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An annotated checklist of Wisconsin sap and short-winged flower beetles (Coleoptera: Nitidulidae, Kateretidae)

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Abstract: A survey of Wisconsin Nitidulidae and Kateretidae yielded 78 species through analysis of literature records, museum and private collections, and three years of field research (2000-2002). Twenty-seven species (35% of the Wisconsin fauna) represent new state records, having never been previously recorded from the state. Wisconsin distribution, along with relevant collecting techniques and natural history information, are summarized. The Wisconsin nitidulid and kateretid faunas are compared to reconstructed and updated faunal lists for Illinois, Indiana, Michigan, Minnesota, Ohio, and south-central Canada. Literature and distributional records suggest at least 11 additional nitidulid species may occur in Wisconsin.

Introduction

Nitidulidae and Kateretidae represent taxonomically and ecologically diverse groups of beetles. Nitidulidae, the “sap” or “picnic” beetles, is a moderately large family with 3,000+ species in about 271 genera worldwide (Kirejtshuk 1998). In North America, this family has 30 genera and 165 species (Habeck 2002b). Kateretidae (= Brachypteridae), the “short-winged flower beetles”, consists of fewer than 100 species worldwide (Audisio 1993). In North America, the 12 kateretid species are circumscribed by seven genera (Habeck 2002a).

Despite immense species diversity, economic as well as ecological significance, and a phenomenal array of feeding strategies, few thorough faunal surveys exist for Nitidulidae and Kateretidae of the United States. Vogt (1950) documented occurrences of nitidulid and kateretid species in Maryland, including nitidulid species occurring at sap flows. Vogt (1951) recorded nitidulid occurrences in Florida and southern Texas. Curl (1953) identified nitidulids on oak wilt mats in Illinois. Connell (1956) surveyed the Nitidulidae of Delaware, however, the work focused on the single genus *Carpophilus*. Daugherty and Brett (1966) observed Nitidulidae associated with sweet corn in North Carolina. Skalbeck (1976), as part of a PhD thesis, discussed the distribution of Nitidulidae in deciduous forests of Minnesota. Recent publications from Ohio have focused on sap beetle attraction to various fermenting baits, in relation to agricultural applications and surroundings (Peng and Williams 1991, Williams *et al.* 1992, Williams *et al.* 1994, Blackmer and Phelan 1995, Williams *et al.*

1997). Juzwik *et al.* (1999) and Cease and Juzwik (2001) conducted studies to determine which nitidulid species frequent tree wounds and oak wilt mats in Minnesota. Several general beetle reviews including nitidulids and kateretids have been conducted for individual states or subdivisions thereof (e.g. Dury 1902 for Cincinnati, Ohio, Blatchley 1910 for Indiana, Peck and Thomas 1998 for Florida) or entire regions (e.g. Hatch 1961 for the Pacific Northwest, McNamara 1991 for Canada, Downie and Arnett 1996 for the Northeastern United States).

In Wisconsin, Rauterberg (1888) recorded a portion of the Coleoptera of Wisconsin collected in the Milwaukee vicinity, including familiar nitidulid and kateretid species. McMullen *et al.* (1960) collected nitidulids from the mycelial mats of oak wilt fungus, *Ceratocystis fagacearum* (Bretz) Hunt, and tried to determine which species could transmit the fungus to tree wounds. McMullen and Shenefelt (1961) reported using fermenting banana bait to collect nitidulids from Dane, Marathon, and Wood counties. Katovich and Ostry (1998) surveyed insects associated with butternut trees and the fungus, *Sirococcus claviginenti-juglandacearum* Nair, Kostichka, and Kuntz in Wisconsin and Minnesota. Until now, however, no comprehensive studies of Wisconsin's nitidulid and kateretid diversity, life histories, and distributions have been conducted.

Materials and Methods

At the onset of this survey, literature records as well as museum and private collections were examined to determine which nitidulid and kateretid spe-

cies had previously been collected in Wisconsin. The following museum and private collections were reviewed for Wisconsin records: Field Museum of Natural History (FMNH), Florida State Collection of Arthropods (FSCA), University of Wisconsin-Madison Insect Research Collection (WIRC), and private collections of Dale Habeck and Annette Phibbs. Field survey work focused on historically under-sampled regions and unique Wisconsin habitats (e.g. oak savanna, hemlock forest). A variety of trapping methods was used to collect nitidulids and kateretids, including baited and unbaited Lindgren funnel traps, banana traps (McMullen and Schenefelt 1961), black-light traps, cantaloupe traps, flight intercept traps, Malaise traps, and pitfall traps. Baits used with Lindgren funnel traps included brown sugar and yeast solution, whole wheat bread dough, and rotting bananas (Williams *et al.* 1994, Blackmer and Phelan 1995, Collison, personal communication). During the second field season, the whole wheat bread dough bait was replaced by rotting bananas to decrease numbers of ubiquitous species such as *Glischrochilus quadrisignatus* (Say) and species of Silphidae. In addition to trapping, nitidulids and kateretids were collected by hand from ant colonies, carrion, dung, flowers, fungi, rotting fruit, and wood. Specimens were also obtained from sweep net and leaf litter samples. The following ongoing surveys in conjunction with the WIRC also provided Wisconsin specimen records: Wisconsin Department of Natural Resources (WDNR) projects, Hemlock Draw (TNC) Survey, Fort McCoy inventory project, and Necedah National Wildlife Refuge inventory project.

Results

Four genera and five species of Kateretidae, and 22 genera and 73 species of Nitidulidae are now known to occur in Wisconsin. Specimen data were entered into the relational biodiversity database software, BIOTA™ (Colwell, 1996), and voucher specimens have been deposited in the WIRC and in Michele B. Price's collection (MBPC).

Although a variety of trapping methods was used to sample nitidulids, baited Lindgren funnel traps, flight intercept traps, cantaloupe traps, and banana traps (McMullen and Schenefelt 1961) yielded the most specimens and species. Kateretids were mainly collected by hand from flowers.

