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Complementarity of Blacklight Trap and Flight Interception Trap in a Multi-Year Study of Flying Coleoptera near a Farm Pond in Southern Québec (Canada)

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Abstract

A blacklight trap (LT) and a flight interception trap (FIT) were installed throughout the May–September period during four years (2014–2017), near a farm pond within an orchard at Compton, in southern Québec (Canada). We collected by LT 162,001 adults representing 560 beetle species and morphospecies belonging to 49 families, and using a FIT 10,159 individuals for 468 Coleoptera species belonging to 48 families. We observed a similarity of 9.8% between these two assemblages including 214 common species (26.3% of total of 814 caught taxa). We caught mainly nocturnal Carabidae, Hydrophilidae, Staphylinidae and Dryopidae in the LT, and primarily diurnal Nitidulidae and Staphylinidae in FIT. Generally, the maximal species richness was recorded during June–August in LT, and during May in FIT. The number of species occurring as singletons or doubletons over all sampling years were 202 (36.1% of species) in LT and 259 (55.3%) in FIT. Also, 283 species (50.5%) in LT and 332 species (70.9%) in FIT flew during 1–3 months only over 20 sampling months. In both traps, dominant and subdominant species represented together a large proportion of catches in spite of strong year-to-year fluctuations in the relative abundance of species. It is important to evaluate the rarity of a species with complementary sampling methods over many years. We studied also the seasonal flight pattern for the 31 most abundant species in LT and for seven abundant species in FIT; the flight peak of many nocturnal species was in July and/or August, whereas six species collected in FIT flew mainly in early season (May–July). The pattern of flight period was different in LT and FIT for the cryptophagids *Atomaria ephippiata* Zimmermann and *A. fuscata* Schönherr (Coleoptera: Cryptophagidae), and for the throscid *Trixagus chevrolati* (Bonvouloir) (Coleptera: Throscidae). We determined the sex-ratio for 31 abundant species; 17 species presented a female-biased sex-ratio.

Keywords: Coleoptera, flight interception trap, light trap, long-term monitoring, Québec

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Light traps (LT) and flight interception traps (FIT) are excellent for faunal surveys and general biodiversity assessment (Young 2004). It is important to understand that no one sampling method and trap technology is suitable for surveying diverse insect groups or even one taxon, as demonstrated in various ecosystems (Chong and Hinson 2015). The use of passive trapping techniques can complement a survey that traditionally relies on active trapping techniques by capturing species or populations that would not be detected otherwise (Chong and Hinson 2015). For example, Zhang et al. (2004) collected about 13,000 individuals of 231 beetle species belonging to 45 families, using a LT and a FIT throughout the year during 1990–1995, in a Hong Kong forest; 65% of the families contained species trapped by one method but not by the other.

Light traps (active trapping techniques) are used to catch nocturnal insects and also to detect the emergence of some pest species; different light sources are attractive to different insect types (*e.g.*, ultra-violet attracts many Coleoptera) (Young 2004). Light trapping is particularly useful to collect small Carabidae, often missed in pitfall traps, such as species in the tribes Clivinini, Dyschiriini, Tachyni, Trechini, Bembidiini and Lebiini (Jocque et al. 2016).

Of the wide range of techniques available for sampling insects in flight are methods which are not dependent on attractants such as light, odour or visual stimuli. The use of passive, non-attractant techniques is essential when trying to determine natural flight paths and flight patterns of insects in search of their plant or animal hosts, or other sources of food, as well as flights related to mating patterns and breeding

foci (Muirhead-Thomson 1991). The ideal would be a completely passive, invisible, inert interception design of trap; also FIT with transparent acrylic sheet may provide unbiased collection of all flying insects if the trap is clean (Young 2004).

To evaluate the importance of using different trapping methods in a biodiversity assessment, we studied Coleoptera with a light trap and a FIT near a farm pond, within an orchard, in southern Québec during four years (2014–2017).

Materials and Methods

The study site was located in an orchard (Verger Ferland) at Compton (45°14´N, 71°49´ W, about 260 m above sea level), within an agricultural region, in southern Québec (Canada). This orchard included about 10,000 fruit trees, mainly apple trees, about 2,000 pear trees and 500 plum trees. In the orchard, there had a permanent artificial farm pond (about 40 × 100 m) established 50 years ago, surrounding of cattail (*Typha* sp.) plants in large numbers, and many herbaceous and ligneous plants.

The blacklight trap consisted of a 15 W UV tube, protected by a plastic cover, and tied up to a heavy transparent acrylic sheet (56 cm height, 28 cm width, at about 1.5 m above the soil). Insects were collected in a funnel and a jar (filled with 300 ml of ethanol-ethylene glycol solution) under the tube. The trap was suspended under a plywood panel for its protection against rains.

We used a flight interception trap of the type "window trap", with a transparent acrylic sheet (1.2 m height, 0.6 m width) at the soil level, white pan traps on both sides containing water and a germicid detergent.

The LT and the FIT (about 15 m apart) were installed in May–September over 2014–2017 (total of 20 sampling months), at the side of the farm pond, 20 m from nearest apple trees, about 200 m from a sheep farm, and 500 m from a river (Rivière Coaticook, slowly flowing water). These traps were set in place continuously during the sampling period, and emptied generally twice a week, more often if required. The trap counts were combined on a weekly basis.

The beetles collected were identified using more than 100 taxonomic publications (revisions, keys, notes) and, in several cases, we had taxonomic specialists help to confirm or complete our identification. A list of main taxonomic references includes Bousquet (2010), Bright (1976 and 1993), Bright and Bouchard (2008), Brunke et al. (2011), Downie and Arnett (1996), Easton (1955), Gordon and Skelley (2007), Herman (1972,1976 and 1983), King and Lago (2012), Klimaszewski et al. (2018), Larson et al. (2000), Parsons (1943), Pelletier and Hébert (2014 and 2019), Rabaglia et al. (2006), Smetana (1988 and 1995), and Yensen (1975). We followed the classification of Hydrophilidae according to Bousquet et al. (2013), *i.e.*, Hydrophilidae including genera *Helophorus* Fabricius and *Hydrochus* Leach. For poorly known groups, we used a local numbering for morphospecies of a taxon (*e.g.*, *Carpelimus* sp. C1 for the first recorded morphospecies of this genus from Compton, and *Carpelimus* sp. S01 for the first recorded morphospecies of this genus from Scotstown (site previously studied in 2006–2012)). The identification of adventive and Holarctic species was based on Bousquet et al. (2013) and Klimaszewski et al. (2012, 2013, 2015, 2017 and 2020). For all species, voucher specimens were deposited in the Canadian National Collection of Insects, Arachnids, and Nematods (Central Experimental Farm, Agriculture and Agri-Food Canada, Ottawa, Ontario), or in our personal collection.

We assessed the similarity of flying beetle assemblages collected by both traps with the Renkonen's percent similarity (Levesque and Levesque 1992). A dominant taxon (family or species) represented at least 5% of catches in a trap, and a subdominant taxon, 2–5%. We used a chi-square test to determine whether the sex-ratio of some abundant species differed from a 1:1 ratio.

Results

During the four-year study, we collected 162,001 adults representing 560 beetle species and morphospecies belonging to 49 families in the LT, and 10,159 individuals for 468 Coleoptera species belonging to 48 families in the FIT. These two assemblages included 214 common species (26.3% of total of 814 taxa). Seventeen families contained species trapped by one method but not by the other. In the LT, the four dominant families were Carabidae, Hydrophilidae, Staphylinidae and Dryopidae, representing together 84.8% of catches (Table 1). In the FIT, only two families, Nitidulidae and Staphylinidae, were dominant for a total of 71.1% of catches (Table 1). Families with the highest species richness in both traps were Staphylinidae (44 common species/175 total species), Carabidae (39/128), Curculionidae (21/77), Hydrophilidae (19/60), Chrysomelidae (5/47), Scarabaeidae (7/30), Dytiscidae (5/25), Nitidulidae (9/23), and Elateridae (7/22) (Table 1). We recorded at least 83 adventive species (18.6% of individuals) and 23 Holarctic species (13.3%) in LT, and at least 118 adventive species (22.5%) and 14 Holarctic species (53.4%) in FIT.

Table 1. Total catches and species richness of flying beetle families from Compton, collected in blacklight trap and flight interception trap (FIT), in 2014–2017 (+ = family representing less than 0.1% of catches)

	Blacklight trap				FIT			
	Number		Species		Number		Species	
Family	N	%	n	%	N	%	n	%
Carabidae	58350	**36.0**	100	17.8	501	4.9	67	14.3
Hydrophilidae	53497	**33.0**	53	9.4	182	1.8	26	5.6
Staphylinidae	16662	**10.3**	107	19.1	796	**7.8**	112	23.9
Dryopidae	8880	**5.5**	2	0.4	1	+	1	0.2
Cryptophagidae	6438	4.0	12	2.1	374	3.7	9	1.9
Scirtidae	3822	2.4	13	2.3	34	0.3	7	1.5
Dytiscidae	2796	1.7	22	3.9	43	0.4	8	1.7
Throscidae	2505	1.6	2	0.4	222	2.2	3	0.6
Scarabaeidae	2462	1.5	27	4.8	189	1.9	10	2.1
Heteroceridae	2046	1.3	10	1.8	0	0	0	0
Phalacridae	1060	0.7	5	0.9	169	1.7	6	1.3
Latridiidae	823	0.6	6	1.1	64	0.6	6	1.3
Nitidulidae	659	0.4	19	3.4	6435	**63.3**	13	2.8
Histeridae	385	0.2	1	0.2	2	+	2	0.4
Curculionidae	342	0.2	46	8.2	288	2.8	52	11.1
Elmidae	191	0.1	9	1.6	1	+	1	0.2
Anthicidae	161	0.1	7	1.2	61	0.6	4	0.8
Coccinellidae	138	0.1	3	0.5	63	0.6	9	1.9
Ptiliidae	110	0.1	3	0.5	14	0.1	1	0.2
Elateridae	100	0.1	15	2.7	86	0.8	14	3.0
Silphidae	89	0.1	5	0.9	3	+	2	0.4
Haliplidae	80	+	5	0.9	16	0.2	3	0.6
Cantharidae	75	+	15	2.7	13	0.1	4	0.8
Chrysomelidae	73	+	10	1.8	381	3.8	42	9.0
Leiodidae	70	+	6	1.1	26	0.3	12	2.6
Other families	187	0.1	57	10.2	195	1.9	54	11.5
TOTAL	162001		560		10159		468	

Similarity of both assemblages. We observed a similarity of 9.8% between beetles collected by both traps, particularly associated with Cryptophagidae (2.4%), Throscidae (1.5%), Carabidae (1.4%) and Staphylinidae (1.2%). The cryptophagids *Atomaria ephippiata* Zimmermann and *A. fuscata* Schönherr, and the throscid T*rixagus chevrolati* (Bonvouloir) were together responsible of 3.8% of the similarity between both flying beetle assemblages.

Variations in the species richness. In LT, the annual number of species ranged from 322 (in 2014) to 390 (in 2016) (Table 2). Generally, the maximal flight period of nocturnal species was recorded in June–August (Table 2). During this four-year study, the cumulative number of nocturnal flying beetle species at the end of September was 322 in 2014, 408 in 2015, 496 in 2016, and 560 in 2017 (Table 2).

In FIT, the annual number of species ranged from 224 (in 2017) to 246 (in 2016); at least 50% of species observed during one sampling year flew in May; the cumulative number of species was 238 in 2014, 343 in 2015, 420 in 2016, and 468 in 2017 (Table 2).

The constancy in the flight at Compton was very variable in 2014–2017: 283 species (50.5%) in LT and 332 (70.9%) in FIT flew during 1–3 months only over 20 sampling months (*i.e.*, LT: 163 species in a single month, 79 in two months and 41 in three months; FIT: 202 species in a single month, 83 in two months and 47 on three months). The maximal number of months with flight record was 19–20 for 27 nocturnal species, and 16–19 for only seven species in FIT.

Variations in the abundance. Year-to-year fluctuations in total catches of flying beetles were proportionally higher in the LT than in the FIT: the annual number of individuals varied between 23,947 (in 2014) and 73,043 (in 2016) (ratio 1:3.1) in the LT, and between 1,968 (in 2014) and 3,032 (in 2015) (ratio 1:1.5) in the FIT.

The number of individuals by species over all sampling years ranged from 1 to

Table 2. Monthly and annual numbers of flying beetle species collected by blacklight trap (LT) and flight interception trap (FIT) at Compton in May-September 2014–2017, and number of new record taxa and the cumulative number of species at the end of each year

Year	Monthly number of species					Annual total	New rec.	Cumul. number
	M	J	J	A	S			
LT								
2014	56	189	255	129	68	322	322	322
2015	107	125	244	167	120	343	86	408
2016	127	201	280	202	92	390	88	496
2017	148	237	218	165	79	370	64	560
FIT								
2014	114	93	68	51	44	238	238	238
2015	142	65	66	51	34	234	105	343
2016	137	92	101	66	35	246	77	420
2017	109	99	65	41	39	224	48	468

23,626 adults in LT, and from 1 to 5,263 adults in FIT. The number of species occurring as singletons or doubletons were 202 (36.1% of species) in LT and 259 (55.3%) in FIT.

Nocturnal species. The four most abundant nocturnal species (in LT) were the carabid *Bembidion versicolor* (LeConte) (14.6% of total beetle catches), the dryopid *Dryops viennensis* (Laporte) (5.5%), and the hydrophilids *Cercyon quisquilius* (Linnaeus) (5.4%) and *Helophorus orientalis* Motschulsky (9.2%).

Now, we present variations for dominant/subdominant species, belonging to Carabidae, Dryopidae, Hydrophilidae and Staphylinidae, collected by blacklight trap. Among Carabidae, we collected mainly *B.versicolor* (40.5% of catches) and six other dominant species: *Stenolophus ochropezus* (Say), *Dyschirius dejeanii* Putzeys, *Paratachys scitulus* (LeConte), *Bembidion mimus* Hayward, *B. patruele* Dejean, and *Stenolophus comma* (Fabricius) (Table 3). Dryopidae was nearly exclusively represented by *D. viennensis* (Table 3). Among Hydrophilidae, we captured firstly *H. orientalis* (27.8% of catches) and five other dominant species: *C. quisquilius, Enochrus hamiltoni* (Horn), *E. ochraceus* (Melsheimer), *Cercyon praetextatus* (Say), and *Helophorus lineatus* Say (Table 3). For Staphylinidae, *Anotylus rugosus* (Fabricius) (20.3% of catches) was the most abundant species, and four other species were dominant: *Carpelimus quadripunctatus* (Say), *Bledius gallicus* (Gravenhorst) (= *B. philadelphicus* Fall), *Carpelimus* sp. S01 and *Lithocharis ochracea* (Gravenhorst) (Table 3). Some dominant and subdominant species showed considerable year-to-year fluctuation in percentage: for examples, between 17.6 and 48.7% for the carabid *B. versicolor*, between 8.4 and 21.9% for the hydrophilid *E. hamiltoni*, and between 1.1 and 25.8% for the staphylinid *B. gallicus* (Table 3).

