SB-ED | | | |
| Irrigation | No | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Brookston clay loam (Typic Argiaquoll) | | | | | | | | |
| Fertilizer | At the NT site, fertilizer (6-36-18) was banded beside the seed at a rate of 185 kg/ha in 1995 and 1996. Hence, 11.1 kg/ha of N was added to the NT site and not the CT site. | | | | | | | | |
| Comments | Controlled drainage and no-tillage were compared with their conventional alternatives on 2 sets of paired watersheds, each individual watershed being 5.62-ac in size. Each plot was 46 x 494m, and contained 5 subsurface drain tiles. Sample collection was based on flow volume with collection volumes varying by time of year and expected runoff volumes. Flow weighted mean nitrate concentrations were calculated from the sum of the nitrate loss over the period divided by the total flow volume. The 1995 and 1996 growing seasons were very dry, except for the month of September 1996, where 198 mm fell at the conventional tillage (CT) site, with only 74.6 mm at the no-till (NT) site. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | soybean | Yield | -999999 | kg/ha |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 2 | soybean | Yield | -999999 | kg/ha |
| **Crop** | 3 | soybean | Yield | -999999 | NA |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300542604** | **Study Area** | **NT - DR** | Area (ha) | 2.27 | Tillage | No Till | Cover Crop | None |
| Practice ID | 716 | Practice Name | NT - DR | General Practice | | Conservation Tillage | | Area Type | T |
| Category | Management | Study Focus | Tillage, Controlled Drainage | Practice Overview | | NM-CCN-NT-SB-EN | | | |
| Irrigation | No | Irrig. Descrip. | N/A (rainfall) | | | | | | |
| Soils | Brookston clay loam (Typic Argiaquoll) | | | | | | | | |
| Fertilizer | At the NT site, fertilizer (6-36-18) was banded beside the seed at a rate of 185 kg/ha in 1995 and 1996. Hence, 11.1 kg/ha of N was added to the NT site and not the CT site. | | | | | | | | |
| Comments | Controlled drainage and no-tillage were compared with their conventional alternatives on 2 sets of paired watersheds, each individual watershed being 5.62-ac in size. Each plot was 46 x 494m, and contained 5 subsurface drain tiles. Sample collection was based on flow volume with collection volumes varying by time of year and expected runoff volumes. Flow weighted mean nitrate concentrations were calculated from the sum of the nitrate loss over the period divided by the total flow volume. The 1995 and 1996 growing seasons were very dry, except for the month of September 1996, where 198 mm fell at the conventional tillage (CT) site, with only 74.6 mm at the no-till (NT) site. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | soybean | Yield | -999999 | kg/ha |
| **Crop** | 2 | soybean | Yield | -999999 | kg/ha |
| **Crop** | 3 | soybean | Yield | -999999 | NA |

| Test Site ID | Test Site Name |
|---|---|
| **2013007038** | **Udawatta et al. 2002** |

| | | | | |
|---|---|---|---|---|
| Location | | Knox County | MO | US |
| Study Citation | 2002 | | | |
| | Udawatta, R.P., J.J. Krstansky, G.S. Henderson, and H.E. Garrett. | | | |
| | Agroforestry Practices, Runoff, and Nutrient Loss: A Paired Watershed Comparison | | | |
| | J. Environ. Qual. 31: 1214-1225 | | | |
| NRCS LRR | Central Feed Grains and Livestock Region | | | |
| NRCS MLRA | Central Claypan Areas | | | |
| HUC_10 | 0711000303 | Test Site Scale | Plot | |
| Experimental Design Type/ Description | Multiple Treatments w/ Control, No Replication | | | |
| | A paired watershed study | | | |
| Crops | Corn, Soybeans | | | |
| Study Duration | 3 years | | | |

Summary

A paired watershed study consisting of agroforestry (trees plus grass buffer strips), contour strips (grass buffer strips), and control treatments with a corn –soybean rotation was used to examine treatment effects on runoff, sediment, and nutrient losses. During the (1991–1997) calibration and subsequent three-year treatment periods, runoff was measured in 0.91 and 1.37-m H-flumes with bubbler flow meters. Composite samples were analyzed for sediment, total phosphorus (TP), total nitrogen (TN), nitrate, and ammonium. The contour strip and agroforestry treatments reduced runoff by 10 and 1% during the treatment period. In both treatments, most runoff reductions occurred in the second and third years after treatment establishment. The contour strip treatment reduced erosion by 19% in 1999, while erosion in the agroforestry treatment exceeded the predicted loss. Treatments reduced TP loss by 8 and 17% on contour strip and agroforestry watersheds. Treatments did not result in reductions in TN during the first two years of the treatment period. The contour strip and agroforestry treatments reduced TN loss by 21 and 20%, respectively, during a large precipitation event in the third year. During the third year of treatments, nitrate N loss was reduced 24 and 37% by contour strip and agroforestry treatments. Contour strip and agroforestry management practices effectively reduced nonpoint-source pollution in runoff from a corn–soybean rotation in the clay pan soils of northeastern Missouri.

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300703801** | **Study Area** | **Control** | Area (ha) | 1.65 | Tillage | NT | Cover Crop | |
| Practice ID | 1 | Practice Name | Control | General Practice | Control | | | Area Type | C |
| Category | Structural | Study Focus | Buffer | Practice Overview | NC-CCN-NT-CS-EN | | | | |
| Irrigation | No | Irrig. Descrip. | Not applicable | | | | | | |
| Soils | The watersheds are underlain by glacial and loess material. Soils are mapped as Putnam silt loam (fine, smectitic, mesic Vertic Albaqualf) and Kilwinning silt loam (fine, smectitic, Vertic Albaqualf). Putnam occurs on nearly level (0–1%) slope portions of | | | | | | | | |
| Fertilizer | None | | | | | | | | |
| Comments | | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Soybean | Yield | 42 | bushels/acre |
| **Crop** | 2 | Corn | Yield | 80 | bushels/acre |
| **Crop** | 3 | Soybean | Yield | 28 | bushels/acre |
| **Crop** | 4 | Corn | Yield | 162 | bushels/acre |