The arrangement of families and subfamilies follows the phylogeny proposed by Kirejtshuk (1982, 1986, 1998); kateretid genera follow Audisio (1993). Due to the state of flux of nitiduline genera (e.g.

Audisio 1993, Kirejtshuk 1998, Leschen 1999) we have deferred to the arrangement of Parsons (1943). Cryptarchine genera follow the order proposed by Parsons (1943) and modified by Audisio (1993). Species are listed in alphabetical order.

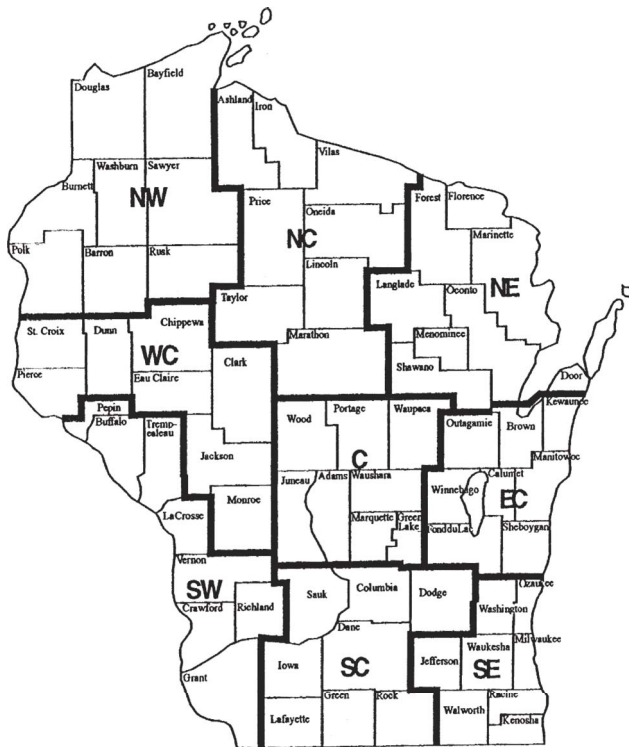
In the following checklist of Wisconsin Nitidulidae and Kateretidae, the **27 new state species records are indicated in boldface**. Species previously recorded in the literature from Wisconsin are followed by the relevant literature reference. To simplify county associations, Wisconsin has been divided into nine, 8-county regions (Map 1, after Kriska and Young 2002, and Hilsenhoff 1995). Life history, phenological, and trapping information pertain solely to adult Wisconsin nitidulid and kateretid records and have been extracted directly from labels accompanying specimens. Thus, in reporting plant, fungal, and animal associations, we report the data as indicated by specimen labels, only. In some cases, the above mentioned are recorded by Latin binomial and author (e.g., under the bark of *Acer negundo* Linnaeus), while in other cases, a common vernacular is used (e.g., under bark of oak). While some species were active at night, a behavior characteristic of nitidulids at sap flows, most were collected during the day. Many phenologies are likely artifacts of sampling activity. We still lack sound natural history information for some species in Wisconsin.

KATERETIDAE Erichson

***Kateretes pusillus* (Thunberg)** – The single specimen examined from Wisconsin was collected from *Spirea* sp. July. WC: Jackson.

***Heterhelus abdominalis* (Erichson)** – Rauterberg (1888) collected this species with a sweep net. We recorded it from flowers of *Cicuta maculata* Linnaeus, *Prunus americana* Marshall, *Sambucus canadensis* Linnaeus, *Veronicastrum virginicum* (Linnaeus) Farwell; one specimen was collected from a Lindgren funnel baited with banana and fermenting brown sugar in mixed hardwood forest. April-July. WC: Chippewa, Jackson; SW: Grant SC: Columbia, Dane, Lafayette, Sauk.

***Heterhelus sericans* (LeConte)** – Our records include branches and flowers of *Sambucus pubens* Michaux, on flowers of *Prunus* sp., and *S. canadensis* flowers. April and May. NE: Florence; SC: Columbia, Dane.



Map 1. Regions of Wisconsin (after Kriska and Young 2002, and Hilsenhoff 1995).

Brachypterus urticae (Fabricius) – Rauterberg (1888) collected this species on nettles. We add the following: from sweep net, in flight intercept traps, and on the following flowering plants: *Aster* sp., *Eupatorium rugosum* Houttuyn, *Fraxinus nigra* Marshall, *Laportea canadensis* (Linnaeus) Weddell, *Solidago ulmifolia* Muhlenberg ex Willdenow, and *Urtica gracilis* Aiton. Mesic hardwood forest. June- November. **NW:** Polk; **WC:** Chippewa; **C:** Green Lake, Marquette, Waupaca; **SW:** Grant, Richland; **SC:** Columbia, Dane, Sauk; **SE:** Washington.

Brachyterolus pulicarius (Linnaeus) – Dodge (1937) documented this species on flowers of *Smilacina racemosa* (Linnaeus) Desfontaines and *Prunus virginiana* Linnaeus. We add the following associations: flight intercept traps, nectaring on flowers of *Asclepias ovalifolia* Decaisne, on flowers of *Berteroia incana* (Linnaeus) DeCandolle, on *Linaria vulgaris* Miller, on flowers of raspberry, and in sweep net. Sand prairie. May-September. **NW:** Burnett; **NC:** Oneida; **NE:** Door, Shawano; **WC:** Eau Claire; **C:** Marquette, Portage; **EC:** Fond Du Lac; **SW:** La Crosse; **SC:** Columbia, Dane, Rock, Sauk; **SE:** Kenosha.

NITIDULIDAE Latreille

Epuraeinae Kirejtshuk

Epuraea aestiva (Linnaeus) – Recovered from flight intercept traps and Lindgren funnel traps baited with banana and fermenting brown sugar. Northern and southern mesic forests. May-August. **NW:** Washburn; **WC:** Monroe; **C:** Waupaca; **SC:** Dane, Lafayette.