Diurnal species. In the FIT, only two nitidulid species were dominant: *Fabogethes nigrescens* (Stephens) (= *Meligethes nigrescens* Stephens) (51.8% of total beetle catches; from 32.2 to 67.5% by year), and *Brassicogethes viridescens* (Fabricius) (10.4%; range: 2.4–23.7%); the throscid *T. chevrolati* (2.2%; range: 1.4–2.8%) was the single subdominant species; these three species represented between 57.4 and 72.7% of annual catches in the FIT during 2014–2017.

Seasonal flight of the most abundant species. The most abundant species represented at least 0.5% of total catches in LT (*i.e.*, 31 species), and at least 1% of total catches in FIT (*i.e.*, seven species).

The nocturnal flight period (in LT) of the most abundant species was unimodal, *i.e.,* mainly observed during a single month or during two consecutive months, more often in July and/or August (Table 4). At least 90% of adults in the carabids *S. comma* and *S. ochropezus* flew in May–July (Table 4). The flight of at least 70% of adults occurred during July in the dryopid *D. viennensis*, the phalacrid *Stilbus* sp. S2, the scirtid *Cyphon* sp. S5, the rove beetle *A. rugosus* and the throscid *T. chevrolati* (Table 4). Among Hydrophilidae, *Cercyon laminatus* Sharp adults flew mainly in August–September (83% of catches) (Table 4).

Among diurnal species in FIT, *A. ephippiata* and *A. fuscata* flew mainly in May; *T. chevrolati* adults flew chiefly in May–June; 88% of *F. nigrescens* adults were collected in June; 79% of *B. viridescens* individuals were caught in June–July; 82% of *Philonthus carbonarius* (Gravenhorst) adults flew in May–July; and *Popillia japon-*

Table 3. Total catches of dominant and subdominant flying beetle species, belonging to Carabidae, Dryopidae, Hydrophilidae or Staphylinidae, collected by blacklight trapping at Compton in 2014–2017, and variations of annual percentages (minimum - maximum)

Family and species	N	%	Range
Carabidae			
Bembidion versicolor (LeConte)	23626	**40.5**	17.6–48.7
Stenolophus ochropezus (Say)	7402	**12.7**	9.0–19.4
Dyschirius dejeanii Putzeys	5697	**9.8**	8.4–12.4
Paratachys scitulus (LeConte)	4223	**7.2**	3.1–18.4
Bembidion mimus Hayward	4019	**6.9**	1.1–10.7
Bembidion patruele Dejean	3268	**5.6**	5.0–6.6
Stenolophus comma (Fabricius)	3138	**5.4**	2.4–10.7
Dyschirius erythrocerus LeConte	1709	2.9	0.3–4.2
Total	53082	91.0	82.5–94.6
Dryopidae			
Dryops viennensis (Laporte)	8878	**99.9**	99.9–100.0
Hydrophilidae			
Helophorus orientalis Motschulsky	14891	**27.8**	23.5–36.3
Cercyon quisquilius (Linnaeus)	8681	**16.2**	13.5–19.3
Enochrus hamiltoni (Horn)	7344	**13.7**	8.4–21.9
Enochrus ochraceus (Melsheimer)	5300	**9.9**	6.9–11.7
Cercyon praetextatus (Say)	4534	**8.5**	4.8–16.5
Helophorus lineatus Say	4100	**7.7**	2.0–14.0
Paracymus subcupreus (Say)	1446	2.7	1.5–3.9
Anacaena prob. *lutescens* (Stephens)	1066	2.0	0.7–3.8
Total	47362	88.5	83.6–91.1
Staphylinidae			
Anotylus rugosus (Fabricius)	3391	**20.3**	15.3–30.0
Carpelimus quadripunctatus (Say)	2706	**16.2**	12.4–25.0
Bledius gallicus (Gravenhorst)	2060	**12.4**	1.1–25.8
Carpelimus sp. S01	1729	**10.4**	6.4–12.2
Lithocharis ochracea (Gravenhorst)	1044	**6.3**	4.1–9.2
Bledius sp. S1 (*annularis* group)	619	3.7	2.3–7.8
Pseudolathra ambigua (LeConte)	506	3.0	1.6–5.9
Bledius sp. S3 (*annularis* group)	490	2.9	1.1–6.7
Achenomorphus corticinus (Gravenhorst)	464	2.8	1.8–4.5
Deleaster dichrous (Gravenhorst)	434	2.6	2.2–3.1
Carpelimus sp. S05	432	2.6	2.0–3.5
Carpelimus sp. S10	381	2.3	1.2–2.9
Total	14256	85.6	84.7–86.8

ica Newman activity was mainly observed in August–September (Table 5).

The pattern of flight period is different in LT and FIT for *A. ephippiata, A. fuscata* and *T. chevrolati* (Tables 4 and 5): their flight was mainly observed during the spring in FIT, and during the summer in LT.

Sex-ratio of some abundant species. We determined the sex-ratio for 31 abundant species on the basis of external morphological characteristics. Seventeen species in LT and *A. ephippiata* in FIT presented a female-biased sex-ratio (Table 6); the sex-ratio of *T. chevrolati* was female-biased only in LT (Table 6). However, we caught mainly males of the hydrophilid *E. ochraceus* and the rove beetle *B. gallicus* in LT, and males of the nitidulid *F. nigrescens* in FIT (Table 6).

Discussion

General observations. In the LT, we collected mainly nocturnal species, particularly small Carabidae, many aquatic and riparian species, and many Curculionidae Scolytinae. Furthermore, the nocturnal flight was primarily observed for some fungivores (Cryptophagidae, Latridiidae), dung beetles (Scarabaeidae Aphodiinae), certain phytophagous scarabs (*e.g., Malade-*

Table 4. Total and monthly catches of the 31 most abundant flying beetle species in the blacklight trap at Compton in May-September 2014–2017

		Monthly catches[b] (%)				
Family and species[a]	**N**	**M**	**J**	**J**	**A**	**S**
Carabidae						
Bembidion mimus Hayward	4019	+	2	**32**	**62**	4
Bembidion patruele Dejean	3268	+	10	**59**	**25**	5
Bembidion versicolor (LeConte)	23626	+	16	**60**	20	4
Dyschirius dejeanii Putzeys	5697	1	12	**47**	**31**	9
Dyschirius erythrocerus LeConte	1709	+	5	**45**	**47**	2
Paratachys scitulus (LeConte)	4223	2	**26**	**45**	21	7
Stenolophus comma (Fabricius)	3138	**29**	**36**	**27**	4	5
Stenolophus ochropezus (Say)	7402	**35**	**32**	23	9	1
Cryptophagidae						
Atomaria ephippiata Zimmermann	1980	3	2	**50**	**42**	4
Atomaria fuscata Schönherr**	3866	+	13	**60**	**26**	+
Dryopidae						
Dryops viennensis (Heer)*	8878	0	5	**89**	6	0
Dytiscidae						
Heterosternuta wickhami (Zaitzev)	1133	0	2	**68**	20	10
Heteroceridae						
Heterocerus fenestratus (Th.)**	1550	4	23	24	**44**	5
Hydrophilidae						
Anacaena prob. *lutescens* (St.)*	1066	+	1	**36**	**61**	2
Cercyon herceus Smetana	862	3	15	**50**	**29**	4
Cercyon laminatus Sharp*	902	+	1	16	**42**	**41**
Cercyon praetextatus (Say)	4534	5	12	**29**	**44**	11
Cercyon quisquilius (Linnaeus)*	8681	+	11	**37**	**29**	23
Enochrus hamiltoni (Horn)	7344	3	14	**46**	**34**	4
Enochrus ochraceus (Melsheimer)	5300	1	13	**37**	**39**	10
Helophorus lineatus Say	4100	+	**68**	**32**	+	+
Helophorus orientalis Mots.**	14891	+	**29**	**49**	20	1
Paracymus subcupreus (Say)	1446	1	12	**38**	**34**	15
Phalacridae						
Stilbus sp. S2	998	4	2	**74**	17	3
Scirtidae						
Cyphon sp. S5	3419	+	3	**79**	17	+
Staphylinidae						
Anotylus rugosus (Fabricius)*	3391	4	4	**78**	11	3
Bledius gallicus (Garvenhorst)*	2060	1	4	**54**	**39**	2
Carpelimus quadripunctatus (Say)	2706	7	**25**	**39**	23	5
Carpelimus sp. S01	1729	6	5	**51**	**27**	11
Lithocharis ochracea (Grav.)*	1044	1	4	**49**	**35**	11
Throscidae						
Trixagus chevrolati (Bonvouloir)	2503	1	**27**	**70**	3	+

[a] Adventive species with *, and Holarctic species with **

[b] + = month with less than 1% of catches

ra castanea Arrow, *Phyllophaga* spp.), many saprophagous beetles (Hydrophilidae, Silphidae, Staphylinidae Oxytelinae), and predators such as the histerid *Aeletes politus* (LeConte), the ladybird *Harmonia axyridis* (Pallas), and some Staphylinidae Paederinae and Staphylininae.

In the FIT, we caught mainly diurnal species. Our trap catches contained a high number of pollen feeders such as nitidulids *B. viridescens* and *F. nigrescens*. Additionally, the FIT captured many Chrysomelidae, diurnal Coccinellidae, diurnal Lampyridae, *P. japonica* (84% of catches in FIT), and the rove beetle *P. carbonarius*.

Our study supports that higher beetle diversity can be quantified by using UV light and FIT in tandem. This has also been shown in South Carolina golf courses in a study quantifying biodiversity of Scarabaeoidea.

Table 5. Total and monthly catches of the seven most abundant flying beetle species from Compton, collected using a flight interception trap in May-September 2014-2017

		Monthly catches[b] (%)				
Family and species[a]	**N**	**M**	**J**	**J**	**A**	**S**
Cryptophagidae						
Atomaria ephippiata Zimmermann	180	**59**	22	8	9	2
Atomaria fuscata Schönherr**	104	**48**	19	17	12	4
Nitidulidae						
Brassicogethes viridescens (Fabricius)*	1057	1	23	**56**	19	1
Fabogethes nigrescens (Stephens)**	5263	11	**88**	1	+	+
Scarabaeidae						
Popillia japonica Newman*	111	0	0	18	**36**	**46**
Staphylinidae						
Philonthus carbonarius (Gravenhorst)*	132	**30**	**27**	**25**	9	9
Throscidae						
Trixagus chevrolati (Bonvouloir)	220	**55**	**35**	7	2	+

[a] Adventive species with *, and Holarctic species with **

[b] + = month with less than 1% of catches

The use of these two traps together were able to capture more species of dung and carrion beetles and diurnal phytophagous scarab beetles (*e.g., P. japonica*: 69% of captures in FIT, 17% in LT) (Chong and Hinson 2015). Additionally, a study in North Carolina supports the suggestion that blacklight traps give a biased description of coccinellid species composition in a given area, and indicates that seasonal and circadian thresholds for flight activity, phototaxis, or both in *H. axyridis* may diverge from those in most other Coccinellidae (Nalepa 2013). At Compton, the flight of *H. axyridis* is mainly nocturnal (*i.e.*, in LT), and other ladybirds fly primarily during daytime.

According to Smetana (1988), the hydrophilid *C. quisquilius* frequently flies during daytime and also comes readily to light, sometimes in large numbers; at Compton, we observed only the nocturnal flight of this species. Whereas our observations on the phenology of *A. ephippiata*, *A. fuscata* and *T. chevrolati* (Tables 4 and 5) suggest a change in the nyctemeral activity of some beetles during the summer. In Oregon, throscids are collected from April until leaf fall in October; they fly in large numbers on warm evenings, but remain in the litter on cold days or during the very dry portion of late summer (Yensen 1975).

As the study site at Compton is located within an agricultural region including apple orchards, fir plantations, maize fields, fodder crops, cattle farms and a sheep farm, we captured adults of some pest species during their migration to colonize new sites. These included the chrysomelid *Diabrotica barberi* Smith and Lawrence (pest of corn), the nitidulids *B. viridescens* (pest of *Brassica* spp.) and *Glischrochilus quadrisignatus* (Say) (secondary pest of several fruit and vegetable crops including apple, corn, pear, raspberry, strawberry), the Asiatic garden beetle *M. castanea* (foliage pest of many young trees),the Japanese beetle *P. japonica* (pest of many plant species including foliage of apple and plum), and the ambrosia beetle *Xylosandrus germanus* (Blandford) (pest of apple trunk) (Campbell et al. 1989, Agnello et al. 2015, Klimaszewski et al. 2015). Among terrestrial Hydrophilidae, *C. quisquilius* is often in sheep dung (Smetana 1988). Furthermore, we recorded species associated with *Typha* sp.: the carabid *S. ochropezus*, the cryptophagids *Atomaria fuscata* Schönherr and *Telmatophilus typhae* (Fallén), the dytiscids *Celina hubbelli* Young and *Coptotomus longulus* LeConte, and the weevil *Ceutorhynchus typhae* (Herbst) (Larson et al. 2000, Bousquet 2010, Pelletier and Hébert 2019).

Variations in the species richness. We collected by LT 33,382 individuals representing 625 beetle species in a grassland at Scotstown (about 50 km from Compton) over a six-year study (2007–2012) (Levesque and Levesque 2023); generally, the maximal species richness of nocturnal flying species occurred in June–July; nearly 60% of species flew during 1–3 months only over 34 sampling months. The results of the present study generally are similar to our observations at Scotstown.

Burner et al. (2022) collected 19,854 individuals for 566 beetle species, from 26 May to 27 August 2020 (total of 12 weeks), in a deciduous forest in southern Norway, using 100 FIT (four types) and 10 Malaise traps. Traps emptied in late June captured 83% of species caught by all 4-week traps across the entire season; the July trapping period cap-

Table 6. Female ratio for 31 abundant nocturnal flying beetle species from Compton, in the blacklight trap (LT) and/or the flight interception trap (FIT) during 2014-2017, and probability for an assumed sex-ratio of 1:1 (Female ratio in bold font when the sex-ratio is significantly biased)

Family and species	N	Fem. %	P
LT			
Carabidae			
Agonum placidum (Say)	481	45	0.04
Bembidion mimus (Hayward)	4019	**54**	< 0.001
Bembidion patruele Dejean	3268	51	0.48
Bembidion versicolor (LeConte)	23626	**51**	< 0.001
Blemus discus (Fabricius)	533	**60**	< 0.001
Dyschirius dejeanii Putzeys	777	**56**	< 0.001
Harpalus pensylvanicus (DeGeer)	256	54	0.17
Harpalus rufipes (DeGeer)	774	**55**	0.006
Paratachys scitulus (LeConte)	4223	**54**	< 0.001
Cryptophagidae			
Atomaria ephippiata Zimmermann	1980	**55**	< 0.001
Dryopidae			
Dryops viennensis (Heer)	8876	**58**	< 0.001
Dytiscidae			
Heterosternuta wickhami (Zaitzev)	523	53	0.17
Ilybius biguttulus (Germar)	207	53	0.44
Hydrophilidae			
Anacaena prob. *lutescens* (Stephens)	1063	**100**	< 0.001
Cercyon herceus Smetana	861	**60**	< 0.001
Cercyon laminatus Sharp	902	51	0.39
Cercyon praetextatus (Say)	4534	**53**	< 0.001
Cercyon quisquilius (Linnaeus)	8681	50	0.82
Enochrus hamiltoni (Horn)	7344	**53**	< 0.001
Enochrus ochraceus (Melsheimer)	4654	**44**	< 0.001
Helophorus orientalis Motschulsky	2044	**100**	< 0.001
Paracymus subcupreus (Say)	1446	51	0.37
Latridiidae			
Melanophthalma americana (Mannerheim)	718	**65**	< 0.001
Staphylinidae			
Achenomorphus corticinus (Gravenhorst)	464	**78**	< 0.001
Anotylus rugosus (Fabricius)	3391	49	0.11
Bledius gallicus (Gravenhorst)	2060	**46**	< 0.001
Lithocharis ochracea (Gravenhorst)	1044	**69**	< 0.001
Throscidae			
Trixagus chervrolati (Bonvouloir)	2503	**95**	< 0.001
FIT			
Cryptophagidae			
Atomaria ephippiata Zimmermann	180	**61**	0.005
Nitidulidae			
Fabogethes nigrescens (Stephens)	5263	**8**	< 0.001
Scarabaeidae			
Popillia japonica Newman	111	45	0.296
Staphylinidae			
Philonthus carbonarius (Gravenhorst)	131	53	0.432
Throscidae			
Trixagus chevrolati (Bonvouloir)	220	45	0.138

tured 60% of species including new additions totalling 11% of all species; although 47% of species were detected in August, only 4% of species were new additions to the species list from this month.