Acknowledgement: Study summaries may be directly quoted from original author's abstract.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Study ID** | **201300703802** | **Study Area** | **Agroforestry** | Area (ha) | 4.44 | Tillage | NT | Cover Crop | |
| Practice ID | 2 | Practice Name | Agroforestry | General Practice | Riparian Buffer | Area Type | T |
| Category | Structural | Study Focus | Buffer | Practice Overview | NC-CCN-NT-CS-EB | | |
| Irrigation | No | Irrig. Descrip. | Not applicable | | | | |
| Soils | The watersheds are underlain by glacial and loess material. Soils are mapped as Putnam silt loam (fine, smectitic, mesic Vertic Albaqualf) and Kilwinning silt loam (fine, smectitic, Vertic Albaqualf). Putnam occurs on nearly level (0–1%) slope portions of | | | | | | |
| Fertilizer | None | | | | | | |
| Comments | Contour grass–legume strips (4.5 m [15 ft.] wide) consisting of redtop (Agrostis gigantea Roth), brome grass (Bromus spp.), and birdsfoot trefoil (Lotus corniculatus L.) were established at 36.5 m (some in lower slope positions were 22.8 m apart) intervals on the agroforestry and contour strip watersheds in June 1997 (Fig. 1). Pin oak (Quercus palustris Muenchh.), swamp white oak (Q. bicolor Willd.), and bur oak (Q. macrocarpa Michx.) were planted 3 m apart down the center of the grass–legume strips of the agroforestry watershed in November 1997. Trees had almost 100% survival in spite of deer damage and a severe drought in 1999. Only one pin oak tree was replaced, in May 2000. In 1999, welded wire fences (5-cm mesh,1 m in diameter ) were installed to protect trees from deer damage. | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Soybean | Yield | 42 | bushels/acre |
| **Crop** | 2 | Corn | Yield | 80 | bushels/acre |
| **Crop** | 3 | Soybean | Yield | 28 | bushels/acre |
| **Crop** | 4 | Corn | Yield | 162 | bushels/acre |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Study ID** | **201300703803** | **Study Area** | **Contour Strip** | Area (ha) | 3.16 | Tillage | NT | Cover Crop | |
| Practice ID | 3 | Practice Name | Contour Strip | General Practice | Filter Strip | Area Type | T |
| Category | Structural | Study Focus | Buffer | Practice Overview | NC-CCN-NT-CS-EB | | |
| Irrigation | No | Irrig. Descrip. | Not applicable | | | | |
| Soils | The watersheds are underlain by glacial and loess material. Soils are mapped as Putnam silt loam (fine, smectitic, mesic Vertic Albaqualf) and Kilwinning silt loam (fine, smectitic, Vertic Albaqualf). Putnam occurs on nearly level (0–1%) slope portions of | | | | | | |
| Fertilizer | 160–50–100 | | | | | | |
| Comments | Contour grass–legume strips (4.5 m [15 ft.] wide) consisting of redtop (Agrostis gigantea Roth), brome grass (Bromus spp.), and birdsfoot trefoil (Lotus corniculatus L.) were established at 36.5 m (some in lower slope positions were 22.8 m apart) intervals on the agroforestry and contour strip watersheds in June 1997 (Fig. 1). | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Soybean | Yield | 42 | bushels/acre |
| **Crop** | 2 | Corn | Yield | 80 | bushels/acre |
| **Crop** | 3 | Soybean | Yield | 28 | bushels/acre |
| **Crop** | 4 | Corn | Yield | 162 | bushels/acre |

| Test Site ID | Test Site Name |
|---|---|
| 2013007037 | Udawatta et al. 2004 |

| | | | | |
|---|---|---|---|---|
| Location | | Knox County | MO | US |
| Study Citation | 2004 | | | |
| | Udawatta, R.P, P.P. Motavalli, and H.E. Garrett. | | | |
| | Phosphorus Loss and Runoff Characteristics in Three Adjacent Agricultural Watersheds with Claypan Soils | | | |
| | J. Environ. Qual. 33: 1709-1719 | | | |
| NRCS LRR | Central Feed Grains and Livestock Region | | | |
| NRCS MLRA | Central Claypan Areas | | | |
| HUC_10 | 0711000303 | Test Site Scale | Plot | |
| Experimental Design Type/ Description | Multiple Treatments w/ Control, No Replication | | | |
| | Effects of precipitation, runoff, and management on total phosphorus (TP) loss from three watersheds were examined from 1991 to 1997 to understand factors affecting P loss in watersheds dominated by claypan soils. | | | |
| Crops | Corn, Soybeans | | | |
| Study Duration | 7 years | | | |


Summary

Effects of precipitation, runoff, and management on total phosphorus (TP) loss from three adjacent, row-cropped watersheds in the claypan region of northeastern Missouri were examined from 1991 to 1997 to understand factors affecting P loss in watersheds dominated by claypan soils. Runoff samples from each individual runoff event were analyzed for TP and sediment concentration. The annual TP loss ranged from 0.29 to 3.59 kg/ha with a mean of 1.36 kg/ha across all the watersheds during the study period. Significantly higher loss of TP from the watersheds was observed during the fallow period. Multiple small runoff events or several large runoff events contributed to loss of TP from the watersheds. Total P loss in 1993, a year with above-normal precipitation, accounted for 30% of the total TP loss observed over seven years. The five largest runoff events out of a total of 66 events observed over seven years accounted for 27% of the TP loss. The five largest sediment losses were responsible for 24% of the TP loss over seven years. Runoff volume and sediment loss explained 64 to 73% and 47 to 58% of the variation in TP loss on watersheds during the study. Flow duration and maximum flow accounted for 49 and 66% of TP loss, respectively. The results of this study suggest that management practices that reduce runoff volume, flow duration, maximum flow, and sediment loss, and that maintain a suitable vegetative cover throughout the year could lower P loss in claypan soils.


| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300703701** | **Study Area** | **East** | Area (ha) | 1.65 | Tillage | No Till | Cover Crop | |
| Practice ID | 1 | Practice Name | Overall_East | General Practice | | Conservation Tillage and Grassed Waterway | | Area Type | T |
| Category | Management/Str | Study Focus | General, Contour Planting, Tillage, Grass Waterway | Practice Overview | | NC-CCN-NT-CS-EG | | | |
| Irrigation | No | Irrig. Descrip. | Not applicable | | | | | | |

| | |
|---|---|
| Soils | The watersheds are underlain by glacial and loess material. Soils are mapped as Putnam silt loam (fine, smectitic, mesic Vertic Albaqualf) and Kilwinning silt loam (fine, smectitic, Vertic Albaqualf). Putnam occurs on nearly level (0–1%) slope portions of |
| Fertilizer | 1991-1997: 1991-not available; 1992-soybean-none; 1993-corn-160-50-100; 1994-soybean-none; 1995-soybean(other varieties) 0-40-120; 1996-corn-59-0-0; 1997-soybean-none. |
| Comments | Beginning in 1991, planting was in a straight row perpendicular to the slope and then beginning in 1996 was on the contour. During the study period, the land preparation method was no-till with the exception of 1992 when watersheds were field-cultivated with a John Deere (Moline, IL) E1000 field cultivator. Each watershed is drained by a grass waterway that leads into a concrete approach structure and an H-flume. The east watershed has a 0.91-m flume while the other two watersheds have 1.37-m flumes. |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Corn | Yield | -999999 | bushels/acre |
| **Crop** | 2 | Soybean | Yield | 25 | bushels/acre |
| **Crop** | 3 | Corn | Yield | 130 | bushels/acre |
| **Crop** | 4 | Soybean | Yield | 55 | bushels/acre |
| **Crop** | 5 | Soybean | Yield | 42.4 | bushels/acre |
| **Crop** | 6 | Corn | Yield | 170 | bushels/acre |
| **Crop** | 7 | Soybean | Yield | 42 | bushels/acre |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300703702** | **Study Area** | **Center** | Area (ha) | 4.44 | Tillage | No Till | Cover Crop | |
| Practice ID | 2 | Practice Name | Overall_Center | General Practice | Conservation Tillage and Grassed Waterway | | | Area Type | T |
| Category | Management/Str | Study Focus | General, Contour Planting, Tillage, Grass Waterway | Practice Overview | NC-CCN-NT-CS-EG | | | | |
| Irrigation | No | Irrig. Descrip. | Not applicable | | | | | | |

Soils: The watersheds are underlain by glacial and loess material. Soils are mapped as Putnam silt loam (fine, smectitic, mesic Vertic Albaqualf) and Kilwinning silt loam (fine, smectitic, Vertic Albaqualf). Putnam occurs on nearly level (0–1%) slope portions of

Fertilizer: 1991-1997: 1991-not available; 1992-soybean-none; 1993-corn-160-50-100; 1994-soybean-none; 1995-soybean(other varieties) 0-40-120; 1996-corn-59-0-0; 1997-soybean-none.

Comments: Beginning in 1991, planting was in a straight row perpendicular to the slope and then beginning in 1996 was on the contour. During the study period, the land preparation method was no-till with the exception of 1992 when watersheds were field-cultivated with a John Deere (Moline, IL) E1000 field cultivator. Each watershed is drained by a grass waterway that leads into a concrete approach structure and an H-flume. The east watershed has a 0.91-m flume while the other two watersheds have 1.37-m flumes.

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Corn | Yield | -999999 | bushels/acre |
| **Crop** | 2 | Soybean | Yield | 25 | bushels/acre |
| **Crop** | 3 | Corn | Yield | 130 | bushels/acre |
| **Crop** | 4 | Soybean | Yield | 55 | bushels/acre |
| **Crop** | 5 | Soybean | Yield | 31.7 | bushels/acre |
| **Crop** | 6 | Corn | Yield | 170 | bushels/acre |
| **Crop** | 7 | Soybean | Yield | 42 | bushels/acre |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300703703** | **Study Area** | **West** | Area (ha) | 3.16 | Tillage | No Till | Cover Crop | |
| Practice ID | 3 | Practice Name | Overall_West | General Practice | Conservation Tillage and Grassed Waterway | | | Area Type | T |
| Category | Management/Str | Study Focus | General, Contour Planting, Tillage, Grass Waterway | Practice Overview | NC-CCN-NT-CS-EG | | | | |
| Irrigation | No | Irrig. Descrip. | Not applicable | | | | | | |

Soils: The watersheds are underlain by glacial and loess material. Soils are mapped as Putnam silt loam (fine, smectitic, mesic Vertic Albaqualf) and Kilwinning silt loam (fine, smectitic, Vertic Albaqualf). Putnam occurs on nearly level (0–1%) slope portions of

Fertilizer: 1991-1997: 1991-not available; 1992-soybean-none; 1993-corn-160-50-100; 1994-soybean-none; 1995-soybean(other varieties) 0-40-120; 1996-corn-59-0-0; 1997-soybean-none.

Comments: Beginning in 1991, planting was in a straight row perpendicular to the slope and then beginning in 1996 was on the contour. During the study period, the land preparation method was no-till with the exception of 1992 when watersheds were field-cultivated with a John Deere (Moline, IL) E1000 field cultivator. Each watershed is drained by a grass waterway that leads into a concrete approach structure and an H-flume. The east watershed has a 0.91-m flume while the other two watersheds have 1.37-m flumes.

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Corn | Yield | -999999 | bushels/acre |
| **Crop** | 2 | Soybean | Yield | 25 | bushels/acre |
| **Crop** | 3 | Corn | Yield | 130 | bushels/acre |
| **Crop** | 4 | Soybean | Yield | 55 | bushels/acre |
| **Crop** | 5 | Soybean | Yield | 24.1 | bushels/acre |
| **Crop** | 6 | Corn | Yield | 170 | bushels/acre |
| **Crop** | 7 | Soybean | Yield | 42 | bushels/acre |


Acknowledgement: Study summaries may be directly quoted from original author's abstract.