Epuraea alternata Parsons – McMullen and Shenefelt (1961) collected this species from banana traps. We took it at Lindgren funnel traps baited with banana and fermenting brown sugar, malt/yeast, and rotting apples, peaches, and pears. Pine/oak/maple forests and southern mesic hardwood forests. June-September. **NE:** Shawano; **C:** Marquette; **SW:** Crawford; **SC:** Dane, Lafayette.

Epuraea avara (Randall) – Rauterberg (1888) collected this species with a sweep net; McMullen et al. (1960) sampled it on oak wilt mycelial mats and at tree wounds of healthy *Quercus ellipsoidalis* Hill; McMullen and Shenefelt (1961) recovered it from banana traps. We sampled it at light traps, Lindgren funnel traps baited with banana and fermenting brown sugar, and under the bark of *Acer negundo* Linnaeus. Hemlock forest, northern wet-mesic forest, pine/oak/maple forest, and southern mesic hardwood forest. April-September. **NW:** Sawyer, Washburn; **NC:** Marathon, Oneida; **NE:** Florence; **C:** Juneau, Marquette, Wood; **EC:** Fond du Lac; **SC:** Green, Lafayette.

Epuraea corticina Erichson – Rauterberg (1888) collected this species with a sweep-net; McMullen et al. (1960) associated it with oak wilt mycelial mats; McMullen and Shenefelt (1961) found it at banana traps. McMullen collected a larva on an oak wilt mat in September, and the adult emerged in November (Parsons 1969). Our collections came from light traps and Lindgren funnel traps baited with fermenting brown sugar and banana. Northern wet-mesic forest, sand oak barrens and southern mesic hardwood forest. May-September. **NW:** Sawyer; **C:** Juneau, Wood; **SW:** Richland; **SC:** Lafayette.

Epuraea erichsoni Reitter – McMullen et al. (1960) collected this species from tree wounds of healthy *Q. ellipsoidalis*. We recorded a variety of associations including: on wounded *Populus* sp. and *Quercus* sp. with *Epuraea terminalis* Mannerheim, on beaver-

chewed birch or aspen, on *Populus grandidentata* Michaux, under the bark of an oak tree struck by lightning the night before, under the bark of *A. negundo*, on flowers of *Prunus* spp., on flowers of *Tanacetum vulgare* Linnaeus, and in light traps. Northern and southern mesic forests. May-September. **NW:** Barron, Burnett, Douglas, Sawyer, Washburn; **NE:** Florence; **WC:** Monroe; **C:** Adams, Juneau, Portage, Wood; **SW:** Richland; **SC:** Columbia, Dane, Green, Lafayette, Sauk; **SE:** Kenosha, Milwaukee, Ozaukee.

***Epuraea flavomaculata* Mäklin** – We recovered this species from an ethanol-baited Lindgren funnel trap in a wood yard, and in flight intercept trap. Northern mesic forest. July. **NE:** Florence, Forest.

***Epuraea helvola* Erichson** – McMullen and Shenefelt (1961) collected this species from banana traps. Our samples came from barrier pitfall traps, apple traps, banana traps, culture traps, flight intercept traps, and malt/yeast traps. We also collected specimens feeding within pores in the cap of a bolete fungus (most likely in the genus *Boletus*) growing in the sand near oak trees, and with a series of *Pallodes austrinus* Leschen from a gilled mushroom growing on sandy soil. Dry northern mesic hardwood forests, oak-pine forests, and sandy oak barrens. May-September. **NC:** Marathon; **WC:** Monroe; **C:** Juneau, Wood; **SW:** Richland; **SC:** Columbia, Dane, Iowa, Sauk.

***Epuraea labilis* Erichson** – McMullen and Shenefelt (1961) collected this species from banana traps. Our material came from a wide variety of traps and associations, including: flight intercept traps, at light, in Lindgren funnel traps baited with brown sugar and banana, in can baited with red and white pine sections, on driftwood, under bark, on the underside of a moldy dark red shelf fungus [either *Ganoderma lucidum* (Leysser ex Fries) Karst or *Ganoderma tsugae* Murrill], on inflorescence of *Solidago* sp., and on flowers of *Prunus* sp. Northern and southern mesic hardwood forests. April-September. **NW:** Douglas, Polk, Sawyer; **NE:** Florence, Oconto, Shawano; **WC:** Eau Claire, Jackson, Monroe; **C:** Waupaca, Wood; **EC:** Fond du Lac; **SC:** Green, Lafayette, Sauk; **SE:** Walworth, Waukesha.

***Epuraea linearis* Mäklin** – We collected specimens at light traps in wooded habitats. June and August. **C:** Wood; **SC:** Dane.

***Epuraea obliquus* Hatch** – Parsons (1967) reported one specimen collected from wilted *Q. ellipsoidalis*. Our samples came from a Lindgren funnel trap baited with banana and fermenting brown sugar, in oak/pine/maple forest, and from a Malaise trap. May-November. **NW:** Bayfield; **C:** Marquette, Wood.

***Epuraea ovata* Horn** – Specimens were recovered from flight intercept traps set near fallen trees and from a Malaise trap. Southern mesic hardwood forest and oak-pine savanna. April to July. **WC:** Monroe; **SC:** Green.

***Epuraea parsonsi* Connell** – A light trap and a Malaise trap provided specimens of this species. July and August. **NW:** Bayfield; **C:** Wood.

***Epuraea peltoides* Horn** – Parsons (1943) first recorded this species from Wisconsin; McMullen and Shenefelt (1961) collected it at banana traps. We collected it at Lindgren funnel traps baited with banana and fermenting brown sugar, from rotting peaches, and at wounded hardwood trees. April-October. **NW:** Barron, Burnett, Douglas, Polk, Sawyer, Washburn; **NC:** Marathon; **NE:** Forest, Oconto, Shawano; **WC:** Monroe; **C:** Juneau, Marquette, Waupaca, Wood; **EC:** Sheboygan, Winnebago; **SW:** Grant, Richland; **SC:** Columbia, Dane, Green, Iowa Lafayette, Sauk; **SE:** Waukesha.

