**Supplementary Table 1.** Field management for Start 1(2003 [Year 0] - 2006 [Year 3]) and Start 2 (2003 [Year -1] - 2007 [Year 3]).  RT = Reduced tillage. FT = Full tillage. TIM = Initial cover crop of timothy grass/red clover. RYE= Initial cover crop of cereal rye followed by hairy vetch.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Treatment** | | | | | | | | |
|  |  | **Start 1** | | | |  | **Start 2** | | | |
|  |  | **RYE** | | **TIM** | |  | **RYE** | | **TIM** | |
| **Operation** | **Date** | **FT** | **RT** | **FT** | **RT** |  | **FT** | **RT** | **FT** | **RT** |
| Manure, lime applied | 10-Oct-03 | x | x | x | x |  | x | x | x | x |
| Cultimulched, S-tined | 13-Oct-03 | x | x | x | x |  | x | x | x | x |
| Planted cereal rye | 14-Oct-03 | x | x |  |  |  |  |  |  |  |
| Planted timothy/oat | 14-Oct-03 |  |  | x | x |  | x | x | x | x |
| Planted red clover/oat | 19-Apr-04 |  |  | x | x |  | x | x | x | x |
| Pitfall trapping | 21-Jun-04 | x | x | x | x |  |  |  |  |  |
| Mow, bale timothy/clover | 30-Jun-04 |  |  | x | x |  | x | x | x | x |
| Rye grain harvested | 29-Jul-04 | x | x |  |  |  |  |  |  |  |
| Rye straw mowed | 2-Aug-04 | x | x |  |  |  |  |  |  |  |
| Mow, bale timothy/clover | 2-Aug-04 |  |  | x | x |  | x | x | x | x |
| Rye straw baled | 3-Aug-04 | x | x |  |  |  |  |  |  |  |
| Pitfall trapping | 6-Aug-04 | x | x | x | x |  |  |  |  |  |
| Compost application | 25-Aug-04 | x | x | x | x |  |  |  |  |  |
| Moldboard plowed | 26-Aug-04 | x |  |  |  |  |  |  |  |  |
| Chisel plowed | 26-Aug-04 |  | x |  |  |  |  |  |  |  |
| Chisel plowed | 22-Sep-04 |  |  |  |  |  |  | x |  |  |
| Moldboard plowed | 22-Sep-04 |  |  |  |  |  | x |  |  |  |
| Planted cereal rye | 22-Sep-04 |  |  |  |  |  | x | x |  |  |
| Planted hairy vetch | 3-Oct-04 | x | x |  |  |  |  |  |  |  |
| Pitfall trapping | 7-Oct-04 | x | x | x | x |  |  |  |  |  |
| Harvest timothy/clover | 14-Oct-04 |  |  | x | x |  |  |  | x | x |
| Moldboard plowed | 26-May-05 | x |  | x |  |  |  |  |  |  |
| Chisel plowed | 26-May-05 |  |  |  | x |  |  |  |  |  |
| Disked | 27-May-05 | x |  | x | x |  |  |  |  |  |
| Disked, cultimulched | 1-Jun-05 | x |  | x | x |  |  |  |  |  |
| Rolled hairy vetch | 1-Jun-05 |  | x |  |  |  |  |  |  |  |
| Planted soybean | 6-Jun-05 | x |  | x | x |  |  |  |  |  |
| Mowed, haybined vetch | 8-Jun-05 |  | x |  |  |  |  |  |  |  |
| Planted soybean | 9-Jun-05 |  | x |  |  |  |  |  |  |  |
| Rotary hoed | 15-Jun-05 | x |  | x | x |  |  |  |  |  |
| Pitfall trapping | 20-Jun-05 | x | x | x | x |  | x | x | x | x |
| S-tined | 11-Jul-05 |  |  | x | x |  |  |  |  |  |
| Mow, bale timothy/clover | 14-Jul-05 |  |  |  |  |  |  |  | x | x |