| Test Site ID | Test Site Name |
|---|---|
| **2013001002** | **UMES Research Farm** |
| Location | Princess Anne, Somerset, MD, US |
| Study Citation | 2012 |
| | Bryant, Ray B.; Anthony R. Budaa, Peter J.A. Kleinmana, Clinton D. Churcha, Louis S. Saporitoa,Gordon J. Folmara, Salil Boseb and Arthur L. Allenc |
| | Using Flue Gas Desulfurization Gypsum to Remove Dissolved Phosphorus from Agricultural Drainage Waters |
| | |
| NRCS LRR | Atlantic and Gulf Coast Lowland Forest and Crop Region |
| NRCS MLRA | Northern Tidewater Area |
| HUC_10 | 0208011004 |
| Test Site Scale | Field |
| Experimental Design Type/ Description | Inflow-Outflow |
| | The specific objectives of this study were to design, build, and monitor the effectiveness of an in-ditch filter to remove dissolved P, thereby reducing nonpoint source P losses from upstream agricultural fields. |
| Crops | Corn, Soybeans |
| Study Duration | 4 years |

Summary

110 Mg of flue gas desulfurization (FGD) gypsum and 5 Mg of sand were used as the reactive ingredients in a ditch filter. The ditch filter was monitored from 2007 to 2010, during which time 29 storm-induced flow events were characterized. To avoid flooding during large storm events, the gypsum ditch filter was designed to allow excess flow to spill over and bypass the filter. To measure bypass flow during large flow events, a compound V-notch, straight-walled weir was used to block flow and to establish a hydrologic head above the filtration bed. After the weir was installed, gabions (rock-filled wire cages) were placed behind the weir to hold it in place and to prevent erosion of the ditch side walls. A manifold, placed in front of the weir, was connected to a drain pipe, which routed the filtered effluent underground around the weir and through a partially buried metal box that provided access to flow monitoring and sampling equipment. The filter bed consists of six 30-m-long, 10-cm-diameter tile lines that were encased in cylindrically shaped filter fabric, attached to the manifold, and sandwiched within a layer of sand with FGD gypsum above (25 cm thick) and below (10 cm thick). A coconut fiber erosion control mat stabilized the surface of the bed until vegetation established by natural succession.



Acknowledgement: Study summaries may be directly quoted from original author's abstract.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300100201** | **Study Area** | **UMES Research Farm** | Area (ha) | 17.00 | Tillage | No Till | Cover Crop | Winter Wheat |
| Practice ID | 1 | Practice Name | Flue Gas Desulfurization Gypsum | General Practice | Ditch Filter | | | Area Type | T |
| Category | Structural | Study Focus | Ditch Filter | Practice Overview | NM-CCY-NT-CS-EO | | | | |
| Irrigation | No | Irrig. Descrip. | Not applicable | | | | | | |

| | |
|---|---|
| Soils | Soils in the drainage area have silt loam surface horizons and well structured, silty clay loam, argillic, subsurface horizons that favor preferential flow. Below a depth of approximately 50 cm, the argillic horizon transitions to highly permeable, mediu |
| Fertilizer | For the 17-ha area drained by the ditch, poultry litter applied only in 2009 at 0.5 Mg/ha. Applied and incorporated before planting. Soil test: Mehlich 3 (equivalent) 450 mg/k (in 2007 prior to study). |
| Comments | Flue gas desulfurization gypsum (110 Mg) and sand (5 Mg) were used in the construction of the filter bed (Fig. 3). To avoid flooding during large storm events, the gypsum ditch filter was designed to allow excess flow to spill over and bypass the filter. To measure bypass flow during large flow events, a compound V-notch, straight-walled weir was used to block flow and to establish a hydrologic head above the filtration bed. After the weir was installed, gabions (rock-filled wire cages) were placed behind the weir to hold it in place and to prevent erosion of the ditch side walls. A manifold, placed in front of the weir, was connected to a drain pipe, which routed the filtered effluent underground around the weir and through a partially buried metal box that provided access to flow monitoring and sampling equipment. The filter bed consists of six 30-m-long, 10-cm-diameter tile lines that were encased in cylindrically shaped filter fabric, attached to the manifold, and sandwiched within a layer of sand with FGD gypsum above (25 cm thick) and below (10 cm thick). A coconut fiber erosion control mat stabilized the surface of the bed until vegetation established by natural succession. |

| | | | | |
|---|---|---|---|---|
| **Crop** | 1 | Corn | Yield | -999999 |
| **Crop** | 2 | Soybean | Yield | -999999 |

| Test Site ID | Test Site Name |
|---|---|
| 2013007001 | Van Vliet et al. 2002 |

| | | | | |
|---|---|---|---|---|
| Location | Agassiz | British Columbia | XX | CA |
| Study Citation | 2002 | | | |
| | Van Vliet, L.J.P., B.J. Zebarth, and G. Derksen. | | | |
| | Effect of Fall-Applied Manure Practices on Runoff, Sediment, and Nutrient Surface Transport from Silage Corn in South Coastal British Columbia | | | |
| | Can. J. Soil Sci. 82:445-456 | | | |
| NRCS LRR | Canada | | | |
| NRCS MLRA | Canada | | | |
| HUC_10 | -999999 | Test Site Scale | Plot | |
| Experimental Design Type/ Description | Multiple Treatments w/ Control, No Replication | | | |
| | plot study: complete randomized block | | | |
| Crops | Corn | | | |
| Study Duration | 2 years | | | |