***Epuraea planulata* Erichson** – McMullen and Shenefelt (1961) collected this species from banana traps. Our material came from Lindgren funnel traps baited with either banana and fermenting brown sugar, or ethanol. Northern mesic and northern wet-mesic forests. April-July. **NW:** Bayfield, Sawyer; **NC:** Oneida; **C:** Wood.

***Epuraea populi* Dodge** – The single specimen examined from Wisconsin was accompanied by no ecological data. June. **NE:** Oconto.

***Epuraea rufa* (Say)** – Rauterberg (1888) collected this species with a sweep-net, while McMullen and Shenefelt (1961) collected it at banana traps. Our samples came from leaf litter samples, light traps, tree bark, as well as on or near driftwood along various beaches. Sandy oak barrens, dry southern mesic hardwood forests, dry northern mesic hardwood forests, Lake Michigan and Superior beaches, and oak savannas. February-December. **NW:** Barron, Bayfield, Polk; **NE:** Shawano; **WC:** Eau Claire, Monroe; **C:** Wood; **EC:** Sheboygan; **SW:** Grant, Richland;

SC: Dane, Green, Iowa, Lafayette, Rock, Sauk; **SE:** Kenosha, Racine, Walworth.

Epuraea rufida (Melsheimer) – Rauterberg (1888) collected this species with sweep-net; we recovered it from flight intercept traps in southern mesic hardwood forests. May-June. **SC:** Green, Lafayette.

Epuraea rufomarginata (Stephens) – Parsons (1967) reported this species at bait traps and light traps. We found one specimen in a flight intercept trap in oak savanna; another was collected from a Lindgren funnel trap sample near a *P. strobilus* that had been struck by lightning. June-August. **WC:** Monroe; **C:** Wood.

Epuraea terminalis Mannerheim – Parsons (1943) first recorded the species from Wisconsin; McMullen et al. (1960) collected it from oak wilt mycelial mats. Our records include: light traps, on wounded *Populus* sp. and *Quercus* sp. (commonly with *E. erichsoni*), on beaver-chewed *P. grandidentata*, under the bark of an oak tree struck by lightning the night before, on driftwood from a Lake Superior beach, and on rotting fruit. June-September. **NW:** Bayfield, Burnett, Douglas; **NC:** Oneida, Vilas; **NE:** Florence, Forest, Shawano; **C:** Marquette, Portage, Waupaca, Wood.

Epuraea truncatella Mannerheim – Our samples came from light traps, a Lindgren funnel trap baited with fermenting brown sugar and banana, a Malaise trap, under the bark of recently dead *Pinus* sp., from *P. strobilus*, and from *Pinus contorta* var. *latifolia* Watson. Forested habitats, usually in the presence of pine. April-October. **NC:** Oneida; **NE:** Florence; **C:** Marquette, Wood; **SC:** Sauk.

Epuraea umbrosa Horn – Our specimens were collected from *Spirea* sp. and from a flight intercept trap in a dry mesic northern hardwood forest. July-August. **WC:** Eau Claire, Jackson.

Carpophilinae Erichson

Carpophilus antiquus Melsheimer – We recovered this species from flight intercept traps, the underside of a rock, a Lindgren funnel trap baited with banana and fermenting brown sugar, a rotting fruit pile, and from the underside of driftwood. Sandy oak barrens and southern mesic hardwood forest, sand prairie, recently pastured limey prairie, and along a Lake Michigan beach. April-October. **SW:**

Grant; **SC:** Green, Iowa, Lafayette, Rock, Sauk; **SE:** Kenosha.

Carpophilus brachypterus (Say) – Rauterberg (1888) documented “swarms” of specimens on willow catkins; Pellitteri and Boush (1983) collected five specimens from Wisconsin grain mills. Our material came from a wide variety of traps and floral associations including: flight intercept traps, Lindgren funnel traps baited with banana and fermenting brown sugar, banana trap, barrier pitfall trap (unbaited), cantaloupe trap, human dung/malt/molasses pitfall trap, Lindgren funnel trap (unbaited), Lindgren funnel trap baited with fermenting brown sugar and bread dough, Lindgren funnel trap baited with ipsdienol, sweep net, Townes Malaise trap, yellow pan trap, flowers of *P. americana* and *P. virginiana*, feeding and mating on flowers of *Antennaria neglecta* Greene, feeding on flowers of *Eupatorium rugosum* Houttuyn, flowers of apple, and flowers of malvaceous plants, leaf litter samples, rotting fruit piles, recently cut hardwood trees, the underside of driftwood, raspberry fruit, white and scotch pine, and on *Salix* sp. Cranberry marsh (near honey bee hives), Lake Michigan Beach, lakeshore dunes, native prairie, northern dry forest, oak/maple/pine forest, oak savanna, pine/oak barrens, sandy prairie, sand barrens, and southern mesic hardwood forest. April-October; one specimen was collected on 14 February in a leaf litter sample. **NW:** Burnett, Douglas, Polk; **NE:** Oconto, Shawano; **WC:** Eau Claire, Jackson, Monroe, St. Croix; **C:** Juneau, Marquette; **EC:** Brown, Sheboygan; **SW:** Grant, Richland, Vernon; **SC:** Columbia, Dane, Green, Iowa, Lafayette, Rock, Sauk; **SE:** Jefferson, Kenosha, Ozaukee, Racine, Walworth, Waukesha.

