**Table S3.** List of caterpillar species (82) and genus (11) collected at the different sampling sites, along with their parasitism rates and abundance (in brackets) as a function of insecticidal treatment and sampling month (1: June ; 2: July; 3: August; 4: September). Where a common spruce budworm parasitoid was found, its identification is provided as a footnote

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Treatment | | |  | Sampling | | | |
| Family | Species | Control | Btk | Tebufenozide |  | 1 | 2 | 3 | 4 |
| Crambidae | *Anania plectilis* | - | 0 (1) | - |  | - | - | - | 1 |
| Depressariidae | *Antaeotricha leucillana* | - | - | 0 (3) |  | - | - | 1 | 2 |
|  | *Nites grotella* | 1 (7) | 4 7 (15) | - |  | 22 | - | - | - |
|  | *Psilocorsis reflexella* | 0 (1) | - | - |  | - | - | - | 1 |
| Drepanidae | *Eudeilinia herminiata* | 0 (1) | - | - |  | - | - | 1 | - |
|  | *Pseudothyatira cymatophoroides* | 0 (1) | - | - |  | - | - | - | 1 |
| Erebidae | *Orgyia antiqua* | - | 0 (1) | - |  | - | 1 | - | - |
|  | *Orgyia leucostigma* | - | 0 (1) | - |  | - | - | 1 | - |
|  | *Palthis angulalis* | 0 (1) | 0 (1) | - |  | - | - | 1 | 1 |
|  | *Parallelia bistriaris* | - | 0 (1) | - |  | - | 1 | - | - |
|  | *Spilosoma virginica* | - | 0 (1) | - |  | - | - | 1 | - |
|  | *Zanclognatha cruralis* | - | - | 0 (1) |  | - | - | - | 1 |
|  | *Zanclognatha dentata* | 0 (1) | - | - |  | - | - | - | 1 |
| Gelechiidae | *Pseudotelphusa belangerella* | - | - | 1 (2) |  | - | - | 2 | - |
|  | *Pseudotelphusa quercinigracella* | - | - | 1 (1) |  | - | - | - | 1 |
| Geometridae | *Caripeta divisata* | 0 (1) | 1 (3) | 1 (1) |  | - | - | 3 | 2 |
|  | *Cladara atroliturata* | 0 (1) | - | - |  | - | 1 | - | - |
|  | *Cladara limitaria* | 1 (1) | - | 0 (1) |  | - | 2 | - | - |
|  | *Coleotechnites piceaella* | - | 0 (1) | - |  | - | - | 1 | - |
|  | *Coleotechnites quercivorella* | - | 0 (1) | - |  | - | 1 | - | - |
|  | *Epirrita autumnata* | 0 (1) | 1 (2) | - |  | 3 | - | - | - |
|  | *Eupithecia columbiata* | 0 (1) | - | - |  | - | 1 | - | - |
|  | *Eupithecia lariciata* | - | 0 (1) | 0 (1) |  | - | - | 1 | 1 |
|  | *Eupithecia maestosa* | 1 (1) | 0 (1) | - |  | - | 1 | 1 | - |
|  | *Eupithecia palpata* | - | 0 (1) | - |  | - | - | 1 | - |
|  | *Eupithecia sp.* | 1 (2) | - | - |  | - | - | - | 2 |
|  | *Eupithecia subfuscata* | - | 0 (1) | 0 (2) |  | - | - | 2 | 1 |
|  | *Homochlodes disconventa* | 1 (1) | - | 1 (1) |  | - | - | 2 | - |
|  | *Hydrelia inornata* | - | 0 (1) | - |  | - | - | 1 | - |
|  | *Hydrelia lucata* | - | - | 1 (1) |  | - | - | 1 | - |
|  | *Hydriomena transfigurata* | - | - | 0 (1) |  | - | - | 1 | - |
|  | *Hypagyrtis esther* | - | - | 0 (1) |  | - | - | - | 1 |
|  | *Hypagyrtis piniata* | - | 1 (1) | 3 (3) |  | - | 1 | - | 2 |
|  | *Hypagyrtis sp.* | 1 (1) | 1 (2) | - |  | - | - | - | 3 |
|  | *Lambdina fiscellaria* | - | 0 (1) | - |  | - | - | - | 1 |
|  | *Lomographa vestaliata* | 1 (1) | - | 0 (1) |  | - | - | 2 | - |
|  | *Macaria signaria* | 1 (3) | 12 (21) | 4 13 (5) |  | - | - | 9 | 20 |
|  | *Macaria sp.* | - | 3 (3) | 0 (1) |  | - | - | - | 4 |
|  | *Macaria submarmorata* | - | 3 (3) | - |  | - | - | - | 3 |
|  | *Melanolophia signataria* | - | 0 (1) | - |  | 1 | - | - | - |
|  | *Melanolophia sp.* | 1 (1) | - | - |  | - | 2 | - | - |
|  | *Nematocampa resistaria* | 0 (1) | - | 1 (1) |  | 1 | - | - | - |
|  | *Plagodis pulveraia* | 1 10 (1) | - | - |  | - | - | 1 | - |
|  | *Probole alienaria* | - | 0 (2) | - |  | - | - | 2 | - |
|  | *Probole amicaria* | - | 0 (1) | - |  | - | - | 1 | - |
|  | *Protoboarmia porcelaria* | 9 (27) | 6 (18) | 0 (2) |  | - | - | 1 | 46 |
