**Table 1.** Ground beetle species collected via unbaited pitfall traps at Powdermill Nature Reserve in Rector, Westmoreland County, Pennsylvania, U.S.A. in 2013-2015. Dispersal categories were based on species descriptions in Larochelle and Larivière (2003); brachypterous (B), dimorphic (D), and macropterous (M). The species list is arranged based on Bousquet (2012). Vouchers were deposited at the C. A. Triplehorn Insect Collection, Museum of Biological Diversity, The Ohio State University, Columbus, Ohio. Each voucher specimen received a unique identifier number.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Tribe** | **Species** | **Dispersal** | **2013** | **2014** | **2015** | **Total** | **Identifier Label** |
| Notiophilini | *Notiophilus aeneus* (Herbst) | M | 4 | 11 | 10 | 25 | OSUC 678043-58 |
| Cychrini | *Sphaeroderus canadensis canadensis* Chaudoir | B | 1 | 3 | 8 | 12 | OSUC 672270-311; 672316-20 |
|  | *Sphaeroderus stenostomus lecontei* Dejean | B | 56 | 97 | 74 | 227 | OSUC 677469-569 |
|  | *Scaphinotus* (*Irichroa*) *viduus* (Dejean) | B | 1 | 1 | 4 | 6 | OSUC 671902-9 |
|  | *Scaphinotus* (*Maronetus*) *imperfectus* (Horn) | B | 0 | 5 | 2 | 7 | OSUC 672852-9 |
|  | *Scaphinotus* (*Steniridia*) *andrewsii mutabilis* (Casey) | B | 0 | 0 | 1 | 1 | OSUC 671898-901 |
| Carabini | *Carabus* (*Carabus*) *goryi* Dejean | B | 160 | 233 | 302 | 695 | OSUC 671911-2031 |
| Trechini | *Trechus* (*Trechus*) *quadristriatus* (Schrank) | M | 1 | 0 | 0 | 1 | OSUC 668394 |
| Bembidiini | *Bembidion* (*Eupetedromus*) *graciliforme* Hayward | M | 0 | 0 | 2 | 2 | OSUC 671691-2 |
| Patrobini | *Patrobus longicornis* (Say) | D | 0 | 2 | 0 | 2 | OSUC 671668 |
| Abacetini | *Loxandrus* spp. | M | 0 | 1 | 3 | 4 | OSUC 671687-90 |
| Pterostichini | *Poecilus* (*Poecilus*) *lucublandus* (Say) | M | 28 | 1 | 3 | 32 | OSUC 672434-48 |
|  | *Lophoglossus scrutator* (LeConte) | M | 0 | 3 | 1 | 4 | OSUC 671717-21 |
|  | *Gastrellarius honestus* (Say) | B | 3 | 0 | 3 | 6 | OSUC 668446-52 |
|  | *Myas* (*Trigonognatha*) *coracinus* (Say) | B | 10 | 6 | 0 | 16 | OSUC 672618-32 |
|  | *Myas* (*Trigonognatha*) *cyanescens* Dejean | B | 7 | 4 | 1 | 12 | OSUC 671722-30 |
|  | *Pterostichus* (*Bothriopterus*) *mutus* (Say) | M | 0 | 1 | 3 | 4 | OSUC 671801-5 |
|  | *Pterostichus* (*Bothriopterus*) *trinarius* (Casey) | M | 0 | 2 | 9 | 11 | OSUC 668397-405 |
|  | *Pterostichus* (*Gastrosticta*) *sayanus* Csiki | B | 0 | 3 | 4 | 7 | OSUC 667852-62 |
|  | *Pterostichus* (*Euferonia*) *coracinus* (Newman) | B | 1 | 7 | 1 | 9 | OSUC 672590-614 |
|  | *Pterostichus* (*Euferonia*) *lachrymosus* (Newman) | B | 49 | 77 | 52 | 178 | OSUC 677787-880 |
|  | *Pterostichus* (*Euferonia*) *stygicus* (Say) | B | 75 | 210 | 89 | 374 | OSUC 672036-110 |
|  | *Pterostichus* (*Abacidus*) *atratus* (Newman) | B | 33 | 6 | 1 | 40 | OSUC 668428-43 |
|  | *Pterostichus* (*Abacidus*) *hamiltoni* Horn | B | 41 | 45 | 7 | 93 | OSUC 677965-97 |
|  | *Pterostichus* (*Eosteropus*) *moestus* (Say) | B | 46 | 41 | 60 | 147 | OSUC 677574-694 |
|  | *Pterostichus* (*Monoferonia*) *diligendus* (Chaudoir) | B | 8 | 22 | 5 | 35 | OSUC 672410-29 |
|  | *Pterostichus* (*Cylindrocharis*) *rostratus* (Newman) | B | 15 | 3 | 9 | 27 | OSUC 677885-942 |
|  | *Pterostichus* (*Hypherpes*) *adoxus* (Say) | B | 93 | 90 | 76 | 259 | OSUC 671812-91 |
|  | *Pterostichus* (*Hypherpes*) *tristis* (Dejean) | B | 34 | 19 | 7 | 60 | OSUC 672117-63 |
|  | *Cyclotrachelus* (*Cyclotrachelus*) *fucatus* (Freitag) | B | 127 | 141 | 103 | 371 | OSUC 672668-746 |
|  | *Cyclotrachelus* (*Evarthrus*) *sigillatus* (Say) | B | 113 | 139 | 81 | 333 | OSUC 672468-581 |
|  | *Cyclotrachelus* (*Evarthrus*) *sodalis sodalis* (LeConte) | B | 37 | 37 | 14 | 88 | OSUC 678000-10; 678013-40 |
| Chlaeniini | *Chlaenius* (*Anomoglossus*) *emarginatus* Say | M | 97 | 125 | 143 | 365 | OSUC 672169-263 |
| Licinini | *Dicaelus* (*Paradicaelus*) *politus* Dejean | B | 4 | 11 | 25 | 40 | OSUC 671338-84 |
|  | *Dicaelus* (*Paradicaelus*) *sculptilis intricatus* LeConte | B | 6 | 11 | 18 | 35 | OSUC 672829-49; 672451-7 |
|  | *Dicaelus* (*Paradicaelus*) *teter* Bonelli | B | 40 | 79 | 77 | 196 | OSUC 677699-782 |
| Harpalini | *Notiobia* (*Anisotarsus*) *nitidipennis* (LeConte) | M | 2 | 2 | 4 | 8 | OSUC 672651-65 |
|  | *Notiobia* (*Anisotarsus*) *terminata* (Say) | M | 1 | 2 | 0 | 3 | OSUC 668408-12 |
|  | *Xestonotus lugubris* (Dejean) | M | 1 | 0 | 0 | 1 | OSUC 671670 |
|  | *Anisodactylus* (*Anisodactylus*) *agricola* (Say) | B | 0 | 0 | 1 | 1 | OSUC 671681 |
|  | *Amphasia* (*Amphasia*) *interstitialis* (Say) | M | 15 | 2 | 26 | 43 | OSUC 671046-86 |
|  | *Harpalus* (*Opadius*) *spadiceus* Dejean | B | 0 | 0 | 1 | 1 | OSUC 671685-6 |
|  | *Selenophorus* (*Selenophorus*) *opalinus* (LeConte) | M | 0 | 0 | 1 | 1 | OSUC 671684 |
|  | *Trichotichnus* (*Trichotichnus*) *vulpeculus* (Say) | M | 1 | 2 | 0 | 3 | OSUC 671676-8 |
|  | *Trichotichnus* (*Iridessus*) *autumnalis* (Say) | M | 7 | 22 | 77 | 106 | OSUC 671091-144 |
| Sphodrini | *Calathus* (*Neocalathus*) *gregarius* (Say) | D | 2 | 0 | 0 | 2 | OSUC 671669 |
|  | *Synuchus impunctatus* (Say) | D | 1 | 10 | 2 | 13 | OSUC 671710-6 |
| Platynini | *Olisthopus parmatus* (Say) | M | 2 | 5 | 5 | 12 | OSUC 672754-65 |
|  | *Agonum* (*Europhilus*) *retractum* LeConte | D | 0 | 0 | 2 | 2 | OSUC 671696-8 |
|  | *Agonum* (*Olisares*) *excavatum* Dejean | M | 1 | 0 | 0 | 1 | NAa |
|  | *Agonum* (*Olisares*) *ferreum* Haldeman | M | 6 | 3 | 1 | 10 | OSUC 671700-5 |
|  | *Agonum* (*Olisares*) *fidele* Casey | M | 9 | 67 | 21 | 97 | OSUC 671389-427 |
|  | *Platynus* (*Platynus*) *decentis* (Say) | B | 4 | 3 | 6 | 13 | OSUC 668453-62 |
|  | *Platynus* (*Platynus*) *tenuicollis* (LeConte) | M | 39 | 20 | 7 | 66 | OSUC 671747-83 |
|  | *Platynus* (*Batenus*) *angustatus* Dejean | B | 176 | 270 | 17 | 463 | OSUC 672323-401 |
|  | *Platynus* (*Batenus*) *hypolithos* (Say) | B | 11 | 36 | 1 | 48 | OSUC 672768-97 |
| Lebiini | *Cymindis* (*Tarulus*) *americana* Dejean | D | 0 | 1 | 0 | 1 | OSUC 671667 |
|  | *Cymindis* (*Pinacodera*) *limbata* Dejean | M | 1 | 1 | 0 | 2 | OSUC 671665-6 |
|  | *Apenes* (*Apenes*) *lucidula* (Dejean | D | 6 | 12 | 1 | 19 | OSUC 668413-26 |
|  | **Total Number of Individuals** |  | **1375** | **1894** | **1371** | **4640** |  |
|  | **Total Number of Species** |  | **45** | **48** | **49** | **59** |  |