Carpophilus corticinus Erichson – Our samples came from Lindgren funnel traps baited with banana and brown sugar, cantaloupe traps, flight intercept traps, Lindgren funnel traps baited with brown sugar and bread dough, banana baited traps, flowers of *P. americana*, recently cut stumps/sawdust of *Acer* sp., in/under moist scat on fallen tree, and under bark of fallen tree. Dry mesic hardwood forest, field near honey bee hives, northern mesic forest, oak/maple/pine forest, oak sand barrens, oak savanna, and southern mesic hardwood forest. April-October. **WC:** Eau Claire; **C:** Marquette; **SW:** Grant Richland; **SC:** Columbia, Green, Lafayette, Sauk; **SE:** Ozaukee, Racine.

Carpophilus freemani Dobson – Specimens were recovered at flight intercept traps, Lindgren funnel

traps baited with banana and fermenting brown sugar, cantaloupe traps, and Lindgren funnel traps baited with fermenting brown sugar and bread dough. Sand prairie, dry mesic northern hardwood forest, cranberry marsh near honey bee hives, field near honey bee hives, northern mesic forest, oak/maple/pine forest, sandy oak barrens, and southern mesic hardwood forest. April-October. **NW:** Polk; **NE:** Forest, Oconto; **WC:** Monroe; **C:** Marquette, Wood; **EC:** Winnebago; **SW:** Richland; **SC:** Dane, Green, Lafayette, Rock, Sauk; **SE:** Walworth.

Carpophilus hemipterus (Linnaeus) – McMullen *et al.* (1960) collected this species from oak wilt mycelial mats; McMullen and Shenefelt (1961) collected it at banana traps. It was also one of the most abundant nitidulid species collected in Wisconsin grain mills by Pellitteri and Boush (1983). Our collections came from baited Lindgren funnel traps (baited with either fermenting brown sugar and bread dough or banana and fermenting brown sugar), cantaloupe traps, flight intercept traps, hand collected from bark, a rotting fruit pile, a fermenting hardwood stump, old honey comb, rotting peaches, and from rotting tomatoes. Field near honey bee hives, near sand prairie, northern dry forest, northern mesic forest, pine/oak barrens, and sandy oak barrens. April-November. **NW:** Burnett, Douglas, Polk; **NE:** Forest, Marinette, Shawano; **WC:** Eau Claire, Jackson, Monroe; **C:** Waupaca, Wood; **EC:** Winnebago; **SW:** Richland; **SC:** Dane, Iowa, Rock, Sauk; **SE:** Jefferson, Kenosha, Washington.

Carpophilus lugubris Murray – Yero (1957) first recorded this species from Wisconsin. Our samples came from Lindgren funnel traps, baited with either fermenting brown sugar and bread dough or banana and fermenting brown sugar, cantaloupe traps, flight intercept traps, banana traps, barrier pitfall traps, Townes Malaise traps, recently cut stumps/sawdust of *Acer* sp., banana, a rotting fruit pile, a leaf litter sample, dried melon, flowers of *P. americanus*, scat on fallen tree, and decaying tomatoes. Fields near honey bee hives, sandy oak barrens, southern mesic hardwood forest, cranberry marsh near honey bee hives, hemlock forest, northern mesic hardwood forest, northern dry mesic hardwood forest, near sand prairie, oak savanna, pine/oak barrens, and pine/oak/maple forest. April-October. **NW:** Douglas, Polk; **NC:** Oneida; **NE:** Oconto; **WC:** Jackson, Monroe; **C:** Marquette, Portage, Waupaca, Wood; **EC:** Outagamie, Winnebago; **SW:** Grant, Richland; **SC:** Columbia,

Dane, Green, Iowa, Lafayette, Rock, Sauk; **SE:** Kenosha, Ozaukee, Racine, Washington, Waukesha.

Carpophilus marginellus Motschulsky – During our survey, material came from flight intercept traps, cantaloupe traps, banana traps, Lindgren funnel traps baited with either banana and brown sugar or brown sugar and bread dough, on a fermenting hardwood stump, feeding on flowers of *T. vulgare*, and from in a tree wound. Field near honey bee hives, northern dry forest, oak savanna/sand barrens, pine/oak barrens, sandy oak barrens, and southern mesic hardwood forest. April-October, with the majority collected in June. **NW:** Burnett, Douglas, Polk, Washburn; **NE:** Oconto, Shawano; **WC:** Monroe; **C:** Juneau, Wood; **EC:** Outagamie, Winnebago; **SW:** Grant, Richland; **SC:** Columbia, Dane, Green, Iowa, Lafayette, Sauk; **SE:** Racine.

Carpophilus melanopterus Erichson – All of our Wisconsin specimens were collected in late June from *Yucca* flowers. **SC:** Dane; **SE:** Milwaukee.

Carpophilus sayi Parsons – McMullen *et al.* (1960) collected this species from oak wilt mycelial mats and tree wounds of healthy *Q. ellipsoidalis*; McMullen and Shenefelt (1961) collected it from banana traps. We recorded the species from unbaited Lindgren funnel traps or Lindgren traps baited with either banana and brown sugar or fermenting brown sugar and bread dough, cantaloupe traps, flight intercept traps, beaver-chewed *P. grandidentata* trees, under bark of aspen, a tree stump with fermenting yeast (at night), soil at the base of a fermenting tree wound, and from recently cut stumps and sawdust of *Acer* sp. Northern dry forest, northern wet mesic forest, pine/oak barrens, and pine/oak/maple forest, cranberry marsh near honey bee hives, old growth hemlock forest, northern mesic forest, oak sand barrens, oak savanna, and southern mesic forest. April-October. **NW:** Barron, Bayfield, Burnett, Douglas, Polk, Sawyer, Washburn; **NC:** Marathon, Oneida; **NE:** Florence, Forest, Marinette, Shawano; **WC:** Monroe; **C:** Adams, Juneau, Marquette, Wood; **EC:** Outagamie; **SW:** Richland; **SC:** Columbia, Dane, Lafayette, Sauk; **SE:** Ozaukee, Racine, Waukesha.