| Gracillariidae | *Caloptilia alnivorella* | - | - | 0 (1) |  | - | - | - | 1 |
|  | *Caloptilia invariabilis* | 0 (3) | 0 (2) | 1 (2) |  | 2 | 5 | - | - |
|  | *Parornix betulae* | - | - | 0 (1) |  | - | 1 | - | - |
|  | *Phyllonorycter apparella* | - | - | 0 (2) |  | - | - | 2 | - |
|  | *Parornix sp.* | - | 0 (1) | - |  | - | - | - | 1 |
| Noctuidae | *Acronicta americana* | - | 0 (1) | - |  | - | - | 1 | - |
|  | *Anaplectoides prasina* | 0 (2) | - | 1 (1) |  | - | - |  | 3 |
|  | *Callopistria cordata* | - | - | 0 (3) |  | - | - | 3 | - |
|  | *Crocigrapha normani* | 0 (1) | 0 (1) | - |  | - | 2 | - | - |
|  | *Elaphria versicolor* | - | - | 0 (1) |  | - | - | - | 1 |
|  | *Euplexia benesimilis* | - | 2 (2) | - |  | - | - | 2 | - |
|  | *Feralia comstocki* | - | 0 (3) | 0 (1) |  | - | 1 | 3 | - |
|  | *Feralia jocosa* | 1 (2) | - | - |  | 1 | 1 | - | - |
|  | *Harrisimemna trisignata* | - | 0 (1) | 0 (1) |  | - | 2 | - | - |
|  | *Lithophane baileyi* | 0 (1) | - | - |  | 1 | - | - | - |
|  | *Lithophane sp.* | - | 0 (2) | - |  | 1 | 1 | - | - |
|  | *Phlogophora iris* | 1 (3) | - | - |  | - | - | 3 | - |
|  | *Phlogophora periculosa* | 2 (6) | 2 (9) | 0 (1) |  | - | - | - | 16 |
|  | *Pseudorthodes vecors* | - | - | 0 (1) |  | - | - | - | 1 |
|  | *Spiramater lutra* | - | - | 0 (1) |  | - | - | 1 | - |
|  | *Syngrapha sp.* | 0 (1) | - | - |  | 1 | - | - | - |
|  | *Syngrapha viridisigma* | - | - | 0 (1) |  | 1 | - | - | - |
|  | *Xylotype arcadia* | 0 (1) | - | - |  | 1 | - | - | - |
| Notodontidae | *Peridae basitriens* | 0 (1) | - | - |  | - | - | 1 | - |
| Pyralidae | *Dioryctria reniculelloides* | - | 1 (3) | - |  | - | 1 | - | 2 |
| Tortricidae | *Acleris chalybeana* | 1 13 (1) | - | - |  | - | - | 1 | - |
|  | *Acleris variana* | - | - | 0 (3) |  | - | 3 | - | - |
|  | *Amorbia humerosana* | - | - | 0 (1) |  | - | - | 1 | - |
|  | *Ancylis apicana* | 0 (1) | 1 (3) | - |  | - | 1 | - | 3 |
|  | *Ancylis burgessiana* | 13 2 (20) | 52 2, 7, 13 (73) | 14 2, 13 (27) |  | - | - | - | 120 |
|  | *Ancylis divisana* | 2 (3) | 4 13 (9) | 2 13 (2) |  | - | - | - | 14 |
|  | *Ancylis sp.* | - | 0 (1) | 0 (1) |  | - | - | - | 2 |
|  | *Catastega aceriella* | 0 (1) | 0 (5) | - |  | - | - | - | 6 |
|  | *Choristoneura rosaceana* | 0 (4) | 0 (9) | 0 (1) |  | 11 | 2 | 1 | - |
|  | *Choristoneura sp.* | 2 9 (2) | 0 (1) | - |  | - | 3 | - | - |
|  | *Choristoneura fumiferana* | 34 2, 7, 9, 11, 13, (65) | 65 1,2, 3, 6, 7, 9, 10, 12, 15 (121) | 18 2, 3, 5, 6, 8, 9, 13, 17  (28) |  | 40 | 122 | 51 | - |
|  | *Clepsis persicana* | 0 (1) | - | 0 (1) |  | - | - | 1 | - |
|  | *Epinotia lindana* | 0 (1) | - | - |  | 1 | - | - | - |
|  | *Epinotia rectiplicana* | - | 1 (1) | - |  | - | - | - | 1 |
|  | *Epinotia sp.* | - | - | 0 (1) |  | - | - | - | 1 |
|  | *Olethreutes nigranum* | - | - | 0 (1) |  | 1 | - | - | - |
|  | *Olethreutes quadrifidum* | - | - | 0 (1) |  | 1 | - | - | - |
|  | *Pandemis sp.* | 0 (1) | - | - |  | - | 1 | - | - |
|  | *Sparganothis pettitana* | - | 1 7 (1) | - |  | 1 | - | - | - |
|  | *Syndemis afflictana* | - | 2 3, 13 (2) | - |  | - | - | - | 2 |
|  | *Zeiraphera griseana* | - | 0 (1) | - |  | 1 | - | - | - |
| Yponomeutidae | *Swammerdamia caesiella* | - | 1 (2) | - |  | - | - | - | 2 |

1 *Sarcophaga aldrichi; 2 Actia interrupta; 3 Eumea Caesar; 4 Lypha fumipennis; 5 Phryxe pecosensis; 6 Smidtia fumiferanae; 7 Apanteles sp.; 8 Apanteles fumiferanae; 9 Meteorus trachynotus; 10 Elachertus cacoeciae; 11 Apechtis ontario; 12 Dirophanes hariolus; 13 Glypta fumiferanae; 14 Itoplectis conquisitor; 15  Tranosema rostrale; 16 Tranosema tenuifemur; 17 Mesopolobus verditer*Above identifications obtained using the molecular sorting tool of Nisole et al. (2020)