| Harvested cereal rye | 21-Jul-05 |  |  |  |  |  | x | x |  |  |
| Mow and bale timothy | 24-Jul-05 |  |  |  |  |  | x | x |  |  |
| Rye straw baled | 28-Jul-05 |  |  |  |  |  | x | x |  |  |
| Cultivation | 28-Jul-05 | x | x | x | x |  |  |  |  |  |
| Pitfall trapping | 28-Jul-05 | x | x | x | x |  | x | x | x | x |
| Mow, bale timothy | 28-Aug-05 |  |  |  |  |  |  |  | x | x |
| Compost applied | 2-Sept-05 |  |  |  |  |  | x | x | x | x |
| Moldboard plowed | 15-Sep-05 |  |  |  |  |  | x |  |  |  |
| Chisel plowed | 15-Sep-05 |  |  |  |  |  |  | x |  |  |
| Planted hairy vetch | 15-Sep-05 |  |  |  |  |  | x | x |  |  |
| Pitfall trapping | 21-Oct-05 | x | x | x | x |  |  |  |  |  |
| Harvested soybean | 27-Oct-05 | x | x | x | x |  |  |  |  |  |
| Disked | 19-Apr-06 | x | x | x | x |  |  |  |  |  |
| Disked | 20-Apr-06 |  | x |  | x |  |  |  |  |  |
| Moldboard plowed | 20-Apr-06 | x |  | x |  |  |  |  |  |  |
| Moldboard plowed | 26-Apr-06 |  |  |  |  |  | x |  | x |  |
| Chisel plowed | 27-Apr-06 |  |  |  |  |  |  |  |  | x |
| Disked | 28-Apr-06 | x | x | x | x |  |  |  |  |  |
| Cultimulched | 2-May-06 |  |  |  |  |  | x |  | x | x |
| S-tined, planted maize | 3-May-06 | x | x | x | x |  |  |  |  |  |
| Rotary hoed | 22-May-06 | x | x | x | x |  |  |  |  |  |
| S-tined | 22-May-06 |  |  |  |  |  | x |  | x | x |
| Disked | 23-May-06 |  |  |  |  |  |  |  |  | x |
| Planted soybean | 23-May-06 |  |  |  |  |  | x |  | x | x |
| Rotary hoed | 31-May-06 | x | x | x | x |  |  |  |  |  |
| Rolled hairy vetch | 9-Jun-06 |  |  |  |  |  |  | x |  |  |
| Planted soybean | 13-Jun-06 |  |  |  |  |  |  | x |  |  |
| Rotary hoed | 15-Jun-06 |  |  |  |  |  | x |  | x | x |
| Rolled hairy vetch | 16-Jun-06 |  |  |  |  |  |  | x |  |  |
| Cultivation | 16-Jun-06 | x | x | x | x |  |  |  |  |  |
| Pitfall trapping | 3-Jul-06 | x | x | x | x |  | x | x | x | x |
| Cultivation | 7,19-Jul-06 |  |  |  |  |  | x |  | x | x |
| Cultivation | 3-Aug-06 |  |  |  |  |  |  | x |  |  |
| Pitfall trapping | 21-Aug-06 | x | x | x | x |  | x | x | x | x |
| Pitfall trapping | 2-Nov-06 | x | x | x | x |  | x | x | x | x |
| Harvest soybean | 10-Nov-06 |  |  |  |  |  | x | x | x | x |
| Harvested maize | 5-Dec-06 | x | x | x | x |  |  |  |  |  |
| Chisel plowed | 23-Apr-07 |  |  |  |  |  |  | x |  | x |
| Moldboard plowed | 24-Apr-07 |  |  |  |  |  | x |  | x |  |
| Disked | 1-May-07 |  |  |  |  |  | x | x | x | x |
| S-tined, cultimulched | 10-May-07 |  |  |  |  |  | x | x | x | x |
| Planted maize | 11-May-07 |  |  |  |  |  | x | x | x | x |
| Rotary hoed | 30-May-07 |  |  |  |  |  | x | x | x | x |
| Cultivation | 30-May-07 |  |  |  |  |  |  | x |  | x |
| Cultivation | 7, 18-Jun-07 |  |  |  |  |  | x | x | x | x |