Amphicrossinae Kirejtshuk

Amphicrossus ciliatus (Olivier) – We recovered this species from Lindgren funnel traps baited with either banana and fermenting brown sugar or fermenting brown sugar and bread dough, cantaloupe

traps, flight intercept traps, light traps, sap flows of *Quercus* sp. and *Acer* sp., on the bark of *Ulmus* sp. and *Quercus velutina* Lamarck, and from a fleshy, gilled fungus on a standing live tree. Cranberry marsh (near honey bee hives), field near honey bee hives, oak savanna, sandy oak barrens, and southern mesic hardwood forest. May-September, the majority of specimens were collected in June and August. **WC:** Monroe; **SW:** Grant, Richland; **SC:** Columbia, Dane, Green, Iowa, Lafayette, Sauk; **SE:** Ozaukee, Racine, Washington, Waukesha.

Nitidulinae Latreille

Stelidota coenosa Erichson–McMullen and Shenefelt (1961) collected this species from banana traps. Our samples came from barrier pitfall traps, flight intercept traps, and an apple trap. Sandy oak barrens and lakeshore dunes. May-July. **NC:** Marathon; **C:** Wood; **EC:** Sheboygan; **SC:** Dane, Sauk.

Stelidota geminata (Say)–Rauterberg (1888) collected this species on flowers, while McMullen and Shenefelt (1961) collected it at banana traps. We collected it at flight intercept traps, human dung/malt/molasses-baited pitfall traps, cantaloupe traps, Lindgren funnel traps baited with banana and brown sugar, rotting fruit, under scat, in leaf litter, and from a large shelf fungus growing on an old growth (100+ year old) maple tree. Southern mesic hardwood forest and sandy oak barrens. May-November. **SW:** Grant, Richland; **SC:** Dane, Green, Iowa, Lafayette, Rock; **SE:** Ozaukee, Racine, Washington.

Stelidota octomaculata (Say) – Parsons (1943) first recorded this species from Wisconsin; McMullen *et al.* (1960) collected it from tree wounds of healthy *Q. ellipsoidalis*; McMullen and Shenefelt (1961) collected it at banana traps. Our specimens came from pitfall traps baited with human dung/malt/molasses, leaf litter samples, fungi, driftwood on a Lake Superior beach, and one specimen was collected from the stem of a gilled mushroom. Northern and southern mesic hardwood forests. April-December. **NW:** Burnett, Douglas, Polk, Washburn; **NC:** Marathon; **NE:** Marinette, Shawano; **WC:** Eau Claire, Monroe; **C:** Juneau, Waupaca, Wood; **SW:** Grant, Richland; **SC:** Dane, Green, Lafayette, Sauk; **SE:** Kenosha, Walworth.

Omosita colon (Linnaeus) – Rauterberg (1888) collected this species on carrion and McMullen and Shenefelt (1961) collected it at banana traps. Our samples were recovered from cantaloupe traps, hu-

man/dung/molasses pitfall traps, Lindgren funnel traps baited with fermenting brown sugar and bread dough or banana, dried ham traps, carcasses of deer, opossum, porcupine, raccoon, salmon, skunk, and woodchuck, on driftwood, rotting fruit, recently cut hardwood tree, oak wilt culture, and from a stinkhorn mushroom. March-October. **NW:** Bayfield, Burnett, Douglas, Polk, Rusk, Sawyer, Washburn; **NC:** Marathon; **NE:** Door, Forest, Shawano; **WC:** Eau Claire, Monroe; **C:** Green Lake, Juneau, Marquette, Portage, Waupaca, Wood; **EC:** Manitowoc, Sheboygan, Winnebago; **SW:** Crawford, Grant, LaCrosse, Richland; **SC:** Columbia, Dane, Green, Iowa, Lafayette, Rock, Sauk; **SE:** Jefferson, Kenosha, Ozaukee, Racine, Washington.

Omosita discoidea (Fabricius) – The single specimen we examined from Wisconsin was collected at a banana trap. October. **C:** Wood.

Nitidula bipunctata Linnaeus – Rauterberg (1888) first recorded this species from Wisconsin. We found it at cantaloupe traps, Lindgren funnel traps baited with fermenting brown sugar and banana, deer bones, a woodchuck carcass, and under a long dead porcupine on a sandy road. April-August. **NW:** Burnett, Douglas, Polk; **NE:** Forest; **EC:** Winnebago; **SW:** Crawford; **SC:** Columbia, Dane, Iowa.

Nitidula carnaria (Schaller) – The first record for Wisconsin is that of Dodge (1937). Our specimens came from a barrier pitfall trap, under a dead salmon on a Lake Michigan beach, and under a long dead porcupine on a sandy road. April, May and July. **NW:** Polk; **SE:** Kenosha.

Nitidula rufipes (Linnaeus) – Parsons (1943) included Wisconsin in the geographical distribution of this species. We associated it with deer bones, dog and skunk carcasses, and from beneath a long dead porcupine on a sandy road. April-September. **NW:** Bayfield, Burnett, Polk; **NE:** Oconto; **C:** Waupaca; **SC:** Dane, Iowa.

Nitidula ziczac Say – Rauterberg (1888) collected this species on decaying fruit, while our specimens came from a raccoon carcass and from beneath a long dead porcupine on a sandy road. June-September. **NW:** Polk; **C:** Marquette, Waupaca.

Prometopia sexmaculata Say – Rauterberg (1888) collected this species under beech bark and McMullen *et al.* (1960) collected it from oak wilt mycelial mats.

We collected it at flight intercept traps, at blacklight, from Lindgren funnel traps, and beneath bark of *Q. ellipsoidalis* and *Q. velutina*. Lake Michigan beach, northern mesic hardwood forest, oak savanna, sandy oak barrens, and southern mesic hardwood forest. April-October. **NW:** Barron, Polk; **NE:** Shawano; **WC:** Monroe; **C:** Wood; **EC:** Fond du Lac, Sheboygan; **SW:** Grant, Richland; **SC:** Columbia, Dane, Green, Lafayette, Rock, Sauk; **SE:** Racine.