We collected 34,629 individuals of 848 beetle species using four FIT in a grassland and an adjacent woods at Scotstown during a five-year study (April/May–October in 2006–2010) (Levesque and Levesque 2019);

about 50% of species captured in a FIT during one sampling year flew in May and/or June; furthermore, about 70% of species from a FIT flew during 1–3 months only over 33 sampling months. Our observations at Scotstown and at Compton were similar.

So, in north-temperate regions (*i.e.*, southern Norway and southern Québec), the maximal species richness of beetles collected by FIT was observed in spring or in early summer. Previously, we presented the curve of cumulative number of beetle species in each FIT over 33 sampling months at Scotstown in 2006–2010 (Levesque and Levesque 2019); we note a certain flattening of these curves in last months of each year because the seasonality in the flight activity of many species.

Finally, the number of newly recorded beetle species in inventories by LT or FIT generally declined from year to year at Scotstown (Levesque and Levesque 2019 and 2023) and at Compton (Table 2). Over a multi-year sampling, we observed an increase of the estimation for the species richness of flying beetles from a site in reason of the number more or less important of tourist species. At Compton, we collected beetles by five methods: a LT (four years, 560 species), six FIT in various locations within the orchard (1–4 years/trap, total 781 species), six pitfall trap lines (one year/line, total 133 species), beating of foliage of wild fruit trees and other trees (one year, 95 species), and sweeping net (three years, 388 species), for a total of about 1150 species and morphospecies, *i.e.*, an addition of more than 300 taxa to the 814 species captured by the LT and the FIT near the farm pond.

Variations in the abundance. At Scotstown and at Compton, dominant and subdominant species captured in both flight trap types represented together a large proportion of catches in spite of strong year-to-year fluctuations in the relative abundance of species. For example, in LT, *B. versicolor* represented 27.4% of carabid catches at Scotstown and 40.5% at Compton, and the annual percentage varied between 0.7 and 39.8% at Scotstown, and between 17.6 and 48.7% at Compton (Levesque and Levesque 2023; Table 3). In FIT, *F. nigrescens* represented 34.3% of beetle catches in the grassland at Scotstown and 51.8% at Compton, and the annual percentage varied between 10.3 and 59.6% at Scotstown (Levesque and Levesque 2019), and between 32.2 and 67.5% at Compton. Furthermore, species occurring as singletons or doubletons represented a large proportion of species captured by a method: 43.3% of species in LT and 45.7% of species in FIT at Scotstown, and 36.1% of species in LT and 55.3% in FIT at Compton.

At Compton and at Scotstown (Levesque and Levesque 2019, 2023), we observed that the apparent rarity of some species collected by one trap type is not confirmed by the other type. For example, at Compton in 2014–2017, we collected 434 individuals of the rove beetle *Deleaster dichrous* (Gravenhorst) in the LT (Table 3) and only two adults in the FIT; at Scostown in 2007–2010, we caught 412 *D. dichrous* in LT and only one adult in FIT.

Sex-ratio of some species. We caught only females of two hydrophilids, *Anacaena* prob. *lutescens* (Stephens) and *H. orientalis* (Table 6), predominantly parthenogenetic in North America (van Berge Henegouwen 1986, Smetana 1988). In a previous study, we investigated with FIT the beetle flight in a raspberry agroecosystem at Johnville (about 10 km from Compton) over 1987–1989; adults of the throscid *T. chevrolati* (87% of females) were active mainly from mid-May to mid-July (Levesque and Levesque 1993). Generally, our observations on the *T. chevrolati* flight in FIT at Compton were rather similar at our previous ones (Table 5), except for the sex-ratio (45% of females). We may compare the sex-ratio for 13 nocturnal species and for three species collected by FIT at Compton and at Scotstown (Levesque and Levesque 2019, 2023, Table 6); the sex-ratio was similar in both sites at the exception of three species caught in LT (*C. praetextatus, Melanophthalma americana* (Mannerheim) and *A. rugosus*).

Complementarity of both traps. The blacklight trap and the FIT were useful to study the species richness. At Compton, we collected a total of 814 species including some potential serious apple pests (*e.g., X. germanus*). Both traps may be complementary to evaluate the rarity of certain species. Furthermore, we may observe a different seasonal abundance for the flight activity of three species caught by these two methods; we collected possibly these species in FIT mainly during the spring reproduction period, and in LT during the aestival migration of new generation towards new sites.

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Supplementary data: List of the 814 beetle species captured at Compton (2014–2017) using a blacklight trap (LT) and a flight interception trap (FIT).

		LT		FIT	
Family	**Species**	**N**	**%**	**N**	**%**
ANTHICIDAE	*Anthicus cervinus* LaFerté-Sénectère	19	0.012	0	0.000
ANTHICIDAE	*Anthicus ephippium* LaFerté-Sénectère	4	0.002	0	0.000
ANTHICIDAE	*Anthicus scabriceps* LeConte	3	0.002	0	0.000
ANTHICIDAE	*Malporus formicarius* (LaFerté-Sénectère)	0	0.000	3	0.030
ANTHICIDAE	*Notoxus anchora* Hentz	5	0.003	3	0.030
ANTHICIDAE	*Omonadus floralis* (Linnaeus)	0	0.000	1	0.010
ANTHICIDAE	*Omonadus formicarius* (Goeze)	1	0.001	0	0.000
ANTHICIDAE	*Sapintus fulvipes* (LaFerté-Sénectère)	128	0.079	54	0.532
ANTHICIDAE	*Sapintus pubescens* (LaFerté-Sénectère)	2	0.001	0	0.000
ANTHRIBIDAE	*Euparius marmoreus* (Olivier)	0	0.000	1	0.010
ANTHRIBIDAE	*Euxenus punctatus* LeConte	0	0.000	1	0.010
ANTHRIBIDAE	*Trigonorhinus sticticus* (Boheman)	0	0.000	3	0.030
BUPRESTIDAE	*Chrysobothris* sp. C	0	0.000	1	0.010
BYRRHIDAE	*Syncalipta spinosa* (Rossi)	0	0.000	4	0.039
BYTURIDAE	*Byturus unicolor* Say	0	0.000	5	0.049
CANTHARIDAE	*Cantharis livida* Linnaeus	1	0.001	1	0.010
CANTHARIDAE	*Cantharis rufa* Linnaeus	50	0.031	4	0.039
CANTHARIDAE	*Cantharis tuberculata* (LeConte)	2	0.001	5	0.049
CANTHARIDAE	*Chauliognathus pennsylvanicus* (DeGeer)	0	0.000	3	0.030
CANTHARIDAE	*Dichelotarsus piniphilus* (Eschscholtz)	1	0.001	0	0.000
CANTHARIDAE	*Dichelotarsus probus* (Fall)	1	0.001	0	0.000
CANTHARIDAE	*Dichelotarsus puberulus* (LeConte)	3	0.002	0	0.000
CANTHARIDAE	*Dichelotarsus punctatus* (LeConte)	1	0.001	0	0.000
CANTHARIDAE	*Dichelotarsus* sp. S1	1	0.001	0	0.000
CANTHARIDAE	*Malthodes similis* Fender	1	0.001	0	0.000
CANTHARIDAE	*Podabrus modestus* (Say)	1	0.001	0	0.000
CANTHARIDAE	*Podabrus nothoides* LeConte	2	0.001	0	0.000
CANTHARIDAE	*Rhagonycha imbecillis* (LeConte)	1	0.001	0	0.000
CANTHARIDAE	*Rhagonycha mollis mollis* Fall	1	0.001	0	0.000
CANTHARIDAE	*Rhagonycha recta* (Melsheimer)	8	0.005	0	0.000
CANTHARIDAE	*Silis percomis* (Say)	1	0.001	0	0.000
CARABIDAE	*Acupalpus canadensis* Casey	7	0.004	0	0.000
CARABIDAE	*Acupalpus carus* (LeConte)	161	0.099	1	0.010

(Continued on next page)

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SUPPLEMENTARY DATA. (Continued).

		LT		FIT	
Family	**Species**	**N**	**%**	**N**	**%**
CARABIDAE	*Acupalpus pauperculus* Dejean	135	0.083	2	0.020
CARABIDAE	*Acupalpus pumilus* Lindroth	0	0.000	2	0.020
CARABIDAE	*Agonum aeruginosum* Dejean	12	0.007	0	0.000
CARABIDAE	*Agonum anchomenoides* Randall	5	0.003	0	0.000
CARABIDAE	*Agonum canadense* Goulet	0	0.000	5	0.049
CARABIDAE	*Agonum harrisii* LeConte	202	0.125	3	0.030
CARABIDAE	*Agonum lutulentum* (LeConte)	168	0.104	1	0.010
CARABIDAE	*Agonum melanarium* Dejean	2	0.001	3	0.030
CARABIDAE	*Agonum muelleri* (Herbst)	0	0.000	1	0.010
CARABIDAE	*Agonum palustre* Goulet	0	0.000	3	0.030
CARABIDAE	*Agonum placidum* (Say)	481	0.297	0	0.000
CARABIDAE	*Agonum* prob. *moerens* Dejean	0	0.000	2	0.020
CARABIDAE	*Agonum sordens* Kirby	0	0.000	1	0.010
CARABIDAE	*Agonum tenue* (LeConte)	38	0.023	1	0.010
CARABIDAE	*Agonum thoreyi* Dejean	233	0.144	1	0.010
CARABIDAE	*Amara aenea* (DeGeer)	1	0.001	31	0.305
CARABIDAE	*Amara angustatoides* Hieke	0	0.000	1	0.010
CARABIDAE	*Amara apricaria* (Paykull)	40	0.025	0	0.000
CARABIDAE	*Amara aulica* (Panzer)	4	0.002	0	0.000
CARABIDAE	*Amara bifrons* (Gyllenhal)	12	0.007	0	0.000
CARABIDAE	*Amara familiaris* (Duftschmid)	0	0.000	33	0.325
CARABIDAE	*Amara flebilis* (Casey)	0	0.000	1	0.010
CARABIDAE	*Amara littoralis* Mannerheim	0	0.000	15	0.148
CARABIDAE	*Amara lunicollis* Schiodte	0	0.000	1	0.010
CARABIDAE	*Amara pallipes* Kirby	0	0.000	2	0.020
CARABIDAE	*Amara rubrica* Haldeman	3	0.002	0	0.000
CARABIDAE	*Amphasia sericea* (Harris)	59	0.036	0	0.000
CARABIDAE	*Anisodactylus discoideus* Dejean	31	0.019	0	0.000
CARABIDAE	*Anisodactylus harrisii* LeConte	0	0.000	1	0.010
CARABIDAE	*Anisodactylus nigrita* Dejean	0	0.000	10	0.098
CARABIDAE	*Anisodactylus sanctaecrucis* (Fabricius)	14	0.009	42	0.413
CARABIDAE	*Atranus pubescens* (Dejean)	1	0.001	0	0.000
CARABIDAE	*Badister grandiceps* Casey	264	0.163	4	0.039
CARABIDAE	*Badister neopulchellus* Lindroth	135	0.083	0	0.000
CARABIDAE	*Badister transversus* Casey	10	0.006	0	0.000

CARABIDAE	*Bembidion affine* Say	2	0.001	0	0.000
CARABIDAE	*Bembidion canadianum* Casey	0	0.000	1	0.010
CARABIDAE	*Bembidion castor* Lindroth	9	0.006	0	0.000
CARABIDAE	*Bembidion chalceum* Dejean	35	0.022	0	0.000
CARABIDAE	*Bembidion cheyennense* Casey	219	0.135	0	0.000
CARABIDAE	*Bembidion concretum* Casey	21	0.013	0	0.000
CARABIDAE	*Bembidion confusum* Hayward	9	0.006	0	0.000
CARABIDAE	*Bembidion immaturum* Lindroth	1	0.001	0	0.000
CARABIDAE	*Bembidion impotens* Casey	490	0.302	1	0.010
CARABIDAE	*Bembidion mimus* Hayward	4019	2.481	38	0.374
CARABIDAE	*Bembidion muscicola* Hayward	1	0.001	3	0.030
CARABIDAE	*Bembidion nigrum* (Say)	1	0.001	0	0.000
CARABIDAE	*Bembidion occultator* Notman	0	0.000	2	0.020
CARABIDAE	*Bembidion patruele* Dejean	3268	2.017	1	0.010
CARABIDAE	*Bembidion planum* (Haldeman)	16	0.010	0	0.000
CARABIDAE	*Bembidion quadrimaculatum oppositum* Say	3	0.002	23	0.226
CARABIDAE	*Bembidion rapidum* (LeConte)	5	0.003	0	0.000
CARABIDAE	*Bembidion scopulinum* (Kirby)	4	0.002	0	0.000
CARABIDAE	*Bembidion transparens* (Gebler)	5	0.003	0	0.000
CARABIDAE	*Bembidion versicolor* (LeConte)	23626	14.584	37	0.364
CARABIDAE	*Bembidion versutum* LeConte	44	0.027	0	0.000
CARABIDAE	*Blemus discus* (Fabricius)	533	0.329	1	0.010
CARABIDAE	*Brachinus cyanipennis* Say	1	0.001	0	0.000
CARABIDAE	*Bradycellus badipennnis* (Haldeman)	0	0.000	2	0.020
CARABIDAE	*Bradycellus congener* (LeConte)	12	0.007	0	0.000
CARABIDAE	*Bradycellus kirbyi* (Horn)	0	0.000	1	0.010
CARABIDAE	*Bradycellus lecontei* Csiki	1	0.001	0	0.000
CARABIDAE	*Bradycellus lugubris* (LeConte)	0	0.000	2	0.020
CARABIDAE	*Bradycellus neglectus* (LeConte)	2	0.001	8	0.079
CARABIDAE	*Bradycellus nigriceps* LeConte	15	0.009	1	0.010
CARABIDAE	*Bradycellus nigrinus* (Dejean)	1	0.001	33	0.325
CARABIDAE	*Bradycellus rupestris* (Say)	19	0.012	35	0.345
CARABIDAE	*Bradycellus semipubescens* Lindroth	0	0.000	31	0.305
CARABIDAE	*Chlaenius lithophilus* (Say)	0	0.000	1	0.010
CARABIDAE	*Chlaenius pensylvanicus* Say	55	0.034	0	0.000
CARABIDAE	*Chlaenius sericeus* (Forster)	11	0.007	1	0.010
CARABIDAE	*Chlaenius tricolor* Dejean	15	0.009	0	0.000
CARABIDAE	*Cicindela duodecimguttata* Dejean	0	0.000	1	0.010

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SUPPLEMENTARY DATA. (Continued).