Summary

Runoff from manured cropland during the wet fall and winter season, when 70% of the annual rainfall occurs, is a surface water quality concern in the Lower Fraser Valley of British Columbia. This study compares different fall-manure application strategies on runoff and contaminant transport from silage com (Zea mays) land. The treatments were (i) a control, which did not receive manure in the fall; (ii) manure broadcast in the fall on corn stubble; and (iii) manure broadcast in the fall on com stubble with an established relay crop. Runoff, solids, and nutrients loads from natural precipitation were measured on replicated experimental plots (0.0125 ha) from 1996 to 1998. Fall-applied manure on 3-5% sloping silage cornland without a relay crop resulted in a high risk to surface water quality, due to high suspended solid loads of between 7 and 14 Mg ha-1 yr1 and high nutrient transport with mean annual total Kjeldahl N (TKN) P, and K loads of 98, 21, and 63 kg/ha, respectively. Compared with no relay crop, intercropping silage com with a relay crop of Italian ryegrass (Lolium multijlorum) reduced the mean annual runoff and suspended solid load by 53 and 74%, respectively, TKN load by 56%, P load by 42%, K load by 31 %, and Cu load by 57%. Even though total nutrient loads were lower with the relay crop treatment, all fall manure treatments including the relay crop resulted in nutrient loads above guidelines for the first three runoff events immediately following application.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300700101** | **Study Area** | **CT** | Area (ha) | 0.01 | Tillage | Disked | Cover Crop | None |
| Practice ID | 1 | Practice Name | CT | General Practice | | Control | | Area Type | C |
| Category | Management | Study Focus | Fertilizer, Cover Crop | Practice Overview | | NM-CCN-CT-CO-EN | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Silt Loam- Fairfield | | | | | | | | |
| Fertilizer | In the spring, potassium (KCl) fertilizer (N-P2O-K2O ratio of 0-0-60) was broadcast on all six plots at a rate of 100 kg/ha prior to manure application. No fall manure application. | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Corn for Silage | Yield | -999999 | NA |
| **Crop** | 2 | Corn for Silage | Yield | -999999 | NA |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300700102** | **Study Area** | **CP** | Area (ha) | 0.01 | Tillage | Disked | Cover Crop | None |
| Practice ID | 2 | Practice Name | CP | General Practice | Fertilizer | | | Area Type | T |
| Category | Management | Study Focus | Fertilizer, Cover Crop | Practice Overview | NC-CCN-CT-CO-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Silt Loam- Fairfield | | | | | | | | |
| Fertilizer | In the spring, potassium (KCl) fertilizer (N-P2O-K2O ratio of 0-0-60) was broadcast on all six plots at a rate of 100 kg/ha prior to manure application. Liquid dairy manure broadcast on corn stubble in the fall following a silage corn harvest and not incorporated | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Corn for Silage | Yield | -999999 | NA |
| **Crop** | 2 | Corn for Silage | Yield | -999999 | NA |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300700103** | **Study Area** | **RC** | Area (ha) | 0.01 | Tillage | Disked | Cover Crop | Italian ryegrass |
| Practice ID | 3 | Practice Name | RC | General Practice | Fertilizer, Cover Crop | | | Area Type | T |
| Category | Management | Study Focus | Fertilizer, Cover Crop | Practice Overview | NC-CCY-CT-CO-EN | | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Silt Loam- Fairfield | | | | | | | | |
| Fertilizer | In the spring, potassium (KCl) fertilizer (N-P2O-K2O ratio of 0-0-60) was broadcast on all six plots at a rate of 100 kg/ha prior to manure application. Fall-applied liquid dairy manure broadcast on corn stubble an not incorporated | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Corn for Silage (with Italian ryegrass rela | Yield | -999999 | NA |
| **Crop** | 2 | Corn for Silage (with Italian ryegrass rela | Yield | -999999 | NA |

| Test Site ID | Test Site Name |
|---|---|
| **2013005473** | **Willis, G. H., 1997** |

| | | | | |
|---|---|---|---|---|
| Location | Baton Rouge | East Baton Rouge | LA | US |
| Study Citation | 1997 | | | |
| | Willis, G. H., L. M. Southwick, J. L. Fouss, C. E. Carter and J. S. Rogers. | | | |
| | Nitrate losses in runoff and subsurface drain effluent from controlled-water-table plots. | | | |
| | Bull. Environ. Contam. Toxicol. 58:566-573. | | | |
| NRCS LRR | South Atlantic and Gulf Slope Cash Crops, Forest, and Livestock Region | | | |
| NRCS MLRA | Carolina and Georgia Sand Hills | | | |
| HUC_10 | 0807020208 | Test Site Scale | Plot | |
| Experimental Design Type/ Description | plot study: complete randomized block | | | |
| Crops | Corn | | | |
| Study Duration | 2 years | | | |

Summary

This paper reports the concentrations and loads of nitrate in runoff and subsurface drain effluent from controlled-water table plots located on alluvial soil in southern Louisiana. The study was conducted on sixteen 0.21-ha plots on the Louisiana Agricultural Experiment Station's Ben Hur Farm near Baton Rouge from April, 1995 till mid-March, 1996. Four replications of four water table management treatments were imposed on the plots: (1) surface drainage only (SUR) , (2) conventional subsurface drainage at 1.2 m or more below the soil surface (DRN), (3) controlled water table depth at 45 cm below the soil surface (CWT45), end (4) controlled water depth table at 75 cm below the soil surface (CWT75). Although N03-N concentrations were high on numerous occasions, the drain volumes were small, resulting in low total amounts lost in subsurface drain effluent.The results suggest that water table control is a promising tool for managing soil water to reduce agrochemical loads in surface and groundwaters on high-water-table soils. However, several more years of data under variable weather regimens, and dynamic adjustments to water table depths during the growing season, will be required before the full utility of the process can be evaluated.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300547301** | **Study Area** | **SUR** | Area (ha) | 0.21 | Tillage | Not specified | Cover Crop | None |
| Practice ID | 438 | Practice Name | SUR | General Practice | | Control | | Area Type | C |
| Category | Management | Study Focus | Controlled Drainage | Practice Overview | | NM-CCN-CT-CO-EN | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |

Soils: Commerce silt loam (Aeric Fluvaquent)

Fertilizer: A "starter" application of ammonium nitrate was applied at 56 kg N/ha on April 19 and was tilled into the top 7.5 to 10 cm of soil. A side-dress N application (84 kg N/ha) was made on May 17. On June 28 a third application (84 kg N/ha) was applied by aircraft; no tillage occurred.

Comments: This study was conducted on 16 0.21-ha plots. Three subsurface drains were installed 1.2 m below the soil surface. Field instrumentation included microprocessor-controlled water table management (drainage and/or sub irrigation), and automated measuring and sampling of runoff and drain line effluent. A starter nitrogen application at 56 kg/ha was tilled into the surface on April 19. Corn was planted on April 27. A sidedress of 84 kg N/ha was applied on May 17th and a third application of 84 kg N/ha was applied by airplane on June 28. The water table treatments were imposed on the day of planting and maintained until day 146, one day before corn harvest. Sampling of runoff went from day 0 to day 197; sampling of drain line effluent continued through day 328. Tillage treatments were the same for all plots.