| Pitfall trapping | 2-Jul-07 |  |  |  |  |  | x | x | x | x |
| Pitfall trapping | 1-Nov-07 |  |  |  |  |  | x | x | x | x |
| Harvested maize | 8-Nov-07 |  |  |  |  |  | x | x | x | x |

**Supplementary Table 2.** Annual number of disturbances and soil disturbance ratings (SDR) for the four cover crop\*tillage treatments in each year of each Start.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Start** |  | **S1** | | | | **S2** | | | |
| **Tillage** |  | **FT** | | **RT** | | **FT** | | **RT** | |
| **Cover Crop** | **Year** | **RYE** | **TIM** | **RYE** | **TIM** | **RYE** | **TIM** | **RYE** | **TIM** |
| Annual SDR | 1 | 61 | 50 | 51 | 51 | 61 | 11 | 51 | 11 |
|  | 2 | 148 | 161 | 85 | 151 | 120 | 120 | 58 | 128 |
|  | 3 | 133 | 133 | 111 | 122 | 166 | 146 | 156 | 158 |
| Cumulative Rotation SDR | 1 | 109 | 108 | 99 | 99 | 208 | 114 | 188 | 114 |
|  | 2 | 257 | 269 | 184 | 250 | 328 | 234 | 246 | 242 |
|  | 3 | 390 | 402 | 295 | 372 | 494 | 380 | 402 | 400 |
| Annual Number of Disturbances | 1 | 11 | 12 | 11 | 12 | 17 | 13 | 17 | 13 |
|  | 2 | 10 | 11 | 9 | 11 | 8 | 8 | 6 | 9 |
|  | 3 | 10 | 10 | 10 | 10 | 12 | 8 | 12 | 12 |
| Cumulative Rotation Number of Disturbances | 1 | 11 | 12 | 11 | 12 | 17 | 13 | 17 | 13 |
|  | 2 | 21 | 23 | 20 | 23 | 25 | 21 | 23 | 22 |
|  | 3 | 31 | 33 | 30 | 33 | 37 | 29 | 35 | 34 |

**Supplementary Table 3**. Activity-density (A-D) of Carabidae species collected in S1 and S2 of the field experiment (2004-2007). Listed species are characterized by their primary trophic behavior (G=Granivore, C=Carnivore, O=Omnivore), size class (S=small, M=Medium, and L=Large), and habitat preference (open, covered, wet, or mixed) as described in Bousquet (2010, 2012). Bolded text indicates species that comprised >5% of the total specimens. A period indicates the information was not found.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Species** | **Code** | **Trophic Behavior** | **Size Class** | **Habitat** | **Total No. S1** | **Total No. S2** | **% of Total** |
| *Acupalpus testaceus* Dejean | ACTE | C | S | Wet | 1 | 0 | 0.05 |
| *Agonum cupripenne* (Say) | AGCU | C | M | Open | 72 | 8 | 3.67 |
| *Agonum muelleri* (Herbst) | AGMU | C | M | Open | 13 | 4 | 0.78 |
| *Agonum octopunctata* (Fabricius) | AGOC | C | M | Wet | 1 | 0 | 0.05 |
| *Agonum placidum* (Say) | AGPL | O | M | Open | 58 | 1 | 2.71 |
| *Agonum punctiforme* (Say) | AGPU | C | M | Open | 5 | 8 | 0.6 |
| *Amara aenea* (DeGeer) | AMAE | G | M | Open | 1 | 0 | 0.05 |
| *Amara convexa* LeConte | AMCO | C | M | Open | 1 | 0 | 0.05 |
| *Amara impuncticolis* (Say) | AMIM | G | M | Open | 3 | 0 | 0.14 |
| *Amara musculis* (Say) | AMMU | G | S | Open | 0 | 1 | 0.05 |