		LT		FIT	
Family	**Species**	**N**	**%**	**N**	**%**
CARABIDAE	*Cicindela sexguttata* Fabricius	0	0.000	9	0.089
CARABIDAE	*Clivina americana* Dejean	7	0.004	0	0.000
CARABIDAE	*Clivina fossor* (Linnaeus)	114	0.070	0	0.000
CARABIDAE	*Colliuris pensylvanica* (Linnaeus)	3	0.002	0	0.000
CARABIDAE	*Dicheirotrichus cognatus* (Gyllenhal)	5	0.003	1	0.010
CARABIDAE	*Dyschirius affinis* Fall	10	0.006	0	0.000
CARABIDAE	*Dyschirius dejeanii* Putzeys	5697	3.517	7	0.069
CARABIDAE	*Dyschirius erythrocerus* LeConte	1709	1.055	0	0.000
CARABIDAE	*Dyschirius globulosus* (Say)	1	0.001	0	0.000
CARABIDAE	*Dyschirius politus* (Dejean)	130	0.080	0	0.000
CARABIDAE	*Dyschirius sphaericollis* (Say)	12	0.007	0	0.000
CARABIDAE	*Elaphropus incurvus* (Say)	1	0.001	1	0.010
CARABIDAE	*Elaphropus tripunctatus* (Say)	1	0.001	0	0.000
CARABIDAE	*Elaphropus vernicatus* (Casey)	1	0.001	4	0.039
CARABIDAE	*Harpalus erythropus* Dejean	52	0.032	0	0.000
CARABIDAE	*Harpalus herbivagus* Say	1	0.001	11	0.108
CARABIDAE	*Harpalus pensylvanicus* (DeGeer)	256	0.158	1	0.010
CARABIDAE	*Harpalus rufipes* (DeGeer)	774	0.478	1	0.010
CARABIDAE	*Harpalus somnulentus* Dejean	0	0.000	2	0.020
CARABIDAE	*Lachnocrepis parallela* (Say)	0	0.000	3	0.030
CARABIDAE	*Lebia atriventris* Say	3	0.002	0	0.000
CARABIDAE	*Lebia fuscata* Dejean	28	0.017	0	0.000
CARABIDAE	*Lebia moesta* LeConte	1	0.001	4	0.039
CARABIDAE	*Lebia ornata* Say	1	0.001	1	0.010
CARABIDAE	*Lebia solea* Hentz	7	0.004	0	0.000
CARABIDAE	*Lebia tricolor* Say	12	0.007	0	0.000
CARABIDAE	*Lebia viridis* Say	76	0.047	6	0.059
CARABIDAE	*Loricera pilicornis* (Fabricius)	13	0.008	1	0.010
CARABIDAE	*Notiobia terminata* (Say)	46	0.028	0	0.000
CARABIDAE	*Ophonus rufibarbis* (Fabricius)	1	0.001	0	0.000
CARABIDAE	*Paratachys proximus* (Say)	6	0.004	0	0.000
CARABIDAE	*Paratachys scitulus* (LeConte)	4223	2.607	11	0.108
CARABIDAE	*Patrobus longicornis* (Say)	2	0.001	0	0.000
CARABIDAE	*Perigona nigriceps* (Dejean)	21	0.013	0	0.000
CARABIDAE	*Platynus tenuicollis* (LeConte)	2	0.001	0	0.000

CARABIDAE	*Platypatrobus lacustris* Darlington	2	0.001	0	0.000
CARABIDAE	*Poecilus chalcites* (Say)	1	0.001	0	0.000
CARABIDAE	*Pterostichus luctuosus* (Dejean)	0	0.000	2	0.020
CARABIDAE	*Pterostichus vernalis* Panzer	0	0.000	5	0.049
CARABIDAE	*Schizogenius ferrugineus* Putzeys	3	0.002	0	0.000
CARABIDAE	*Schizogenius lineolatus* (Say)	3	0.002	0	0.000
CARABIDAE	*Schizogenius sulcifrons* Putzeys	8	0.005	0	0.000
CARABIDAE	*Selenophorus opalinus* (LeConte)	5	0.003	0	0.000
CARABIDAE	*Stenolophus comma* (Fabricius)	3138	1.937	13	0.128
CARABIDAE	*Stenolophus conjunctus* (Say)	2	0.001	3	0.030
CARABIDAE	*Stenolophus fuliginosus* Dejean	2	0.001	13	0.128
CARABIDAE	*Stenolophus fuscatus* Dejean	0	0.000	4	0.039
CARABIDAE	*Stenolophus humidus* Hamilton	1	0.001	2	0.020
CARABIDAE	*Stenolophus lecontei* (Chaudoir)	57	0.035	0	0.000
CARABIDAE	*Stenolophus lineola* (Fabricius)	37	0.023	0	0.000
CARABIDAE	*Stenolophus ochropezus* (Say)	7402	4.569	6	0.059
CARABIDAE	*Trechus rubens* (Fabricius)	11	0.007	0	0.000
CARABIDAE	*Trichotichnus vulpeculus* (Say)	1	0.001	0	0.000
CERAMBYCIDAE	*Hyperplatys aspersa* (Say)	1	0.001	0	0.000
CERAMBYCIDAE	*Oberea affinis* Leng & Hamilton	0	0.000	1	0.010
CERAMBYCIDAE	*Tetraopes tetrophthalmus* (Forster)	0	0.000	1	0.010
CERAMBYCIDAE	*Typocerus velutinus* (Olivier)	0	0.000	1	0.010
CHRYSOMELIDAE	*Acalymma vittatum* (Fabricius)	12	0.007	0	0.000
CHRYSOMELIDAE	*Altica betulae* Schaeffer	0	0.000	1	0.010
CHRYSOMELIDAE	*Altica chalybea* Illiger	1	0.001	0	0.000
CHRYSOMELIDAE	*Altica corni* Woods	0	0.000	4	0.039
CHRYSOMELIDAE	*Altica tombacina* (Mannerheim)	0	0.000	7	0.069
CHRYSOMELIDAE	*Altica woodsi* Isely	0	0.000	4	0.039
CHRYSOMELIDAE	*Baliosus nervosus* (Panzer)	0	0.000	1	0.010
CHRYSOMELIDAE	*Calligrapha californica coreopsivora* Brown	0	0.000	1	0.010
CHRYSOMELIDAE	*Cassica rubiginosa* O. F. Müller	0	0.000	25	0.246
CHRYSOMELIDAE	*Cassida flaveola* Thunberg	0	0.000	1	0.010
CHRYSOMELIDAE	*Chaetocnema concinna* (Marsham)	0	0.000	5	0.049
CHRYSOMELIDAE	*Chaetocnema irregularis* LeConte	0	0.000	1	0.010
CHRYSOMELIDAE	*Chaetocnema minuta* Melsheimer	0	0.000	1	0.010
CHRYSOMELIDAE	*Crepidodera heikertingeri* (Lazorko)	0	0.000	2	0.020
CHRYSOMELIDAE	*Crepidodera* spp. C	0	0.000	3	0.030
CHRYSOMELIDAE	*Deloyala guttata* (Olivier)	0	0.000	1	0.010

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SUPPLEMENTARY DATA. (Continued).

		LT		FIT	
Family	**Species**	**N**	**%**	**N**	**%**
CHRYSOMELIDAE	*Diabrotica barberi* Smith & Lawrence	44	0.027	62	0.610
CHRYSOMELIDAE	*Dibolia borealis* Chevrolat	0	0.000	4	0.039
CHRYSOMELIDAE	*Dibolia chelones* Parry	0	0.000	1	0.010
CHRYSOMELIDAE	*Donacia piscatrix* Lacordaire	1	0.001	0	0.000
CHRYSOMELIDAE	*Donacia* sp. C	1	0.001	1	0.010
CHRYSOMELIDAE	*Galerucella calmariensis* (Duftschmid)	0	0.000	8	0.079
CHRYSOMELIDAE	*Graphops curtipennis* (Melsheimer)	0	0.000	3	0.030
CHRYSOMELIDAE	*Longitarsus erro* Horn	0	0.000	1	0.010
CHRYSOMELIDAE	*Longitarsus luridus* (Scopoli)	0	0.000	48	0.472
CHRYSOMELIDAE	*Longitarsus melanurus* (Melsheimer)	0	0.000	1	0.010
CHRYSOMELIDAE	*Longitarsus pratensis* (Panzer)	0	0.000	51	0.502
CHRYSOMELIDAE	*Longitarsus* prob. *testaceus* (Melsheimer)	0	0.000	1	0.010
CHRYSOMELIDAE	*Longitarsus rubiginosus* (Foudras)	0	0.000	1	0.010
CHRYSOMELIDAE	*Microrhopala xerene* (Newman)	0	0.000	3	0.030
CHRYSOMELIDAE	*Neohaemonia melsheimeri* (Lacordaire)	3	0.002	0	0.000
CHRYSOMELIDAE	*Neohaemonia nigricornis* (Kirby)	4	0.002	4	0.039
CHRYSOMELIDAE	*Ophraella conferta* LeConte	0	0.000	2	0.020
CHRYSOMELIDAE	*Ophraella notata* (Fabricius)	0	0.000	1	0.010
CHRYSOMELIDAE	*Orsodacne atra* (Ahrens)	0	0.000	3	0.030
CHRYSOMELIDAE	*Oulema melanopus* (Linnaeus)	0	0.000	1	0.010
CHRYSOMELIDAE	*Paria fragariae* Wilcox	1	0.001	0	0.000
CHRYSOMELIDAE	*Paria* prob. *pratensis* Balsbaugh	0	0.000	2	0.020
CHRYSOMELIDAE	*Phyllotreta* prob. *bipustulata* (Fabricius)	0	0.000	1	0.010
CHRYSOMELIDAE	*Phyllotreta robusta* LeConte	0	0.000	11	0.108
CHRYSOMELIDAE	*Phyllotreta striolata* (Fabricius)	5	0.003	31	0.305
CHRYSOMELIDAE	*Plateumaris metallica* (Ahrens)	0	0.000	3	0.030
CHRYSOMELIDAE	*Psylliodes affinis* (Paykull)	0	0.000	5	0.049
CHRYSOMELIDAE	*Psylliodes picina* (Marsham)	0	0.000	68	0.669
CHRYSOMELIDAE	*Systena frontalis* (Fabricius)	1	0.001	5	0.049
CHRYSOMELIDAE	*Tricholochmaea alni* (Fall)	0	0.000	1	0.010
CHRYSOMELIDAE	*Tricholochmaea decora decora* (Say)	0	0.000	1	0.010
CIIDAE	*Cis fuscipes* Mellié	4	0.002	0	0.000
CLAMBIDAE	*Clambus armadillo* (DeGeer)	2	0.001	1	0.010
CLAMBIDAE	*Clambus howdeni* Endrody-Younga	1	0.001	1	0.010
CLAMBIDAE	*Clambus vulneratus* LeConte	6	0.004	0	0.000

CLERIDAE	*Enoclerus nigripes rufiventris* (Spinola)	0	0.000	1	0.010
CLERIDAE	*Isohydnocera curtipennis* (Newman)	2	0.001	16	0.157
CLERIDAE	*Madoniella dislocatus* (Say)	1	0.001	0	0.000
CLERIDAE	*Necrobia violacea* (Linnaeus)	1	0.001	0	0.000
COCCINELLIDAE	*Anisosticta bitriangularis* (Say)	0	0.000	2	0.020
COCCINELLIDAE	*Coccinella septempunctata* (Linnaeus)	0	0.000	3	0.030
COCCINELLIDAE	*Coleomegilla maculata lengi* Timberlake	4	0.002	26	0.256
COCCINELLIDAE	*Harmonia axyridis* (Pallas)	131	0.081	7	0.069
COCCINELLIDAE	*Hippodamia parenthesis* (Say)	0	0.000	18	0.177
COCCINELLIDAE	*Hippodamia variegata* (Goeze)	0	0.000	1	0.010
COCCINELLIDAE	*Hyperaspis octavia* Casey	0	0.000	1	0.010
COCCINELLIDAE	*Propylea quatuordecimpunctata* (Linnaeus)	0	0.000	3	0.030
COCCINELLIDAE	*Psyllobora vigintimaculata* (Say)	3	0.002	0	0.000
COCCINELLIDAE	*Scymnus* sp. C3	0	0.000	2	0.020
COLYDIIDAE	*Synchita fuliginosa* Melsheimer	1	0.001	0	0.000
CORYLOPHIDAE	*Gloeosoma* prob. *fuscicornis* (Casey)	0	0.000	1	0.010
CORYLOPHIDAE	*Molamba lunata* LeConte	2	0.001	0	0.000
CORYLOPHIDAE	*Orthoperus* sp. C	2	0.001	0	0.000
CRYPTOPHAGIDAE	*Antherophagus ochraceus* Melsheimer	13	0.008	24	0.236
CRYPTOPHAGIDAE	*Atomaria ephippiata* Zimmermann	1980	1.222	180	1.772
CRYPTOPHAGIDAE	*Atomaria fuscata* Schönherr	3866	2.386	104	1.024
CRYPTOPHAGIDAE	*Atomaria lewisi* Reitter	98	0.060	28	0.276
CRYPTOPHAGIDAE	*Atomaria nigrirostris* Stephens	57	0.035	16	0.157
CRYPTOPHAGIDAE	*Atomaria* prob. *apicalis* Erichson	259	0.160	0	0.000
CRYPTOPHAGIDAE	*Atomaria* prob. *pumilio* (Casey)	88	0.054	0	0.000
CRYPTOPHAGIDAE	*Atomaria pusilla* Paykull	10	0.006	0	0.000
CRYPTOPHAGIDAE	*Atomaria testacea* Stephens	0	0.000	1	0.010
CRYPTOPHAGIDAE	*Cryptophagus* prob. *difficilis* Casey	0	0.000	1	0.010
CRYPTOPHAGIDAE	*Cryptophagus setulosus* Sturm	8	0.005	0	0.000
CRYPTOPHAGIDAE	*Henoticus serratus* (Gyllenhal)	1	0.001	0	0.000
CRYPTOPHAGIDAE	*Henotiderus centromaculatus* Reitter	0	0.000	1	0.010
CRYPTOPHAGIDAE	*Telmatophilus americanus* LeConte	18	0.011	0	0.000
CRYPTOPHAGIDAE	*Telmatophilus typhae* Fallén	40	0.025	19	0.187
CUCUJIDAE	*Charaphloeus adustus* (LeConte)	1	0.001	0	0.000
CUCUJIDAE	*Charaphloeus convexulus* (LeConte)	1	0.001	0	0.000
CUCUJIDAE	*Cryptolestes* sp.	0	0.000	1	0.010
CUCUJIDAE	*Cucujus clavipes* Fabricius	2	0.001	0	0.000
CUCUJIDAE	*Laemophloeus fasciatus* Melsheimer	2	0.001	1	0.010

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SUPPLEMENTARY DATA. (Continued).