**Crop** 1 Corn Yield -999999 NA

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300547302** | **Study Area** | **DNR** | Area (ha) | 0.21 | Tillage | Not specified | Cover Crop | None |
| Practice ID | 439 | Practice Name | DNR | General Practice | | Drainage Water Management | | Area Type | T |
| Category | Management | Study Focus | Controlled Drainage | Practice Overview | | NM-CCN-CT-CO-EN | | | |
| Irrigation | Yes | Irrig. Descrip. | | | | | | | |

Soils: Commerce silt loam (Aeric Fluvaquent)

Fertilizer: A "starter" application of ammonium nitrate was applied at 56 kg N/ha on April 19 and was tilled into the top 7.5 to 10 cm of soil. A side-dress N application (84 kg N/ha) was made on May 17. On June 28 a third application (84 kg N/ha) was applied by aircraft; no tillage occurred.

Comments: This study was conducted on 16 0.21-ha plots. Three subsurface drains were installed 1.2 m below the soil surface. Field instrumentation included microprocessor-controlled water table management (drainage and/or sub irrigation), and automated measuring and sampling of runoff and drain line effluent. A starter nitrogen application at 56 kg/ha was tilled into the surface on April 19. Corn was planted on April 27. A sidedress of 84 kg N/ha was applied on May 17th and a third application of 84 kg N/ha was applied by airplane on June 28. The water table treatments were imposed on the day of planting and maintained until day 146, one day before corn harvest. Sampling of runoff went from day 0 to day 197; sampling of drain line effluent continued through day 328. Tillage treatments were the same for all plots.

**Crop** 1 Corn Yield -999999 NA

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300547303** | **Study Area** | **CWT45** | Area (ha) | 0.21 | Tillage | Not specified | Cover Crop | None |
| Practice ID | 437 | Practice Name | CWT45 | General Practice | | Drainage Water Management | | Area Type | T |
| Category | Management | Study Focus | Controlled Drainage | Practice Overview | | NM-CCN-CT-CO-ED | | | |
| Irrigation | Yes | Irrig. Descrip. | | | | | | | |

Soils: Commerce silt loam (Aeric Fluvaquent)

Fertilizer: A "starter" application of ammonium nitrate was applied at 56 kg N/ha on April 19 and was tilled into the top 7.5 to 10 cm of soil. A side-dress N application (84 kg N/ha) was made on May 17. On June 28 a third application (84 kg N/ha) was applied by aircraft; no tillage occurred.

Comments: This study was conducted on 16 0.21-ha plots. Three subsurface drains were installed 1.2 m below the soil surface. Field instrumentation included microprocessor-controlled water table management (drainage and/or sub irrigation), and automated measuring and sampling of runoff and drain line effluent. A starter nitrogen application at 56 kg/ha was tilled into the surface on April 19. Corn was planted on April 27. A sidedress of 84 kg N/ha was applied on May 17th and a third application of 84 kg N/ha was applied by airplane on June 28. The water table treatments were imposed on the day of planting and maintained until day 146, one day before corn harvest. Sampling of runoff went from day 0 to day 197; sampling of drain line effluent continued through day 328. Tillage treatments were the same for all plots.

**Crop** 1 Corn Yield -999999 NA

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300547304** | **Study Area** | **CWT75** | Area (ha) | 0.21 | Tillage | Not specified | Cover Crop | None |
| Practice ID | 436 | Practice Name | CWT75 | General Practice | Drainage Water Management | | | Area Type | T |
| Category | Management | Study Focus | Controlled Drainage | Practice Overview | NM-CCN-CT-CO-ED | | | | |
| Irrigation | Yes | Irrig. Descrip. | | | | | | | |

Soils: Commerce silt loam (Aeric Fluvaquent)

Fertilizer: A "starter" application of ammonium nitrate was applied at 56 kg N/ha on April 19 and was tilled into the top 7.5 to 10 cm of soil. A side-dress N application (84 kg N/ha) was made on May 17. On June 28 a third application (84 kg N/ha) was applied by aircraft; no tillage occurred.

Comments: This study was conducted on 16 0.21-ha plots. Three subsurface drains were installed 1.2 m below the soil surface. Field instrumentation included microprocessor-controlled water table management (drainage and/or sub irrigation), and automated measuring and sampling of runoff and drain line effluent. A starter nitrogen application at 56 kg/ha was tilled into the surface on April 19. Corn was planted on April 27. A sidedress of 84 kg N/ha was applied on May 17th and a third application of 84 kg N/ha was applied by airplane on June 28. The water table treatments were imposed on the day of planting and maintained until day 146, one day before corn harvest. Sampling of runoff went from day 0 to day 197; sampling of drain line effluent continued through day 328. Tillage treatments were the same for all plots.

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Corn | Yield | -999999 | NA |

| Test Site ID | Test Site Name |
|---|---|
| **2013007005** | **Wood et al. 1999** |

| | | | | |
|---|---|---|---|---|
| Location | Belle Mina | Limestone | AL | US |
| Study Citation | 1999 | | | |
| | Wood, B.H., C.W. Wood, K.H. Yoo, K.S. Yoon, and D.P. Delaney. | | | |
| | Seasonal Surface Runoff Losses of Nutrients and Metals from Soils Fertilized with Broiler Litter and Commercial Fertilizer | | | |
| | J. Environ. Qual. 28: 1210-1218 | | | |
| NRCS LRR | East and Central Farming and Forest Region | | | |
| NRCS MLRA | Springfield Plain | | | |
| HUC_10 | 0603000207 | Test Site Scale | Plot | |
| Experimental Design Type/ Description | Multiple Treatments w/ Control | | | |
| | plot study: complete randomized block | | | |
| Crops | Corn, rye | | | |
| Study Duration | 3 years | | | |