| *Amara otiosa* Casey | AMOT | G | M | Open | 1 | 1 | 0.09 |
| *Amara turbata* Casey | AMTU | O | M | Open | 1 | 0 | 0.05 |
| *Amara* spp. (unidentified) | AMsp. | G | M | Open | 1 | 0 | 0.05 |
| *Amphasia interstitialis* (Say) | AMIN | O | L | Covered | 0 | 1 | 0.05 |
| *Anisodactylus consobrinus* LeConte | ANCO | O | L | . | 2 | 1 | 0.14 |
| *Anisodactylus ovularis* (Casey) | ANOV | O | L | . | 1 | 2 | 0.14 |
| *Anisodactylus sanctaecrucis* (Fabricius) | ANSA | O | L | Wet | 70 | 11 | 3.72 |
| *Anisodactylus* spp. (unidentified) | ANsp. | O | L | Open | 1 | 2 | 0.14 |
| *Badister notatus* Haldeman | BANO | C | S | Open | 0 | 1 | 0.05 |
| *Bembidion affine* Say | BEAF | C | S | Wet | 2 | 0 | 0.09 |
| *Bembidion impotens* Casey | BEIM | C | S | Wet | 0 | 1 | 0.05 |
| *Bembidion mimus* Hayward | BEMI | C | S | Open | 8 | 0 | 0.37 |
| *Bembidion obtusum* Audinet-Serville | BEOB | O | S | Open | 0 | 8 | 0.37 |
| ***Bembidion quadrimaculatum* Say** | **BEQU** | **O** | **S** | **Open** | **259** | **115** | **17.16** |
| *Bembidion rapidum* (LeConte) | BERA | C | S | Wet | 81 | 19 | 4.59 |
| *Bradycellus rupestris* (Say) | BRRU | O | S | Open | 2 | 2 | 0.18 |
| *Calathus gregarius* (Say) | CAGR | O | L | Mixed | 1 | 3 | 0.18 |
| *Chlaenius emarginatus* Say | CHEM | C | L | Covered | 0 | 5 | 0.23 |
| *Chlaenius pusillus* Say | CHPU | C | M | Covered | 0 | 1 | 0.05 |
| *Chlaenius tricolor tricolor* Dejean | CHTR | C | L | Wet | 22 | 12 | 1.56 |
| ***Cicindela punctulata* Olivier** | **CIPU** | **C** | **L** | **Open** | **59** | **99** | **7.25** |
| *Cicindela sexguttata* Fabricius | CISE | C | L | Mixed | 2 | 4 | 0.28 |
| *Clivinia bipustulata (*Fabricius) | CLBI | O | M | Wet | 5 | 11 | 0.73 |
| *Clivinia impressifrons* LeConte | CLIM | O | M | Open | 3 | 6 | 0.41 |
| *Colliuris pensylvanica* (Linneaus) | COPE | C | M | Open | 5 | 0 | 0.23 |
| *Cyclotrachelus furtivus* (LeConte) | CYFU | C | L | . | 4 | 12 | 0.73 |
| *Dyschirius globulosus* (Say) | DYGL | C | S | Open | 9 | 4 | 0.6 |
| *Elaphropus incurvus* (Say) | ELIN | C | S | Wet | 29 | 27 | 2.52 |
| *Elaphropus vernicatus* (Casey) | ELVE | G | S | Wet | 1 | 0 | 0.05 |
| *Harpalus affinis* (Schrank) | HAAF | G | L | Open | 3 | 6 | 0.41 |
| *Harpalus compar* LeConte | HACO | G | L | Open | 7 | 10 | 0.78 |
| *Harpalus erythropus* Dejean | HAER | C | L | Open | 1 | 1 | 0.09 |
| *Harpalus herbivagus* Say | HAHE | G | M | Open | 41 | 6 | 2.16 |
| *Harpalus longicollis* LeConte | HALO | C | L | Open | 0 | 3 | 0.14 |
| ***Harpalus pensylvanicus* (DeGeer)** | **HAPE** | **G** | **L** | **Open** | **70** | **189** | **11.89** |
| *Harpalus rubripes* (Duftschmid) | HARU | G | M | Open | 6 | 26 | 1.47 |
| *Harpalus* spp. (unidentified) | HAsp | G | M | Open | 1 | 2 | 0.14 |