		LT		FIT	
Family	**Species**	**N**	**%**	**N**	**%**
CUCUJIDAE	*Telephanus velox* Haldeman	0	0.000	29	0.285
CURCULIONIDAE others	*Acalyptus carpini* (Herbst)	0	0.000	1	0.010
CURCULIONIDAE others	*Anthonomus decipiens* LeConte	0	0.000	1	0.010
CURCULIONIDAE others	*Anthonomus musculus* Say	0	0.000	1	0.010
CURCULIONIDAE others	*Anthonomus quadrigibbus* Say	0	0.000	1	0.010
CURCULIONIDAE others	*Anthonomus signatus* Say	0	0.000	30	0.295
CURCULIONIDAE others	*Apion* sp. C1	0	0.000	1	0.010
CURCULIONIDAE others	*Apion* sp. J2	0	0.000	1	0.010
CURCULIONIDAE others	*Bagous americanus* LeConte	8	0.005	2	0.020
CURCULIONIDAE others	*Calomycterus setarius* Roelofs	0	0.000	13	0.128
CURCULIONIDAE others	*Ceutorhynchus erysimi* (Fabricius)	0	0.000	1	0.010
CURCULIONIDAE others	*Ceutorhynchus obstrictus* (Marsham)	25	0.015	0	0.000
CURCULIONIDAE others	*Ceutorhynchus typhae* (Herbst)	0	0.000	10	0.098
CURCULIONIDAE others	*Conotrachelus corni* (Brown)	1	0.001	0	0.000
CURCULIONIDAE others	*Conotrachelus geminatus* LeConte	1	0.001	0	0.000
CURCULIONIDAE others	*Dryophthorus americanus* Bedel	2	0.001	4	0.039
CURCULIONIDAE others	*Eubulus bisignatus* Say	1	0.001	0	0.000
CURCULIONIDAE others	*Eutrichapion cyanitinctum* (Fall)	0	0.000	30	0.295
CURCULIONIDAE others	*Exomias pellucidus* (Boheman)	0	0.000	23	0.226
CURCULIONIDAE others	*Glocianus punctiger* (C. R. Sahlberg)	0	0.000	1	0.010
CURCULIONIDAE others	*Hylobius congener* Dalla Torre, Shenkling & Marshall	1	0.001	0	0.000
CURCULIONIDAE others	*Hypera nigrirostris* (Fabricius)	0	0.000	2	0.020
CURCULIONIDAE others	*Hypera punctata* (Fabricius)	0	0.000	1	0.010
CURCULIONIDAE others	*Hypera rumicis* (Linnaeus)	0	0.000	1	0.010
CURCULIONIDAE others	*Isochnus rufipes* (LeConte)	9	0.006	14	0.138
CURCULIONIDAE others	*Lignyodes bischoffi* (Blatchley)	1	0.001	0	0.000
CURCULIONIDAE others	*Lignyodes helvolus* (LeConte)	1	0.001	0	0.000
CURCULIONIDAE others	*Listronotus* spp. C	173	0.107	6	0.059
CURCULIONIDAE others	*Nanophyes marmoratus* (Goeze)	7	0.004	3	0.030
CURCULIONIDAE others	*Notaris puncticollis* (LeConte)	5	0.003	2	0.020
CURCULIONIDAE others	*Odontocorynus salebrosus* (Casey)	1	0.001	12	0.118
CURCULIONIDAE others	*Otiorhynchus singularis* (Linnaeus)	0	0.000	1	0.010
CURCULIONIDAE others	*Perapion curtirostre* (Germar)	0	0.000	2	0.020
CURCULIONIDAE others	*Phyllobius intrusus* Kôno	2	0.001	0	0.000
CURCULIONIDAE others	*Phyllobius oblongus* (Linnaeus)	1	0.001	3	0.030

CURCULIONIDAE	others	*Phytobius leucogaster* (Marsham)	1	0.001	0	0.000
CURCULIONIDAE	others	*Polydrusus cervinus* (Linnaeus)	16	0.010	2	0.020
CURCULIONIDAE	others	*Pseudanthonomus crataegi* (Walsh)	0	0.000	1	0.010
CURCULIONIDAE	others	*Rhinoncus castor* (Fabricius)	0	0.000	1	0.010
CURCULIONIDAE	others	*Rhinoncus pericarpius* (Linnaeus)	0	0.000	2	0.020
CURCULIONIDAE	others	*Rhinoncus perpendicularis* Reiche	0	0.000	1	0.010
CURCULIONIDAE	others	*Rhinoncus pyrrhopus* Boheman	1	0.001	10	0.098
CURCULIONIDAE	others	*Rhinusa tetra* (Fabricius)	2	0.001	2	0.020
CURCULIONIDAE	others	*Sciaphilus asperatus* (Bonsdorff)	0	0.000	6	0.059
CURCULIONIDAE	others	*Sitona cylindricollis* Fahraeus	0	0.000	3	0.030
CURCULIONIDAE	others	*Sitona flavescens* (Marsham)	0	0.000	1	0.010
CURCULIONIDAE	others	*Sitona hispidulus* (Fabricius)	1	0.001	6	0.059
CURCULIONIDAE	others	*Sphenophorus zeae* Walsh	0	0.000	2	0.020
CURCULIONIDAE	others	*Tachyerges niger* (Horn)	1	0.001	0	0.000
CURCULIONIDAE	others	*Tanysphyrus lemnae* (Fabricius)	4	0.002	1	0.010
CURCULIONIDAE	others	*Trachyphloeus bifoveolatus* (Beck)	0	0.000	1	0.010
CURCULIONIDAE	others	*Tychius griseus* Schaeffer	0	0.000	5	0.049
CURCULIONIDAE	others	*Tychius picirostris* (Fabricius)	1	0.001	37	0.364
CURCULIONIDAE	others	*Tyloderma aereum* (Say)	3	0.002	0	0.000
CURCULIONIDAE	Scolytinae	*Anisandrus dispar* (Fabricius)	2	0.001	3	0.030
CURCULIONIDAE	Scolytinae	*Cryphalus ruficollis* Hopkins	0	0.000	1	0.010
CURCULIONIDAE	Scolytinae	*Crypturgus borealis* Swaine	1	0.001	0	0.000
CURCULIONIDAE	Scolytinae	*Dendroctonus simplex* LeConte	1	0.001	0	0.000
CURCULIONIDAE	Scolytinae	*Dryocoetes autographus* (Ratzeburg)	10	0.006	0	0.000
CURCULIONIDAE	Scolytinae	*Dryocoetes* prob. *betulae* Hopkins	10	0.006	0	0.000
CURCULIONIDAE	Scolytinae	*Dryocoetes* prob. *granicollis* (LeConte)	4	0.002	0	0.000
CURCULIONIDAE	Scolytinae	*Gnathotrichus materiarius* (Fitch)	2	0.001	0	0.000
CURCULIONIDAE	Scolytinae	*Hylastes opacus* Erichson	1	0.001	1	0.010
CURCULIONIDAE	Scolytinae	*Hylesinus aculeatus* Say	8	0.005	2	0.020
CURCULIONIDAE	Scolytinae	*Monarthrum mali* (Fitch)	1	0.001	0	0.000
CURCULIONIDAE	Scolytinae	*Orthotomicus caelatus* (Eichhoff)	3	0.002	0	0.000
CURCULIONIDAE	Scolytinae	*Phloeosinus canadensis* Swaine	1	0.001	1	0.010
CURCULIONIDAE	Scolytinae	*Phloeotribus liminaris* (Harris)	1	0.001	0	0.000
CURCULIONIDAE	Scolytinae	*Pityokteines sparsus* (LeConte)	2	0.001	0	0.000
CURCULIONIDAE	Scolytinae	*Pityophthorus* sp. C2	0	0.000	1	0.010
CURCULIONIDAE	Scolytinae	*Pityophthorus* sp. S3	1	0.001	0	0.000
CURCULIONIDAE	Scolytinae	*Polygraphus rufipennis* (Kirby)	1	0.001	0	0.000
CURCULIONIDAE	Scolytinae	*Trypodendron lineatum* (Olivier)	1	0.001	0	0.000

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SUPPLEMENTARY DATA. (Continued).

		LT		FIT	
Family	**Species**	**N**	**%**	**N**	**%**
CURCULIONIDAE Scolytinae	*Xyleborinus* prob. *attenuatus* (Blandford)	0	0.000	1	0.010
CURCULIONIDAE Scolytinae	*Xyleborinus saxesenii* (Ratzeburg)	4	0.002	0	0.000
CURCULIONIDAE Scolytinae	*Xyleborus obesus* LeConte	1	0.001	1	0.010
CURCULIONIDAE Scolytinae	*Xyleborus sayi* (Hopkins)	17	0.010	3	0.030
CURCULIONIDAE Scolytinae	*Xylosandrus germanus* (Blandford)	1	0.001	26	0.256
DERMESTIDAE	*Anthrenus fuscus* Olivier	6	0.004	5	0.049
DERMESTIDAE	*Anthrenus scrophulariae* (Linnaeus)	1	0.001	0	0.000
DERMESTIDAE	*Attagenus unicolor* (Brahm)	0	0.000	11	0.108
DERMESTIDAE	*Trogoderma* sp. C1	4	0.002	0	0.000
DRYOPIDAE	*Dryops viennensis* (Heer)	8878	5.480	1	0.010
DRYOPIDAE	*Helichus lithophilus* (Germar)	2	0.001	0	0.000
DYTISCIDAE	*Agabus* sp. C1	0	0.000	3	0.030
DYTISCIDAE	*Agabus* sp. C2	2	0.001	0	0.000
DYTISCIDAE	*Celina hubbelli* Young	76	0.047	0	0.000
DYTISCIDAE	*Colymbetes sculptilis* Harris	4	0.002	0	0.000
DYTISCIDAE	*Copelatus glyphicus* (Say)	103	0.064	0	0.000
DYTISCIDAE	*Coptotomus longulus* LeConte	191	0.118	2	0.020
DYTISCIDAE	*Desmopachria convexa* (Aubé)	10	0.006	0	0.000
DYTISCIDAE	*Heterosternuta wickhami* (Zaitzev)	1133	0.699	0	0.000
DYTISCIDAE	*Hydrocolus stagnalis* (Gemminger & Harold)	19	0.012	0	0.000
DYTISCIDAE	*Hydroporus* prob. *melsheimeri* Fall	7	0.004	0	0.000
DYTISCIDAE	*Hydroporus* prob. *puberulus* LeConte	77	0.048	1	0.010
DYTISCIDAE	*Hydroporus* prob. *rufinasus* Mannerheim	11	0.007	1	0.010
DYTISCIDAE	*Hygrotus impressopunctatus* (Schaller)	75	0.046	0	0.000
DYTISCIDAE	*Hygrotus laccophilinus* (LeConte)	3	0.002	0	0.000
DYTISCIDAE	*Hygrotus nubilus* (LeConte)	110	0.068	0	0.000
DYTISCIDAE	*Hygrotus picatus* (Kirby)	54	0.033	0	0.000
DYTISCIDAE	*Hygrotus sayi* Balfour-Browne	87	0.054	0	0.000
DYTISCIDAE	*Ilybius angustior* (Gyllenhal)	8	0.005	0	0.000
DYTISCIDAE	*Ilybius biguttulus* (Germar)	207	0.128	0	0.000
DYTISCIDAE	*Ilybius pleuriticus* (LeConte)	11	0.007	0	0.000
DYTISCIDAE	*Ilybius* prob. *discedens* Sharp	1	0.001	0	0.000
DYTISCIDAE	*Laccophilus maculosus* Say	0	0.000	7	0.069
DYTISCIDAE	*Liodessus affinis* (Say)	576	0.356	14	0.138
DYTISCIDAE	*Neoporus undulatus* (Say)	31	0.019	9	0.089

DYTISCIDAE	*Rhantus binotatus* (Harris)	0	0.000	6	0.059
ELATERIDAE	*Agriotes mancus* (Say)	0	0.000	4	0.039
ELATERIDAE	*Agriotes oblongicollis* (Melsheimer)	2	0.001	0	0.000
ELATERIDAE	*Ampedus rubricus* (Say)	0	0.000	2	0.020
ELATERIDAE	*Athous acanthus* (Say)	8	0.005	1	0.010
ELATERIDAE	*Ctenicera cylindriformis* (Herbst)	1	0.001	1	0.010
ELATERIDAE	*Ctenicera mediana* (Germar)	0	0.000	1	0.010
ELATERIDAE	*Ctenicera pulchra* (LeConte)	0	0.000	2	0.020
ELATERIDAE	*Ctenicera tarsalis* (Melsheimer)	1	0.001	34	0.335
ELATERIDAE	*Ctenicera vulnerata* (LeConte)	1	0.001	0	0.000
ELATERIDAE	*Dalopius pallidus* Brown	1	0.001	4	0.039
ELATERIDAE	*Dalopius* sp. C	1	0.001	0	0.000
ELATERIDAE	*Dalopius vagus* Brown	3	0.002	0	0.000
ELATERIDAE	*Denticollis denticornis* (Kirby)	1	0.001	0	0.000
ELATERIDAE	*Elathous discalceatus* (Say)	1	0.001	0	0.000
ELATERIDAE	*Hemicrepidius hemipodus* (Say)	15	0.009	2	0.020
ELATERIDAE	*Hypnoidus abbreviatus* (Say)	4	0.002	26	0.256
ELATERIDAE	*Limonius agonus* (Say)	0	0.000	1	0.010
ELATERIDAE	*Melanotus castanipes* (Paykull)	13	0.008	0	0.000
ELATERIDAE	*Melanotus similis* (Kirby)	39	0.024	4	0.039
ELATERIDAE	*Microhypnus striatulus* (LeConte)	0	0.000	1	0.010
ELATERIDAE	*Oestodes tenuicollis* (Randall)	0	0.000	2	0.020
ELATERIDAE	*Paradonus pectoralis* (Say)	9	0.006	0	0.000
ELATERIDAE	*Zorochrus melsheimeri* (Horn)	0	0.000	1	0.010
ELMIDAE	*Dubiraphia quadrinotata* (Say)	1	0.001	0	0.000
ELMIDAE	*Optioservus ovalis* (LeConte)	1	0.001	0	0.000
ELMIDAE	*Optioservus trivittatus* (Brown)	7	0.004	0	0.000
ELMIDAE	*Promoresia tardella* (Fall)	7	0.004	1	0.010
ELMIDAE	*Stenelmis cheryl* Brown	61	0.038	0	0.000
ELMIDAE	*Stenelmis crenata* (Say)	70	0.043	0	0.000
ELMIDAE	*Stenelmis mera* Sanderson	30	0.019	0	0.000
ELMIDAE	*Stenelmis* prob. *concinna* Sanderson	3	0.002	0	0.000
ELMIDAE	*Stenelmis* sp. S	11	0.007	0	0.000
EUCINETIDAE	*Eucinetus haemorrhoidalis* (Germar)	0	0.000	1	0.010
EUCNEMIDAE	*Dirrhagofarsus ernae* Otto, Muona & McClarin	2	0.001	1	0.010
EUCNEMIDAE	*Hylis* sp.	0	0.000	2	0.020
EUCNEMIDAE	*Microrhagus triangularis* (Say)	0	0.000	1	0.010
EUCNEMIDAE	*Onichodon canadensis* (Brown)	1	0.001	0	0.000

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SUPPLEMENTARY DATA. (Continued).