aNo vouchers deposited

**Table 2.** Results for permutational multivariate analysis of variance (PERMANOVA) and analysis of multivariate homogeneity of group dispersions (BETADISPER) for ground beetle taxonomic and functional beta-diversity (βsor) among canopy and understory disturbance treatments.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Test** | **Year** | **Taxonomic** | | **Functional** | |
| *F* | *P* | *F* | *P* |
| PERMANOVA | 2013 | 0.80 | 0.712 | 0.78 | 0.795 |
|  | 2014 | 1.29 | 0.179 | 1.44 | 0.089 |
|  | 2015 | 0.69 | 0.867 | 1.56 | 0.025 |
| BETADISPER | 2013 | 0.83 | 0.490 | 0.82 | 0.497 |
|  | 2014 | 0.50 | 0.686 | 1.51 | 0.240 |
|  | 2015 | 1.06 | 0.385 | 1.04 | 0.393 |

**Figure 1.** Nonmetric multidimensional scaling (NMDS) ordinations for taxonomic (left) and functional (right) composition of ground beetle communities in 2013 (A, B), 2014 (C, D), and 2015 (E, F) at Powdermill Nature Reserve, Rector, Pennsylvania, USA. Incidence-based pairwise Sorensen dissimilarity (βsor) was compared among canopy and understory disturbance treatments and undisturbed forest. Ellipses are 95% confidence intervals.