| *Patrobus longicornis* (Say) | PALO | O | L | Mixed | 10 | 4 | 0.64 |
| ***Poecilus chalcites* (Say)** | **POCH** | **C** | **L** | **Open** | **261** | **140** | **18.4** |
| ***Poecilus lucublandus* (Say)** | **POLU** | **C** | **L** | **Open** | **39** | **73** | **5.14** |
| *Pterostichus melanarius* (Illiger) | PTME | O | L | Open | 7 | 27 | 1.56 |
| *Pterostichus mutus* (Say) | PTMU | C | L | Covered | 3 | 1 | 0.18 |
| *Pterostichus stygicus* (Say) | PTST | C | L | Mixed | 2 | 0 | 0.09 |
| *Scarites quadriceps* Chaudoir | SCQU | C | L | . | 54 | 22 | 3.49 |
| *Sphaeroderus stenostomus* Dejean | SPST | C | L | . | 0 | 1 | 0.05 |
| *Stenolophus comma* (Fabricius) | STCOm | O | M | Mixed | 42 | 7 | 2.25 |
| *Stenolophus conjunctus* (Say) | STCOn | O | S | Open | 0 | 1 | 0.05 |
| *Stenolophus ochropezus* (Say) | STOC | O | M | Wet | 1 | 1 | 0.09 |
| *Trechus quadristriatus* (Schrank) | TRQU | O | S | Open | 8 | 6 | 0.64 |
| *Trichotichnus fulgens* (Csiki) | TRFU | C | M | Open | 2 | 1 | 0.14 |
| *Xestonatus lugubris* Dejean | XELU | C | L | Covered | 0 | 1 | 0.05 |

**Supplementary Table 4.** *P*-values from repeated measures split-plot mixed model analysis with tillage and cover crop as main treatment effects for carabid A-D among guilds based on size class and dominant feeding behavior. *P*-values less than 0.05 are bolded.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **GUILDS** | | | | | |
|  | **Small** | **Med** | **Large** | **Carnivore** | **Granivore** | **Omnivore** |
| **Start 1** |  |  |  |  |  |  |
| Year | 0.1126 | **<0.0001** | **<0.0001** | **<0.0001** | **0.0128** | **0.0009** |
| Tillage | 0.5868 | **<0.0001** | 0.2364 | 0.8398 | **<0.0001** | 0.9748 |
| Year\*Tillage | 0.6139 | 0.1017 | 0.3191 | 0.0468 | 0.8858 | 0.0884 |
| Cover Crop | 0.4536 | 0.2296 | 0.2127 | 0.2123 | 0.9082 | 0.0700 |
| Year \* Cover Crop | 0.4082 | 0.2016 | **0.0011** | **0.0007** | 0.6202 | **0.0018** |
| Tillage\*Cover Crop | 0.3559 | **0.0312** | 0.1123 | 0.4002 | 0.2479 | 0.5049 |
| Year \* Tillage\*Cover Crop | 0.6958 | **0.0007** | 0.2549 | 0.4317 | 0.0855 | **0.0111** |
| **Start 2** |  |  |  |  |  |  |
| Year | **0.0005** | **0.0083** | **0.0001** | 0.1265 | **<0.0001** | **<0.0001** |
| Tillage | **0.0287** | 0.2945 | 0.2100 | 0.1790 | **0.02** | 0.1812 |
| Year\*Tillage | 0.0879 | 0.2100 | 0.1727 | 0.3073 | 0.0766 | **0.0208** |
| Cover Crop | 0.2468 | 0.9894 | 0.0843 | **0.0008** | 0.8334 | 0.8270 |
| Year \* Cover Crop | 0.6588 | 0.1622 | 0.4929 | 0.3293 | 0.4229 | 0.4892 |
| Tillage\*Cover Crop | 0.8042 | 0.6933 | 0.8646 | 0.2863 | **0.0077** | **0.0128** |
| Year \* Tillage\*Cover Crop | **0.0106** | 0.6669 | 0.7296 | 0.6804 | 0.9055 | **0.0222** |