		LT		FIT	
Family	**Species**	**N**	**%**	**N**	**%**
GYRINIDAE	*Dineutus* prob. *assimilis* (Kirby)	1	0.001	0	0.000
GYRINIDAE	*Gyrinus affinis* Aubé	5	0.003	0	0.000
GYRINIDAE	*Gyrinus pectoralis* LeConte	0	0.000	1	0.010
GYRINIDAE	*Gyrinus* prob. *gehringi* Chamberlain	4	0.002	0	0.000
GYRINIDAE	*Gyrinus* prob. *latilimbus* Fall	2	0.001	0	0.000
GYRINIDAE	*Gyrinus* prob. *sayi* Aubé	3	0.002	0	0.000
GYRINIDAE	*Gyrinus* sp. C1	1	0.001	0	0.000
HALIPLIDAE	*Haliplus canadensis* Wallis	1	0.001	12	0.118
HALIPLIDAE	*Haliplus cribrarius* LeConte	4	0.002	1	0.010
HALIPLIDAE	*Haliplus immaculicollis* Harris	42	0.026	3	0.030
HALIPLIDAE	*Peltodytes edentulus* (LeConte)	30	0.019	0	0.000
HALIPLIDAE	*Peltodytes tortulosus* Roberts	3	0.002	0	0.000
HETEROCERIDAE	*Augyles* prob. *moleculus* Fall	4	0.002	0	0.000
HETEROCERIDAE	*Heterocerus fenestratus* (Thunberg)	1550	0.957	0	0.000
HETEROCERIDAE	*Heterocerus* prob. *brunneus* Melsheimer	259	0.160	0	0.000
HETEROCERIDAE	*Heterocerus* prob. *gnatho* (LeConte)	150	0.093	0	0.000
HETEROCERIDAE	*Heterocerus* prob. *longilobulus* (Pacheco)	2	0.001	0	0.000
HETEROCERIDAE	*Heterocerus* prob. *mollinus* Kiesenwetter	40	0.025	0	0.000
HETEROCERIDAE	*Heterocerus* prob. *pallidus* Say	27	0.017	0	0.000
HETEROCERIDAE	*Heterocerus* prob. *parrotus* (Pacheco)	1	0.001	0	0.000
HETEROCERIDAE	*Heterocerus* sp. C1	5	0.003	0	0.000
HETEROCERIDAE	*Heterocerus* sp. C2	5	0.003	0	0.000
HISTERIDAE	*Aeletes politus* (LeConte)	385	0.238	0	0.000
HISTERIDAE	*Atholus perplexus* (J. L. LeConte)	0	0.000	1	0.010
HISTERIDAE	*Euspinotus assimilis* (Paykull)	0	0.000	1	0.010
HYDRAENIDAE	*Hydraena* prob. *angulicollis* Newman	1	0.001	0	0.000
HYDROPHILIDAE	*Anacaena* prob. *lutescens* (Stephens)	1066	0.658	16	0.157
HYDROPHILIDAE	*Berosus peregrinus* (Herbst)	17	0.010	0	0.000
HYDROPHILIDAE	*Berosus* prob. *fraternus* LeConte	22	0.014	0	0.000
HYDROPHILIDAE	*Berosus sayi* Hansen	379	0.234	0	0.000
HYDROPHILIDAE	*Berosus stylifer* Horn	1	0.001	0	0.000
HYDROPHILIDAE	*Cercyon analis* (Paykull)	32	0.020	54	0.532
HYDROPHILIDAE	*Cercyon assecla* Smetana	30	0.019	22	0.217
HYDROPHILIDAE	*Cercyon cinctus* Smetana	11	0.007	0	0.000
HYDROPHILIDAE	*Cercyon haemorrhoidalis* (Fabricius)	0	0.000	2	0.020

HYDROPHILIDAE	*Cercyon herceus* Smetana	862	0.532	0	0.000	
HYDROPHILIDAE	*Cercyon laminatus* Sharp	902	0.557	0	0.000	
HYDROPHILIDAE	*Cercyon lateralis* Marsham	116	0.072	0	0.000	
HYDROPHILIDAE	*Cercyon praetextatus* (Say)	4534	2.799	0	0.000	
HYDROPHILIDAE	*Cercyon* prob. *erraticus* Smetana	71	0.044	0	0.000	
HYDROPHILIDAE	*Cercyon* prob. *terminatus* (Marsham)	4	0.002	0	0.000	
HYDROPHILIDAE	*Cercyon pygmaeus* (Illiger)	65	0.040	2	0.020	
HYDROPHILIDAE	*Cercyon quisquilius* (Linnaeus)	8681	5.359	0	0.000	
HYDROPHILIDAE	*Cercyon rosenii* Knisch	4	0.002	1	0.010	
HYDROPHILIDAE	*Cercyon unipunctatus* (Linnaeus)	24	0.015	0	0.000	
HYDROPHILIDAE	*Cercyon ustulatus* (Preyssler)	0	0.000	5	0.049	
HYDROPHILIDAE	*Chaetarthria atra* (LeConte)	1	0.001	0	0.000	
HYDROPHILIDAE	*Cryptopleurum minutum* (Fabricius)	8	0.005	2	0.020	
HYDROPHILIDAE	*Cryptopleurum subtile* Sharp	258	0.159	1	0.010	
HYDROPHILIDAE	*Cryptopleurum vagans* LeConte	1	0.001	0	0.000	
HYDROPHILIDAE	*Cymbiodyta bifidus* (LeConte)	61	0.038	0	0.000	
HYDROPHILIDAE	*Cymbiodyta minima* Notman	27	0.017	0	0.000	
HYDROPHILIDAE	*Cymbiodyta vindicata* Fall	96	0.059	10	0.098	
HYDROPHILIDAE	*Enochrus cinctus* (Say)	30	0.019	0	0.000	
HYDROPHILIDAE	*Enochrus consortus* Green	161	0.099	0	0.000	
HYDROPHILIDAE	*Enochrus hamiltoni* (Horn)	7344	4.533	2	0.020	
HYDROPHILIDAE	*Enochrus ochraceus* (Melsheimer)	5300	3.272	2	0.020	
HYDROPHILIDAE	*Enochrus perplexus* (LeConte)	709	0.438	0	0.000	
HYDROPHILIDAE	*Enochrus* prob. *diffusus* (LeConte)	5	0.003	0	0.000	
HYDROPHILIDAE	*Enochrus* prob. *sayi* Gundersen	10	0.006	0	0.000	
HYDROPHILIDAE	*Enochrus pygmaeus nebulosus* (Say)	553	0.341	0	0.000	
HYDROPHILIDAE	*Enochrus* sp. S	6	0.004	0	0.000	
HYDROPHILIDAE	*Helophorus angusticollis* d'Orchymont	21	0.013	0	0.000	
HYDROPHILIDAE	*Helophorus frosti* Smetana	11	0.007	0	0.000	
HYDROPHILIDAE	*Helophorus lacustris* LeConte	232	0.143	1	0.010	
HYDROPHILIDAE	*Helophorus lineatus* (Say)	4100	2.531	5	0.049	
HYDROPHILIDAE	*Helophorus orchymonti* Smetana	160	0.099	1	0.010	
HYDROPHILIDAE	*Helophorus orientalis* Motschulsky	14891	9.192	6	0.059	
HYDROPHILIDAE	*Helophorus* prob. *sempervarians* Angus	0	0.000	1	0.010	
HYDROPHILIDAE	*Hydrobius fuscipes* (Linnaeus)	621	0.383	23	0.226	
HYDROPHILIDAE	*Hydrobius melaenus* (Germar)	90	0.056	0	0.000	
HYDROPHILIDAE	*Hydrochara obtusata* (Say)	72	0.044	0	0.000	
HYDROPHILIDAE	*Hydrochus* prob. *subcupreus* Randall	10	0.006	0	0.000	

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SUPPLEMENTARY DATA. (Continued).

		LT		FIT	
Family	**Species**	**N**	**%**	**N**	**%**
HYDROPHILIDAE	*Hydrochus pseudosquamifer* D. C. Miller	133	0.082	0	0.000
HYDROPHILIDAE	*Hydrochus* sp. C1	74	0.046	0	0.000
HYDROPHILIDAE	*Laccobius* prob. *minutoides* d'Orchymont	2	0.001	0	0.000
HYDROPHILIDAE	*Laccobius reflexipennis* Cheary	219	0.135	1	0.010
HYDROPHILIDAE	*Paracymus subcupreus* (Say)	1446	0.893	4	0.039
HYDROPHILIDAE	*Phaenonotum exstriatum* (Say)	2	0.001	0	0.000
HYDROPHILIDAE	*Sphaeridium bipustulatum* Fabricius	0	0.000	1	0.010
HYDROPHILIDAE	*Sphaeridium lunatum* Fabricius	1	0.001	7	0.069
HYDROPHILIDAE	*Sphaeridium scarabaeoides* (Linnaeus)	0	0.000	2	0.020
HYDROPHILIDAE	*Tropisternus glaber* (Herbst)	0	0.000	3	0.030
HYDROPHILIDAE	*Tropisternus lateralis nimbatus* (Say)	19	0.012	0	0.000
HYDROPHILIDAE	*Tropisternus mixtus* (LeConte)	2	0.001	6	0.059
HYDROPHILIDAE	*Tropisternus natator* d'Orchymont	0	0.000	2	0.020
LAMPYRIDAE	*Ellychnia corrusca* (Linnaeus)	0	0.000	15	0.148
LAMPYRIDAE	*Lucidota atra* (Olivier)	0	0.000	2	0.020
LAMPYRIDAE	*Photinus ardens* LeConte	4	0.002	0	0.000
LAMPYRIDAE	*Photinus indictus* (LeConte)	0	0.000	3	0.030
LAMPYRIDAE	*Photinus obscurellus* LeConte	8	0.005	0	0.000
LAMPYRIDAE	*Photuris pennsylvanica* (DeGeer)	3	0.002	2	0.020
LAMPYRIDAE	*Pyractomena linearis* LeConte	0	0.000	2	0.020
LAMPYRIDAE	*Pyropyga decipiens* (Harris)	2	0.001	12	0.118
LAMPYRIDAE	*Pyropyga nigricans* (Say)	1	0.001	12	0.118
LANGURIIDAE	(genus ?) sp. S	57	0.035	0	0.000
LANGURIIDAE	*Toramus pulchellus* (LeConte)	0	0.000	2	0.020
LATRIDIIDAE	*Corticaria* sp. S4	50	0.031	0	0.000
LATRIDIIDAE	*Corticarina* sp. C	1	0.001	7	0.069
LATRIDIIDAE	*Cortinicara gibbosa* (Herbst)	37	0.023	3	0.030
LATRIDIIDAE	*Enicmus aterrimus* Motschulsky	0	0.000	1	0.010
LATRIDIIDAE	*Enicmus fictus* Fall	1	0.001	31	0.305
LATRIDIIDAE	*Melanophthalma americana* (Mannerheim)	719	0.444	18	0.177
LATRIDIIDAE	*Stephostethus liratus* (LeConte)	15	0.009	4	0.039
LEIODIDAE	*Anogdus obsoletus* (Melsheimer)	0	0.000	1	0.010
LEIODIDAE	*Colon asperatum* Hatch	64	0.040	3	0.030
LEIODIDAE	*Colon bidentatum* (C. Sahlberg)	1	0.001	0	0.000
LEIODIDAE	*Colon hubbardi* Horn	0	0.000	2	0.020

LEIODIDAE	*Colon magnicolle* Mannerheim	1	0.001	0	0.000
LEIODIDAE	*Colon* sp. C1	0	0.000	1	0.010
LEIODIDAE	*Hydnobius* prob. *laticeps* Notman	0	0.000	5	0.049
LEIODIDAE	*Hydnobius* prob. *pumilus* LeConte	1	0.001	2	0.020
LEIODIDAE	*Hydnobius substriatus* LeConte	0	0.000	1	0.010
LEIODIDAE	*Leiodes assimilis* (LeConte)	2	0.001	0	0.000
LEIODIDAE	*Leiodes strigata* (LeConte)	0	0.000	3	0.030
LEIODIDAE	*Lionothus* prob. *forticornis* Daffner	0	0.000	1	0.010
LEIODIDAE	*Prionochaeta opaca* (Say)	0	0.000	3	0.030
LEIODIDAE	*Ptomaphagus brevior* Jeannel	1	0.001	3	0.030
LEIODIDAE	*Sciodrepoides watsoni* (Spence)	0	0.000	1	0.010
LIMNICHIDAE	*Limnichites punctatus* (LeConte)	1	0.001	0	0.000
MELANDRYIDAE	*Dircaea liturata* (LeConte)	3	0.002	2	0.020
MELANDRYIDAE	*Hallomenus* sp. S1	1	0.001	0	0.000
MELANDRYIDAE	*Serropalpus* sp. S	1	0.001	0	0.000
MELOIDAE	*Epicauta pennsylvanica* (DeGeer)	0	0.000	1	0.010
MONOTOMIDAE	*Monotoma longicollis* Gyllenhal	1	0.001	1	0.010
MONOTOMIDAE	*Monotoma picipes* Herbst	0	0.000	1	0.010
MONOTOMIDAE	*Rhizophagus remotus* LeConte	1	0.001	0	0.000
MORDELLIDAE	*Mordella atrata* Melsheimer	0	0.000	2	0.020
MORDELLIDAE	*Mordella marginata* Melsheimer	1	0.001	2	0.020
MORDELLIDAE	*Mordellaria borealis* (LeConte)	0	0.000	1	0.010
MORDELLIDAE	*Mordellaria serval* (Say)	7	0.004	3	0.030
MORDELLIDAE	*Mordellina nigricans* (Melsheimer)	0	0.000	1	0.010
MORDELLIDAE	*Mordellina* prob. *pustulata* (Melsheimer)	0	0.000	4	0.039
MORDELLIDAE	*Mordellina* sp. S	2	0.001	12	0.118
MORDELLIDAE	*Mordellistena* prob. *pauxilla* Lijeblad	0	0.000	8	0.079
MORDELLIDAE	*Mordellistena* prob. *picilabris* Helmuth	0	0.000	1	0.010
MORDELLIDAE	*Mordellistena* sp. C2	0	0.000	1	0.010
MORDELLIDAE	*Mordellochroa scapularis* (Say)	0	0.000	1	0.010
MYCETOPHAGIDAE	*Litargus tetraspilotus* LeConte	0	0.000	1	0.010
MYCETOPHAGIDAE	*Mycetophagus flexuosus* Say	1	0.001	0	0.000
MYCETOPHAGIDAE	*Mycetophagus* prob. *serrulatus* (Casey)	1	0.001	0	0.000
MYCETOPHAGIDAE	*Typhaea stercorea* (Linnaeus)	3	0.002	0	0.000
NITIDULIDAE	*Brachypterolus pulicarius* (Linnaeus)	0	0.000	4	0.039
NITIDULIDAE	*Brassicogethes viridescens* (Fabricius)	476	0.294	1057	10.405
NITIDULIDAE	*Carpophilus brachypterus* (Say)	16	0.010	19	0.187
NITIDULIDAE	*Carpophilus marginellus* (Motschulsky)	0	0.000	1	0.010

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SUPPLEMENTARY DATA. (Continued).