Summary

A study was conducted on a 4% slope during 1991 to 1993 at Belle Mina, AL, on a Decatur silty clay to determine effects of broiler litter (BL) on seasonal transport losses of nutrients and heavy metals in surface water. A corn (Zea mays L)-winter rye (Secale cereale L.) cropping system was fertilized with either: (i) 9 Mg BL/ha (BL9), (ii) 18 Mg BL/ha (BL18), or (iii) commercial fertilizer at the recommended rate (CF). Runoff water samples were collected after each runoff producing rainfall event. Litter treatments decreased sediment flow-weighted concentrations during the second corn growing season owing to residual broiler litter. Flow-weighted concentrations of NO3-N and NH4-N were highest under BL18 during the second corn season. Total P and dissolved P flow-weighted concentrations and seasonal transport losses were highest under BL18 during the second corn season. Sediment nutrient flow-weighted concentrations of K, Mg, and Mn were highest under CF during the second corn season. Dissolved nutrient flow-weighted concentrations of Ca, K, and Mg were highest under BL18 during the second corn season. Nutrient flow-weighted concentrations, except Ca, from all treatments provide adequate levels to support algae growth.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300700501** | **Study Area** | **CF** | Area (ha) | 0.10 | Tillage | No Till | Cover Crop | Winter Rye |
| Practice ID | 1 | Practice Name | Commercial Conv | General Practice | | Control | | Area Type | C |
| Category | Management | Study Focus | Fertilizer | Practice Overview | | NC-CCY-NT-CO-EN | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Silty Clay- Decatur | | | | | | | | |
| Fertilizer | Broiler litter and commercial fertilizer treatments were applied with a commercial pull type spreader and were disked into the soil immediately after application on March 27, 1991. No adjustments to commercial fertilizer rate. Application rate for N and P were 157 kg N/ha (450 kg ammonium nitrate/ha) and 50 kg P2)5/ha (112 triple super phosphate/ha). | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Corn | Yield | -999999 | NA |
| **Crop** | 2 | Winter Rye Cover Crop | Yield | -999999 | NA |
| **Crop** | 3 | Corn | Yield | -999999 | NA |
| **Crop** | 4 | Winter Rye Cover Crop | Yield | -999999 | NA |


Acknowledgement: Study summaries may be directly quoted from original author's abstract.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300700502** | **Study Area** | **BL9** | Area (ha) | 0.10 | Tillage | No Till | Cover Crop | Winter Rye |
| Practice ID | 2 | Practice Name | Broiler Litter (9) Conv | General Practice | | Nutrient Management | | Area Type | T |
| Category | Management | Study Focus | Fertilizer | Practice Overview | | NC-CCY-NT-CO-EN | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Silty Clay- Decatur | | | | | | | | |
| Fertilizer | Broiler litter and commercial fertilizer treatments were applied with a commercial pull type spreader and were disked into the soil immediately after application on March 27, 1991. | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. | | | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 1 | Corn | Yield | -999999 | NA |
| **Crop** | 2 | Winter Rye Cover Crop | Yield | -999999 | NA |
| **Crop** | 3 | Corn | Yield | -999999 | NA |
| **Crop** | 4 | Winter Rye Cover Crop | Yield | -999999 | NA |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300700503** | **Study Area** | **BL18** | Area (ha) | 0.10 | Tillage | No Till | Cover Crop | Winter Rye |
| Practice ID | 3 | Practice Name | Broiler Litter (18) Conv | General Practice | | Nutrient Management | | Area Type | T |
| Category | Management | Study Focus | Fertilizer | Practice Overview | | NC-CCY-NT-CO-EN | | | |
| Irrigation | No | Irrig. Descrip. | | | | | | | |
| Soils | Silty Clay- Decatur | | | | | | | | |
| Fertilizer | Broiler litter and commercial fertilizer treatments were applied with a commercial pull type spreader and were disked into the soil immediately after application on March 27, 1991. | | | | | | | | |
| Comments | Imported from MANAGE 2013; additional meta data added in 2015. | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 1 | Corn | Yield | -999999 | NA |
| **Crop** | 2 | Winter Rye Cover Crop | Yield | -999999 | NA |
| **Crop** | 3 | Corn | Yield | -999999 | NA |
| **Crop** | 4 | Winter Rye Cover Crop | Yield | -999999 | NA |

| Test Site ID | Test Site Name |
|---|---|
| **2013007042** | **Wortmann et al. 2006** |
| Location | Lincoln, Lancaster, NE, US |
| Study Citation | 2006<br>Wortmann, C.S., and D.T. Walters.<br>Phosphorus Runoff during Four Years following Composted Manure Application<br>J. Environ. Qual. 35:651-657 |
| NRCS LRR | Central Feed Grains and Livestock Region |
| NRCS MLRA | Nebraska and Kansas Loess-Drift Hills |
| HUC_10 | 1020020308 |
| Test Site Scale | Plot |
| Experimental Design Type/ Description | Multiple Treatments w/ Control and Replication<br>Randomized Complete Block with Replication. Research was conducted to evaluate soil P tests in prediction of P concentration in runoff and to determine the residual effects of composted manure on runoff P loss and leaching of P. The research was conducted from 2001 to 2004 under natural runoff events with plots of 11-m length. |
| Crops | Corn, Soybeans |
| Study Duration | 3 years |

Summary

Repeated manure application can lead to excessive soil test P (STP) levels and increased P concentration in runoff, but also to improved water infiltration and reduced runoff. Research was conducted to evaluate soil P tests in prediction of P concentration in runoff and to determine the residual effects of composted manure on runoff P loss and leaching of P. The research was conducted from 2001 to 2004 under natural runoff events with plots of 11-m length. Low-P and high- p compost had been applied during the previous 3 yr, resulting in total applications of 750 and 1150 kg P / ha. Bray-Pl in the surface 5 cm of soil was increased from 16 to 780 mg/kg with application of high-P compost. Runoff and sediment losses were 69 and 120% greater with no compost than with residual compost treatments. Runoff P concentration increased as STP increased, but much P Joss occurred with the no-compost treatment as well. Agronomic soil tests were predictive of mean runoff P concentration, but increases in STP resulted in relatively small increases in runoff P concentration. Downward movement of P was not detected below 0.3 m. In conclusion, agronomic soil tests are useful in predicting long-term runoff P concentration, and risk of P loss may be of concern even at moderate soil P levels. The residual effect of compost application in reducing sediment and runoff loss was evident more than 3 yr after application and should be considered in P indices.


Acknowledgement: Study summaries may be directly quoted from original author's abstract.