***Lobiopa setosa* Harold** – Our material came from Lindgren funnel traps baited with either fermenting brown sugar and bread dough or fermenting brown sugar and banana. Oak savanna and sandy oak barrens. April-August. **SW:** Grant; **SC:** Columbia, Iowa, Lafayette, Sauk.

***Lobiopa undulata* (Say)** – Rauterberg (1888) collected this species under bark; McMullen *et al.* (1960) collected it from oak wilt mycelial mats; McMullen and Shenefelt (1961) recovered it from banana traps. We took it at Lindgren funnel traps baited with fermenting brown sugar and banana, cantaloupe traps, flight intercept traps, Malaise traps, baited pitfall traps, and one specimen was collected from a recently cut stump of *Acer* sp. Sandy oak barrens, northern dry forest, and pine/oak barrens, lake shore dunes, northern mesic forest, and southern mesic forest. April-September. **NW:** Burnett, Douglas, Polk; **NC:** Marathon; **NE:** Shawano; **WC:** Jackson, Monroe; **C:** Juneau, Marquette, Portage, Waupaca, Wood; **EC:** Fond du Lac, Sheboygan, Winnebago; **SW:** Grant, Richland; **SC:** Columbia, Dane, Iowa, Lafayette, Sauk; **SE:** Washington, Waukesha.

***Phenolia grossa* (Fabricius)** – Rauterberg (1888) provided the first Wisconsin record, while McMullen and Shenefelt (1961) collected it at banana traps. In addition to samples recovered from flight intercept traps, our associations included gilled mushrooms growing in the soil at the base of a maple tree, mating on sulfur shelf fungus, *Laetiporus sulphureus* (Fries) Murrill, from *Quercus* sp. stumps and logs, and from soil at the base of a fermenting tree wound. Mesic northern hardwood forest, southern mesic hardwood forest, oak/maple/pine forest, oak savanna, and pine barrens. April-September. **NC:** Marathon, Taylor; **NE:** Shawano; **WC:** Eau Claire, Monroe; **C:** Juneau, Marquette, Waupaca, Waushara, Wood; **SC:** Dane, Green, Lafayette; **SE:** Racine, Waukesha.

***Amphotis ulkei* LeConte** – We collected this myrmecophile with the following ant species: *Formica knighti*

Buren, *Formica subsericea* Say, and an undetermined species of *Crematogaster*. All beetles collected during this study were near or within ant colonies, in sandy soil, and usually associated with pine trees. May-July. **C:** Marquette, Wood; **SC:** Dane.

***Thalycra concolor* LeConte** – Howden (1961) provided the first Wisconsin record, and our two specimens came from a light trap and banana trap. August-September. **C:** Wood.

***Thalycra orientalis* Howden** – The single specimen we examined from our Wisconsin survey was collected from a banana trap. June. **C:** Wood.

***Pocadius helvolus* Erichson** – We sampled this species from the gills of a mushroom, within *Calvatia* sp. puffball fungus, and in puffball with a single adult and larva. Sand prairie. June-September. **C:** Marquette; **SC:** Columbia, Rock, Sauk.

***Cychramus adustus* Erichson** – Rauterberg (1888) collected this species on fungi, and McMullen and Shenefelt (1961) collected it at banana traps. Most of our specimens came from flight intercept traps; one specimen was hand collected from *Rudbeckia hirta* Linnaeus. Northern mesic forest, oak/pine barrens, oak savanna, sand oak barrens, and southern mesic hardwood forest. June-October. **NC:** Marathon; **NE:** Shawano; **WC:** Jackson, Monroe; **C:** Wood; **SC:** Dane, Lafayette; **SE:** Waukesha.

***Aethina tumida* Murray** – Huang and Lin (2001) noted that this invasive species was first recovered from Wisconsin honey bee colonies in the spring of 1999. The beetles were extracted from honey bee hives that came from migratory bee hives in the southern United States. *Aethina tumida* continues to be collected from migratory bee hives in Wisconsin, however it is unclear whether this species has become established in the state. April-October. **NW:** Bayfield; **NC:** Ashland; **NE:** Oconto, Shawano; **WC:** Dunn, Pierce; **C:** Waupaca, Wood; **EC:** Calumet, Outagamie, Sheboygan, Winnebago; **SW:** Trempealeau, Vernon; **SE:** Kenosha, Ozaukee, Washington (Phibbs, personal communication).

***Pallodes austrinus* Leschen** – Our survey records included flight intercept traps, within the gills of fungi, and one specimen from a rotting log near puffball fungi. All were collected from sandy oak barrens. June-September. **SW:** Grant, Richland; **SC:** Iowa, Sauk.

***Pallodes pallidus* (Beauvois)** – Flight intercept traps provided part of our material; we also found it within the gills of fungi. Northern and southern mesic hardwood forests. June-September. **WC:** Eau Claire; **C:** Waupaca; **SC:** Dane, Green, Lafayette, Sauk; **SE:** Racine.

***Cyllodes biplagiatus* LeConte** – In Bayfield, larvae were collected from large fleshy fungi in June and were observed to enter the ground to pupate; the pupal stage lasted seven days (Wickham 1894). Rauterberg (1888) also listed this species from Wisconsin. All our specimens were collected from *Pleurotus ostreatus* (Fries). May-July. **NW:** Bayfield; **NE:** Florence, Marinette, Oconto; **C:** Portage; **EC:** Brown; **SC:** Columbia, Dane; **SE:** Walworth.

***Psilopyga histrina* LeConte** – The first Wisconsin record is that of Parsons (1943); McMullen and Shenefelt (1961) collected it at banana traps. Our material came from flight intercept traps, one specimen hand collected from a woodchuck burrow, and another from beneath a log with the ant, *Aphaenogaster treatae* Forel (Hymenoptera: Formicidae). Sandy oak barrens, sand prairie, oak savanna, and southern mesic hardwood forest. May-September. **NC:** Marathon; **WC:** Monroe; **C:** Wood; **SC:** Columbia, Green, Sauk.