		LT		FIT	
Family	**Species**	**N**	**%**	**N**	**%**
NITIDULIDAE	*Colopterus truncatus* (Randall)	3	0.002	0	0.000
NITIDULIDAE	*Conotelus obscurus* Erichson	0	0.000	23	0.226
NITIDULIDAE	*Cryptarcha ampla* Erichson	4	0.002	0	0.000
NITIDULIDAE	*Epuraea avara* (Randall)	9	0.006	2	0.020
NITIDULIDAE	*Epuraea flavomaculata* Mäklin	0	0.000	1	0.010
NITIDULIDAE	*Epuraea ovata* Horn	5	0.003	0	0.000
NITIDULIDAE	*Epuraea parsonsi* Connell	26	0.016	0	0.000
NITIDULIDAE	*Epuraea* prob. *rufida* (Melsheimer)	1	0.001	0	0.000
NITIDULIDAE	*Epuraea rufa* (Say)	18	0.011	5	0.049
NITIDULIDAE	*Epuraea* sp. C1	2	0.001	0	0.000
NITIDULIDAE	*Epuraea* sp. C2	1	0.001	0	0.000
NITIDULIDAE	*Epuraea* sp. C3	3	0.002	0	0.000
NITIDULIDAE	*Fabogethes nigrescens* (Stephens)	12	0.007	5263	51.806
NITIDULIDAE	*Glischrochilus fasciatus* (Olivier)	34	0.021	3	0.030
NITIDULIDAE	*Glischrochilus quadrisignatus* (Say)	37	0.023	54	0.532
NITIDULIDAE	*Glischrochilus sanguinolentus* (Olivier)	1	0.001	0	0.000
NITIDULIDAE	*Glischrochilus siepmanni* W. J. Brown	2	0.001	2	0.020
NITIDULIDAE	*Omosita colon* (Linnaeus)	7	0.004	1	0.010
NITIDULIDAE	*Omosita discoidea* (Fabricius)	2	0.001	0	0.000
NOTERIDAE	*Suphisellus puncticollis* Crotch	2	0.001	0	0.000
PHALACRIDAE	*Acylomus* sp. S	12	0.007	1	0.010
PHALACRIDAE	*Olibrus semistriatus* LeConte	4	0.002	72	0.709
PHALACRIDAE	*Olibrus* sp. S	5	0.003	48	0.472
PHALACRIDAE	*Phalacrus politus* Melsheimer	0	0.000	1	0.010
PHALACRIDAE	*Stilbus* sp. S1	22	0.014	6	0.059
PHALACRIDAE	*Stilbus* sp. S2	998	0.616	41	0.404
PSEPHENIDAE	*Ectopria nervosa* (Melsheimer)	10	0.006	0	0.000
PTILIIDAE	(genus) sp. C1	5	0.003	0	0.000
PTILIIDAE	*Acrotrichis* spp. C	67	0.041	14	0.138
PTILIIDAE	*Ptenidium* spp. C	38	0.023	0	0.000
PTILODACTYLIDAE	*Ptilodactyla serricollis* (Say)	12	0.007	3	0.030
PTINIDAE	*Oligomerus alternans* LeConte	3	0.002	0	0.000
PTINIDAE	*Ptilinus ruficornis* Say	1	0.001	0	0.000
PYROCHROIDAE	*Dendroides canadensis* Latreille	5	0.003	0	0.000
SCARABAEIDAE	*Acrossus rubripennis* (Horn)	1	0.001	0	0.000

SCARABAEIDAE	*Agoliinus leopardus* (Horn)	1	0.001	0	0.000
SCARABAEIDAE	*Agoliinus manitobensis* (Brown)	6	0.004	0	0.000
SCARABAEIDAE	*Ataenius abditus* (Haldeman)	15	0.009	0	0.000
SCARABAEIDAE	*Ataenius strigatus* (Say)	779	0.481	29	0.285
SCARABAEIDAE	*Blackburneus stercorosus* (Melsheimer)	68	0.042	0	0.000
SCARABAEIDAE	*Calamosternus granarius* (Linnaeus)	251	0.155	11	0.108
SCARABAEIDAE	*Colobopterus erraticus* (Linnaeus)	0	0.000	4	0.039
SCARABAEIDAE	*Dichelonyx albicollis* (Burmeister)	2	0.001	0	0.000
SCARABAEIDAE	*Dichelonyx subvittata* (LeConte)	3	0.002	0	0.000
SCARABAEIDAE	*Diplotaxis sordida* (Say)	1	0.001	0	0.000
SCARABAEIDAE	*Diplotaxis tristis* Kirby	10	0.006	0	0.000
SCARABAEIDAE	*Geotrupes stercorarius* (Linnaeus)	2	0.001	0	0.000
SCARABAEIDAE	*Hoplia trifasciata* Say	1	0.001	0	0.000
SCARABAEIDAE	*Ligyrus relictus* (Say)	4	0.002	0	0.000
SCARABAEIDAE	*Macrodactylus subspinosus* (Fabricius)	7	0.004	17	0.167
SCARABAEIDAE	*Maladera castanea* Arrow	152	0.094	1	0.010
SCARABAEIDAE	*Melinopterus prodromus* (Brahm)	11	0.007	7	0.069
SCARABAEIDAE	*Odonteus liebecki* Wallis	2	0.001	0	0.000
SCARABAEIDAE	*Onthophagus hecate hecate* (Panzer)	0	0.000	2	0.020
SCARABAEIDAE	*Oscarinus rusicola* (Melsheimer)	231	0.143	0	0.000
SCARABAEIDAE	*Phyllophaga* sp. C2	2	0.001	0	0.000
SCARABAEIDAE	*Phyllophaga* spp. C	866	0.535	6	0.059
SCARABAEIDAE	*Popillia japonica* Newman	21	0.013	111	1.093
SCARABAEIDAE	*Psammodius pierottii* Pittino	1	0.001	0	0.000
SCARABAEIDAE	*Serica atracapilla* (Kirby)	3	0.002	0	0.000
SCARABAEIDAE	*Trichiotinus assimilis* (Kirby)	0	0.000	1	0.010
SCARABAEIDAE	*Trox aequalis* Say	10	0.006	0	0.000
SCARABAEIDAE	*Trox scaber* Linnaeus	3	0.002	0	0.000
SCARABAEIDAE	*Trox unistriatus* Palisot de Beauvois	9	0.006	0	0.000
SCIRTIDAE	*Cyphon obscurus* (Guérin-Méneville)	3	0.002	1	0.010
SCIRTIDAE	*Cyphon pusillus* (LeConte)	12	0.007	0	0.000
SCIRTIDAE	*Cyphon* sp. C1	13	0.008	0	0.000
SCIRTIDAE	*Cyphon* sp. C2	3	0.002	0	0.000
SCIRTIDAE	*Cyphon* sp. S2	30	0.019	2	0.020
SCIRTIDAE	*Cyphon* sp. S3	6	0.004	0	0.000
SCIRTIDAE	*Cyphon* sp. S4	78	0.048	1	0.010
SCIRTIDAE	*Cyphon* sp. S5	3419	2.110	15	0.148
SCIRTIDAE	*Cyphon* sp. S6	206	0.127	12	0.118

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SUPPLEMENTARY DATA. (Continued).

		LT		FIT	
Family	**Species**	**N**	**%**	**N**	**%**
SCIRTIDAE	*Cyphon* sp. S7	1	0.001	1	0.010
SCIRTIDAE	*Cyphon variabilis* (Thunberg)	30	0.019	2	0.020
SCIRTIDAE	*Prionocyphon limbatus* LeConte	3	0.002	0	0.000
SCIRTIDAE	*Scirtes tibialis* Guérin-Méneville	18	0.011	0	0.000
SCRAPTIIDAE	*Anaspis rufa* Say	0	0.000	6	0.059
SILPHIDAE	*Necrodes surinamensis* (Fabricius)	27	0.017	0	0.000
SILPHIDAE	*Necrophila americana* (Linnaeus)	2	0.001	1	0.010
SILPHIDAE	*Nicrophorus orbicollis* Say	56	0.035	2	0.020
SILPHIDAE	*Nicrophorus sayi* Laporte	3	0.002	0	0.000
SILPHIDAE	*Oiceoptoma noveboracense* (Forster)	1	0.001	0	0.000
STAPHYLINIDAE - Aleocharinae	sp. C3	1	0.001	0	0.000
STAPHYLINIDAE - Aleocharinae	sp. S09	3	0.002	0	0.000
STAPHYLINIDAE - Aleocharinae	spp. C	9	0.006	13	0.128
STAPHYLINIDAE - Aleocharinae	(Athetini) sp. C2	1	0.001	0	0.000
STAPHYLINIDAE - Aleocharinae	(Athetini) sp. C3	0	0.000	1	0.010
STAPHYLINIDAE - Aleocharinae	(Athetini) sp. C4	0	0.000	1	0.010
STAPHYLINIDAE - Aleocharinae	(Athetini) sp. S01	0	0.000	1	0.010
STAPHYLINIDAE - Aleocharinae	(Athetini) sp. S21	2	0.001	18	0.177
STAPHYLINIDAE - Aleocharinae	(Athetini) sp. S24	1	0.001	3	0.030
STAPHYLINIDAE - Aleocharinae	(Athetini) sp. S25	3	0.002	9	0.089
STAPHYLINIDAE - Aleocharinae	(Athetini) sp. S35	4	0.002	0	0.000
STAPHYLINIDAE - Aleocharinae	(Athetini) sp. S53	0	0.000	2	0.020
STAPHYLINIDAE - Aleocharinae	(Athetini) sp. S59	1	0.001	0	0.000
STAPHYLINIDAE - Aleocharinae	(Oxypodini) sp. S3	0	0.000	1	0.010
STAPHYLINIDAE - Aleocharinae	*Acrotona* sp. C1	0	0.000	1	0.010
STAPHYLINIDAE - Aleocharinae	*Acrotona* sp. S4	0	0.000	9	0.089
STAPHYLINIDAE - Aleocharinae	*Aleochara castaneipennis* Mannerheim	0	0.000	1	0.010
STAPHYLINIDAE - Aleocharinae	*Aleochara curtula* Goeze	0	0.000	24	0.236
STAPHYLINIDAE - Aleocharinae	*Aleochara lata* Gravenhorst	0	0.000	2	0.020
STAPHYLINIDAE - Aleocharinae	*Aleochara sculptiventris* (Casey)	0	0.000	1	0.010
STAPHYLINIDAE - Aleocharinae	*Aleochara thoracica* Casey	0	0.000	2	0.020
STAPHYLINIDAE - Aleocharinae	*Aleochara verna* (Say)	7	0.004	1	0.010
STAPHYLINIDAE - Aleocharinae	*Aloconota sulcifrons* (Stephens)	0	0.000	2	0.020
STAPHYLINIDAE - Aleocharinae	*Amischa analis* (Gravenhorst)	43	0.027	70	0.689
STAPHYLINIDAE - Aleocharinae	*Atheta annexa* (Casey)	0	0.000	1	0.010

STAPHYLINIDAE - Aleocharinae	*Atheta graminicola* (Gravenhorst)	2	0.001	0	0.000
STAPHYLINIDAE - Aleocharinae	*Atheta platanoffi* Brundin	1	0.001	0	0.000
STAPHYLINIDAE - Aleocharinae	*Atheta* prob. *longicornis* (Gravenhorst)	0	0.000	1	0.010
STAPHYLINIDAE - Aleocharinae	*Atheta* sp. S09	0	0.000	3	0.030
STAPHYLINIDAE - Aleocharinae	*Autalia rivularis* Gravenhorst	1	0.001	0	0.000
STAPHYLINIDAE - Aleocharinae	*Cordalia obscura* (Gravenhorst)	1	0.001	0	0.000
STAPHYLINIDAE - Aleocharinae	*Falagria dissecta* Erichson	0	0.000	1	0.010
STAPHYLINIDAE - Aleocharinae	*Gnypeta nigrella* (LeConte)	25	0.015	0	0.000
STAPHYLINIDAE - Aleocharinae	*Gyrophaena* sp. C1	0	0.000	1	0.010
STAPHYLINIDAE - Aleocharinae	*Gyrophaena* sp. S1	0	0.000	1	0.010
STAPHYLINIDAE - Aleocharinae	*Hoplandria laevicollis* (Notman)	0	0.000	1	0.010
STAPHYLINIDAE - Aleocharinae	*Hoplandria lateralis* (Melsheimer)	3	0.002	0	0.000
STAPHYLINIDAE - Aleocharinae	*Liogluta intermedia* Klimaszewsky & Langor	1	0.001	0	0.000
STAPHYLINIDAE - Aleocharinae	*Meronera venustula* (Erichson)	0	0.000	18	0.177
STAPHYLINIDAE - Aleocharinae	*Mocyta fungi* (Gravenhorst)	19	0.012	52	0.512
STAPHYLINIDAE - Aleocharinae	*Mocyta luteola* (Erichson)	1	0.001	2	0.020
STAPHYLINIDAE - Aleocharinae	*Myllaena arcana* Casey	2	0.001	10	0.098
STAPHYLINIDAE - Aleocharinae	*Myllaena* prob. *ludificans* Casey	0	0.000	5	0.049
STAPHYLINIDAE - Aleocharinae	*Myllaena* sp. C1	0	0.000	3	0.030
STAPHYLINIDAE - Aleocharinae	*Myrmecocephalus gatineauensis* Hoebeke	1	0.001	0	0.000
STAPHYLINIDAE - Aleocharinae	*Oxypoda* sp. C1	16	0.010	0	0.000
STAPHYLINIDAE - Aleocharinae	*Oxypoda* sp. S2	1	0.001	0	0.000
STAPHYLINIDAE - Aleocharinae	*Philhygra clemens* Casey	86	0.053	78	0.768
STAPHYLINIDAE - Aleocharinae	*Philhygra* prob. *luridipennis* (Mannerheim)	1	0.001	2	0.020
STAPHYLINIDAE - Aleocharinae	*Philhygra* sp. S5	1	0.001	0	0.000
STAPHYLINIDAE - Aleocharinae	*Philhygra* sp. S6	0	0.000	1	0.010
STAPHYLINIDAE - Aleocharinae	*Philhygra* sp. S8	31	0.019	0	0.000
STAPHYLINIDAE - Aleocharinae	*Phloeopora* sp. S	0	0.000	1	0.010
STAPHYLINIDAE - Aleocharinae	*Placusa* prob. *vaga* Casey	1	0.001	0	0.000
STAPHYLINIDAE - Aleocharinae	*Tachyusa* sp. C	0	0.000	1	0.010
STAPHYLINIDAE - Aleocharinae	*Tachyusa* sp. S	3	0.002	0	0.000
STAPHYLINIDAE - Aleocharinae	*Tetralaucopora americana* (Casey)	0	0.000	1	0.010
STAPHYLINIDAE - Aleocharinae	*Thamiaraea brittoni* (Casey)	1	0.001	0	0.000
STAPHYLINIDAE - Aleocharinae	*Tinotus morion* (Gravenhorst)	2	0.001	1	0.010
STAPHYLINIDAE - Aleocharinae	*Tinotus* prob. *trisectus* Casey	34	0.021	7	0.069
STAPHYLINIDAE - Aleocharinae	*Trichiusa* sp. C1	0	0.000	2	0.020
STAPHYLINIDAE - Micropeplinae	*Micropeplus* sp. C	1	0.001	0	0.000
STAPHYLINIDAE - Omaliinae	*Acidota subcarinata* Erichson	0	0.000	5	0.049

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SUPPLEMENTARY DATA. (Continued).