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300704201** | **Study Area** | **High-P compost** | Area (ha) | 0.03 | Tillage | Disked | Cover Crop | None |
| Practice ID | 1 | Practice Name | High-P compost | General Practice | Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Fertilizer | Practice Overview | NC-CCN-CT-CS-EN | | | | |
| Irrigation | Yes | Irrig. Descrip. | Irrigation water was supplied during the growing season when available water holding capacity reached 50% depletion. All runoff events occurred from March through August and were associated with rainfall or snowmelt events, except for one event in July 2002, which was induced with excessive irrigation. | | | | | | |
| Soils | Fine-silty, mixed, mesic Typic Eutrochrept; texture 28% sand, 58% silt, and 14% clay | | | | | | | | |
| Fertilizer | Low P (0.20-0.36% P) and high P (0.36-0.46% P) composted feedlot manure applied annually to 6 compost treatments in each replication for 3 yr before the 2001 crop season. The P levels were achieved by feeding beef cattle rations of low (0.24-0.28%) and high (0.35-0.45%) P content. Low-P and high-P composts were each applied in 3 management treatments: winter surface application; spring pre-plant application incorporated by disking; and spring postplant surface application with no incorporation. A replicated control was included as the 7th treatment, consisting of 200 kg N ha- 1 applied to corn as NH4N03 broadcast before incorporation with spring tillage. During the course of 3 yr, a total of 750 and 1150 kg ha- 1 of P was applied with the low-P and high-P compost, respectively. The last compost applications were in the spring of 2000 except for the winter-applied treatments, where application was made in January of 2001. Plots receiving this last winter application in 2001 were excluded from the analysis of 2001 data, as this study addressed residual effects of manure application. | | | | | | | | |
| Comments | Study objective was to determine the residual effects of low and high-P composted beef cattle feedlot manure on STP levels, P losses in runoff and sediment, leaching of P, and crop yield. No fertilizer was applied during the study period itself. | | | | | | | | |

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| **Crop** | 1 | Soybean | Yield | 4.07 | Mg/ha |
| **Crop** | 2 | Corn | Yield | 11.42 | Mg/ha |
| **Crop** | 3 | Soybean | Yield | 3.59 | Mg/ha |


Acknowledgement: Study summaries may be directly quoted from original author's abstract.

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300704202** | **Study Area** | **Low-P compost** | Area (ha) | 0.03 | Tillage | Disked | Cover Crop | None |
| Practice ID | 2 | Practice Name | Low-P compost | General Practice | Nutrient Management | | | Area Type | T |
| Category | Management | Study Focus | Fertilizer | Practice Overview | NM-CCN-CT-CS-EN | | | | |
| Irrigation | Yes | Irrig. Descrip. | Irrigation water was supplied during the growing season when available water holding capacity reached 50% depletion. All runoff events occurred from March through August and were associated with rainfall or snowmelt events, except for one event in July 2002, which was induced with excessive irrigation. | | | | | | |
| Soils | Fine-silty, mixed, mesic Typic Eutrochrept; texture 28% sand, 58% silt, and 14% clay | | | | | | | | |
| Fertilizer | Low P (0.20-0.36% P) and high P (0.36-0.46% P) composted feedlot manure applied annually to 6 compost treatments in each replication for 3 yr before the 2001 crop season. The P levels were achieved by feeding beef cattle rations of low (0.24-0.28%) and high (0.35-0.45%) P content. Low-P and high-P composts were each applied in 3 management treatments: winter surface application; spring pre-plant application incorporated by disking; and spring postplant surface application with no incorporation. A replicated control was included as the 7th treatment, consisting of 200 kg N ha- 1 applied to corn as NH4N03 broadcast before incorporation with spring tillage. During the course of 3 yr, a total of 750 and 1150 kg ha- 1 of P was applied with the low-P and high-P compost, respectively. The last compost applications were in the spring of 2000 except for the winter-applied treatments, where application was made in January of 2001. Plots receiving this last winter application in 2001 were excluded from the analysis of 2001 data, as this study addressed residual effects of manure application. | | | | | | | | |
| Comments | Study objective was to determine the residual effects of low and high-P composted beef cattle feedlot manure on STP levels, P losses in runoff and sediment, leaching of P, and crop yield. No fertilizer was applied during the study period itself. | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 1 | Soybean | Yield | 4.27 | Mg/ha |
| **Crop** | 2 | Corn | Yield | 11.22 | Mg/ha |
| **Crop** | 3 | Soybean | Yield | 3.73 | Mg/ha |

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|---|---|---|---|---|---|---|---|---|---|
| **Study ID** | **201300704203** | **Study Area** | **No compost** | Area (ha) | 0.03 | Tillage | Disked | Cover Crop | None |
| Practice ID | 3 | Practice Name | No compost | General Practice | Control | | | Area Type | C |
| Category | Management | Study Focus | Fertilizer | Practice Overview | NM-CCN-CT-CS-EN | | | | |
| Irrigation | Yes | Irrig. Descrip. | Irrigation water was supplied during the growing season when available water holding capacity reached 50% depletion. All runoff events occurred from March through August and were associated with rainfall or snowmelt events, except for one event in July 2002, which was induced with excessive irrigation. | | | | | | |
| Soils | Fine-silty, mixed, mesic Typic Eutrochrept; texture 28% sand, 58% silt, and 14% clay | | | | | | | | |
| Fertilizer | This study area is the replicated control (the 7th treatment), consisting of 200 kg N ha- 1 applied to corn as NH4N03 broadcast before incorporation with spring tillage. | | | | | | | | |
| Comments | Study objective was to determine the residual effects of low and high-P composted beef cattle feedlot manure on STP levels, P losses in runoff and sediment, leaching of P, and crop yield. No fertilizer was applied during the study period itself. | | | | | | | | |

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|---|---|---|---|---|---|
| **Crop** | 1 | Soybean | Yield | 3.84 | Mg/ha |
| **Crop** | 2 | Corn | Yield | 11.08 | Mg/ha |

| | | | | | |
|---|---|---|---|---|---|
| **Crop** | 3 | Soybean | Yield | 3.3 | Mg/ha |


Acknowledgement: Study summaries may be directly quoted from original author's abstract.