		LT		FIT	
Family	**Species**	**N**	**%**	**N**	**%**
STAPHYLINIDAE - Omaliinae	*Geodromicus strictus* Fauvel	8	0.005	0	0.000
STAPHYLINIDAE - Omaliinae	*Hapalaraea floralis* (Paykull)	0	0.000	1	0.010
STAPHYLINIDAE - Omaliinae	*Olophrum consimile* (Gyllenhal)	1	0.001	0	0.000
STAPHYLINIDAE - Omaliinae	*Olophrum obtectum* Erichson	2	0.001	6	0.059
STAPHYLINIDAE - Osoriinae	*Thoracophorus costalis* (Erichson)	3	0.002	0	0.000
STAPHYLINIDAE - Oxytelinae	*Anotylus insignitus* (Gravenhorst)	57	0.035	0	0.000
STAPHYLINIDAE - Oxytelinae	*Anotylus* prob. *suspectus* (Casey)	0	0.000	1	0.010
STAPHYLINIDAE - Oxytelinae	*Anotylus rugosus* (Fabricius)	3391	2.093	17	0.167
STAPHYLINIDAE - Oxytelinae	*Anotylus tetracarinatus* (Block)	64	0.040	0	0.000
STAPHYLINIDAE - Oxytelinae	*Apocellus sphaericollis* (Say)	1	0.001	6	0.059
STAPHYLINIDAE - Oxytelinae	*Bledius analis* LeConte	8	0.005	0	0.000
STAPHYLINIDAE - Oxytelinae	*Bledius aquilonarius* Herman	2	0.001	0	0.000
STAPHYLINIDAE - Oxytelinae	*Bledius emarginatus* (Say)	285	0.176	0	0.000
STAPHYLINIDAE - Oxytelinae	*Bledius gallicus* (Gravenhorst)	2060	1.272	0	0.000
STAPHYLINIDAE - Oxytelinae	*Bledius* sp. S1	619	0.382	0	0.000
STAPHYLINIDAE - Oxytelinae	*Bledius* sp. S3	490	0.302	1	0.010
STAPHYLINIDAE - Oxytelinae	*Bledius tau* LeConte	4	0.002	0	0.000
STAPHYLINIDAE - Oxytelinae	*Bledius viriosus* Herman	9	0.006	1	0.010
STAPHYLINIDAE - Oxytelinae	*Carpelimus quadripunctatus* (Say)	2706	1.670	1	0.010
STAPHYLINIDAE - Oxytelinae	*Carpelimus* sp. C1	1	0.001	0	0.000
STAPHYLINIDAE - Oxytelinae	*Carpelimus* sp. S01	1729	1.067	23	0.226
STAPHYLINIDAE - Oxytelinae	*Carpelimus* sp. S02	0	0.000	7	0.069
STAPHYLINIDAE - Oxytelinae	*Carpelimus* sp. S03	281	0.173	1	0.010
STAPHYLINIDAE - Oxytelinae	*Carpelimus* sp. S05	432	0.267	0	0.000
STAPHYLINIDAE - Oxytelinae	*Carpelimus* sp. S06	48	0.030	0	0.000
STAPHYLINIDAE - Oxytelinae	*Carpelimus* sp. S07	27	0.017	0	0.000
STAPHYLINIDAE - Oxytelinae	*Carpelimus* sp. S08	12	0.007	0	0.000
STAPHYLINIDAE - Oxytelinae	*Carpelimus* sp. S09	95	0.059	12	0.118
STAPHYLINIDAE - Oxytelinae	*Carpelimus* sp. S10	381	0.235	0	0.000
STAPHYLINIDAE - Oxytelinae	*Carpelimus* sp. S11	40	0.025	1	0.010
STAPHYLINIDAE - Oxytelinae	*Deleaster dichrous* (Gravenhorst)	434	0.268	2	0.020
STAPHYLINIDAE - Oxytelinae	*Ochthephilus planus* (LeConte)	6	0.004	0	0.000
STAPHYLINIDAE - Oxytelinae	*Oxytelus incisus* Motschulsky	16	0.010	0	0.000
STAPHYLINIDAE - Oxytelinae	*Oxytelus laqueatus* (Marsham)	2	0.001	2	0.020
STAPHYLINIDAE - Oxytelinae	*Oxytelus sculptus* Gravenhorst	6	0.004	1	0.010

STAPHYLINIDAE - Oxytelinae	*Platystethus degener* Mulsant & Rey	3	0.002	8	0.079
STAPHYLINIDAE - Oxytelinae	*Thinobius* sp. C1	5	0.003	0	0.000
STAPHYLINIDAE - Paederinae	*Achenomorphus corticinus* (Gravenhorst)	464	0.286	3	0.030
STAPHYLINIDAE - Paederinae	*Homaeotarsus badius* (Gravenhorst)	29	0.018	0	0.000
STAPHYLINIDAE - Paederinae	*Homaeotarsus bicolor* (Gravenhorst)	44	0.027	0	0.000
STAPHYLINIDAE - Paederinae	*Homaeotarsus cinctus* (Say)	1	0.001	0	0.000
STAPHYLINIDAE - Paederinae	*Lathrobium armatum* Say	13	0.008	0	0.000
STAPHYLINIDAE - Paederinae	*Lathrobium nigrum* LeConte	4	0.002	0	0.000
STAPHYLINIDAE - Paederinae	*Lathrobium* sp. C	1	0.001	0	0.000
STAPHYLINIDAE - Paederinae	*Lithocharis ochracea* (Gravenhorst)	1044	0.644	33	0.325
STAPHYLINIDAE - Paederinae	*Lithocharis thoracica* (Casey)	1	0.001	0	0.000
STAPHYLINIDAE - Paederinae	*Lobrathium collare* (Erichson)	75	0.046	0	0.000
STAPHYLINIDAE - Paederinae	*Lobrathium grande* (LeConte)	2	0.001	0	0.000
STAPHYLINIDAE - Paederinae	*Medon fusculus* (Mannerheim)	0	0.000	1	0.010
STAPHYLINIDAE - Paederinae	*Pseudolathra ambigua* (LeConte)	506	0.312	1	0.010
STAPHYLINIDAE - Paederinae	*Rugilus ceylanensis* (Kraatz)	3	0.002	1	0.010
STAPHYLINIDAE - Paederinae	*Rugilus fragilis* (Gravenhorst)	0	0.000	2	0.020
STAPHYLINIDAE - Paederinae	*Rugilus rufipes* Germar	0	0.000	5	0.049
STAPHYLINIDAE - Paederinae	*Scopaeus* spp. C	3	0.002	5	0.049
STAPHYLINIDAE - Pselaphinae	*Batrisodes frontalis* (LeConte)	0	0.000	2	0.020
STAPHYLINIDAE - Pselaphinae	*Decarthron abnorme* (LeConte)	12	0.007	0	0.000
STAPHYLINIDAE - Pselaphinae	*Eutrichites zonatus* (Brendel)	119	0.073	0	0.000
STAPHYLINIDAE - Pselaphinae	*Pilopius piceus* (LeConte)	3	0.002	0	0.000
STAPHYLINIDAE - Pselaphinae	*Reichenbachia* sp. C	7	0.004	1	0.010
STAPHYLINIDAE - Pselaphinae	*Rybaxis* prob. *varicornis* Brendel	5	0.003	1	0.010
STAPHYLINIDAE - Pselaphinae	*Rybaxis* sp. C1	1	0.001	0	0.000
STAPHYLINIDAE - Scaphidiinae	*Scaphisoma convexum* (Say)	0	0.000	2	0.020
STAPHYLINIDAE - Scaphidiinae	*Scaphisoma lacustris* (Casey)	5	0.003	6	0.059
STAPHYLINIDAE - Scydmaeninae	*Euconnus* sp. S	1	0.001	0	0.000
STAPHYLINIDAE - Staphylininae	*Acylophorus* prob. *pronus* Erichson	0	0.000	7	0.069
STAPHYLINIDAE - Staphylininae	*Bisnius blandus* (Gravenhorst)	0	0.000	2	0.020
STAPHYLINIDAE - Staphylininae	*Bisnius* prob. *sordidus* (Gravenhorst)	0	0.000	1	0.010
STAPHYLINIDAE - Staphylininae	*Erichsonius nanus* (Horn)	2	0.001	5	0.049
STAPHYLINIDAE - Staphylininae	*Erichsonius pusio* (Horn)	0	0.000	2	0.020
STAPHYLINIDAE - Staphylininae	*Gabrius subnigritulus* (Reitter)	9	0.006	10	0.098
STAPHYLINIDAE - Staphylininae	*Heterothops pusio* LeConte	2	0.001	0	0.000
STAPHYLINIDAE - Staphylininae	*Neobisnius jucundus* (Horn)	1	0.001	1	0.010
STAPHYLINIDAE - Staphylininae	*Neobisnius sobrinus* (Erichson)	143	0.088	23	0.226

(Continued on next page)

SUPPLEMENTARY DATA. (Continued).

Family	Species	LT		FIT	
		N	%	N	%
STAPHYLINIDAE - Staphylininae	*Neobisnius terminalis* (LeConte)	7	0.004	0	0.000
STAPHYLINIDAE - Staphylininae	*Ontholestes cingulatus* (Gravenhorst)	0	0.000	2	0.020
STAPHYLINIDAE - Staphylininae	*Philonthus blossius* Smetana	40	0.025	3	0.030
STAPHYLINIDAE - Staphylininae	*Philonthus carbonarius* (Gravenhorst)	4	0.002	132	1.299
STAPHYLINIDAE - Staphylininae	*Philonthus cognatus* Stephens	0	0.000	6	0.059
STAPHYLINIDAE - Staphylininae	*Philonthus cruentatus* (Gmelin)	0	0.000	1	0.010
STAPHYLINIDAE - Staphylininae	*Philonthus cyanipennis* (Fabricius)	0	0.000	5	0.049
STAPHYLINIDAE - Staphylininae	*Philonthus debilis* (Gravenhorst)	1	0.001	0	0.000
STAPHYLINIDAE - Staphylininae	*Philonthus lomatus* Erichson	0	0.000	10	0.098
STAPHYLINIDAE - Staphylininae	*Philonthus* prob. *jurgans* (Tottenham)	0	0.000	1	0.010
STAPHYLINIDAE - Staphylininae	*Philonthus pseudolodes* Smetana	166	0.102	0	0.000
STAPHYLINIDAE - Staphylininae	*Philonthus quadricollis* Horn	3	0.002	0	0.000
STAPHYLINIDAE - Staphylininae	*Philonthus rectangulus* Sharp	0	0.000	1	0.010
STAPHYLINIDAE - Staphylininae	*Philonthus rufulus* Horn	252	0.156	0	0.000
STAPHYLINIDAE - Staphylininae	*Philonthus sericans* (Gravenhorst)	0	0.000	3	0.030
STAPHYLINIDAE - Staphylininae	*Philonthus* spp. C	0	0.000	7	0.069
STAPHYLINIDAE - Staphylininae	*Philonthus umbratilis* (Gravenhorst)	58	0.036	2	0.020
STAPHYLINIDAE - Staphylininae	*Philonthus validus* Casey	0	0.000	1	0.010
STAPHYLINIDAE - Staphylininae	*Philonthus varians* (Paykull)	0	0.000	17	0.167
STAPHYLINIDAE - Staphylininae	*Philonthus vulgatus* Casey	88	0.054	0	0.000
STAPHYLINIDAE - Staphylininae	*Platydracus cinnamopterus* (Gravenhorst)	0	0.000	2	0.020
STAPHYLINIDAE - Staphylininae	*Quedius curtipennis* Bernhauer	0	0.000	2	0.020
STAPHYLINIDAE - Staphylininae	*Quedius molochinus* (Gravenhorst)	0	0.000	1	0.010
STAPHYLINIDAE - Steninae	*Stenus erythropus* Melsheimer	0	0.000	2	0.020
STAPHYLINIDAE - Steninae	*Stenus flavicornis* Erichson	0	0.000	1	0.010
STAPHYLINIDAE - Steninae	*Stenus lustrator* Erichson	0	0.000	3	0.030
STAPHYLINIDAE - Tachyporinae	*Coproporus ventriculus* (Say)	0	0.000	1	0.010
STAPHYLINIDAE - Tachyporinae	*Lordithon anticus* (Horn)	0	0.000	1	0.010
STAPHYLINIDAE - Tachyporinae	*Lordithon appalachianus* Campbell	0	0.000	1	0.010
STAPHYLINIDAE - Tachyporinae	*Sepedophilus littoreus* (Linnaeus)	2	0.001	0	0.000
STAPHYLINIDAE - Tachyporinae	*Sepedophilus marshami* (Stephens)	0	0.000	2	0.020
STAPHYLINIDAE - Tachyporinae	*Tachinus rufipes* (DeGeer)	0	0.000	4	0.039
STAPHYLINIDAE - Tachyporinae	*Tachyporus dispar* (Paykull)	0	0.000	7	0.069
STAPHYLINIDAE - Tachyporinae	*Tachyporus transversalis* Gravenhorst	0	0.000	1	0.010
STAPHYLINIDAE - Xantholininae	*Atrecus americanus* (Casey)	0	0.000	1	0.010

STAPHYLINIDAE - Xantholininae	*Gyrohypnus angustatus* Stephens	2	0.001	3	0.030
STAPHYLINIDAE - Xantholininae	*Leptacinus intermedius* Donisthorpe	1	0.001	1	0.010
STAPHYLINIDAE - Xantholininae	*Oxybleptes kiteleyi* Smetana	0	0.000	1	0.010
STAPHYLINIDAE - Xantholininae	*Xantholinus linearis* (Olivier)	0	0.000	6	0.059
STENOTRACHELIDAE	*Cephaloon lepturoides* Newman	0	0.000	1	0.010
TENEBRIONIDAE	*Blapstinus metallicus* (Fabricius)	0	0.000	1	0.010
TENEBRIONIDAE	*Cynaeus angustus* (LeConte)	5	0.003	0	0.000
TENEBRIONIDAE	*Hymenorus* prob. *pilosus* (Melsheimer)	1	0.001	0	0.000
TENEBRIONIDAE	*Isomira quadristriata* (Couper)	5	0.003	0	0.000
TENEBRIONIDAE	*Mycetochara fraterna* (Say)	4	0.002	0	0.000
TENEBRIONIDAE	*Paratenetus* sp. S	0	0.000	1	0.010
TENEBRIONIDAE	*Tenebrio molitor* Linnaeus	1	0.001	0	0.000
TENEBRIONIDAE	*Tribolium castaneum* (Herbst)	2	0.001	0	0.000
THROSCIDAE	*Aulonothroscus* sp. C	0	0.000	1	0.010
THROSCIDAE	*Trixagus carinicollis* (Schaeffer)	1	0.001	1	0.010
THROSCIDAE	*Trixagus chevrolati* (Bonvouloir)	2503	1.545	220	2.166
Number of Individuals		**162001**	100.000	**10159**	100.000
Number of Species		560		468	