Meligethinae Thomas

***Meligethes nigrescens* Stephens** – Our survey samples came from Malaise traps, from sweeping in a rotational pasture, on *Spirea* sp., and on sumac. May-July. **SW:** Vernon; **SC:** Dane, Iowa, Rock, Sauk.

***Meligethes saevus* Leconte** – Williams (1996, 2002) reported *M. saevus* larvae and adults on flowers of its only known food plant, *Onosmodium molle* A. Michaux. This plant grows in gravelly or rocky calcareous prairies, barrens, openings, glades and bluffs (Williams 1996). May-August (Williams 2002). **WC:** Pierce; **SW:** Buffalo, Grant; **SC:** Dane, Green, Iowa.

***Meligethes simplipes* Easton** – We recovered one specimen from a flight intercept trap near several fallen trees; a second was taken while sweeping foliage. Southern mesic hardwood forest and mixed hardwood forest. June-July. **SC:** Green, Sauk.

Cillaeinae Kirejtshuk & Audisio

***Colopterus maculatus* (Erichson)** – McMullen *et al.* (1960) collected this species from oak wilt mycelial mats; McMullen and Shenefelt (1961) found it at banana traps. Our material came from flight intercept traps, Lindgren funnel traps baited with banana and fermenting brown sugar, natural tree wounds, and melons. Northern dry forest, oak savanna, and pine/oak barrens. May-October. **NW:** Polk; **NE:** Marinette; **WC:** Monroe; **C:** Wood.

***Colopterus niger* (Say)** – We recovered this species from Lindgren funnel traps baited with banana and fermenting brown sugar. Oak sand barrens and southern mesic hardwood forest. April-September. **SW:** Richland; **SC:** Green, Iowa, Lafayette, Sauk.

***Colopterus semitectus* (Say)** – McMullen *et al.* (1960) collected this species from oak wilt mycelial mats and tree wounds of healthy *Q. ellipsoidalis*. Our material came from banana traps and Lindgren funnel traps baited with banana and fermenting brown sugar. Southern mesic hardwood forest. April-September. **C:** Adams, Wood; **SC:** Dane, Lafayette.

***Colopterus truncatus* (Randall)** – Rauterberg (1888) collected this species with sweep net; McMullen *et al.* (1960) collected 917 specimens from mycelial mats of *C. fagacearum* and 95 specimens from wounds on *Q. ellipsoidalis*. McMullen and Shenefelt (1961) also recorded it from banana traps. We recorded it from cantaloupe traps, flight intercept traps, light traps, Lindgren funnel traps (baited and unbaited), from *Populus* sp., beaver-chewed *P. grandidentata*, on a fermenting *Acer* sp. stump, and in a dry rotting fungus. Hemlock forest, northern mesic hardwood forest, oak/maple/pine forest, oak savanna, pine/oak barrens, sandy oak barrens, and southern mesic hardwood forest. April-October. **NW:** Burnett, Douglas, Polk, Sawyer, Washburn; **NC:** Marathon, Oneida; **NE:** Florence, Shawano; **WC:** Eau Claire, Jackson, Monroe; **C:** Adams, Juneau, Marquette, Portage, Waupaca, Wood; **EC:** Sheboygan; **SW:** Grant, Richland; **SC:** Columbia, Dane, Green, Lafayette, Sauk; **SE:** Walworth, Washington, Waukesha.

***Colopterus unicolor* (Say)** – Downie and Arnett (1996) included Wisconsin in the distribution notes. All our Wisconsin specimens were collected with light traps. August-September. **C:** Wood.

Table 1. Nitidulidae and Kateretidae faunal lists for Illinois, Indiana, Michigan, Minnesota, Ohio, Southcentral Canada (SC = Manitoba, Ontario, Quebec), and Wisconsin.

Species:	IL	IN	MI	MN	OH	SC	WI
Kateretidae							
<i>Kateretes pusillus</i> (Thunberg)				*		*	*
<i>Heterhelus abdominalis</i> (Erichson)		*			*	*	*
<i>H. sericans</i> (LeConte)		*				*	*
<i>Brachypterus urticae</i> (Fabricius)		*	*			*	*
<i>Brachypterolus pulicarius</i> (Linnaeus)						*	*
Nitidulidae							
Epuraeinae Kirejtshuk, 1986							
<i>Epuraea adumbrata</i> Mannerheim						*	
<i>E. aestiva</i> (Linnaeus)		*		*		*	*
<i>E. alternata</i> Parsons		*	*		*	*	*
<i>E. avara</i> (Randall)		*	*	*	*	*	*
<i>E. corticina</i> Erichson		*		*	*	*	*
<i>E. erichsoni</i> Reitter	*	*	*	*	*	*	*
<i>E. flavomaculata</i> Mäklin			*	*		*	*
<i>E. fulvescens</i> Horn					*	*	
<i>E. helvola</i> Erichson		*		*	*	*	*
<i>E. horni</i> Crotch	*	*			*	*	
<i>E. labilis</i> Erichson		*	*	*	*	*	*
<i>E. linearis</i> Mäklin						*	*
<i>E. obliquus</i> Hatch			*			*	*
<i>E. obtusicollis</i> Reitter		*				*	
<i>E. ovata</i> Horn		*	*	*	*	*	*
<i>E. parsonsi</i> Connell						*	*
<i>E. peltoides</i> Horn		*	*	*	*	*	*
<i>E. planulata</i> Erichson				*	*	*	*
<i>E. populi</i> Dodge			*	*		*	*
<i>E. rufa</i> (Say)		*		*	*	*	*
<i>E. rufida</i> (Melsheimer)		*	*	*	*	*	*
<i>E. rufomarginata</i> (Stephens)				*		*	*
<i>E. terminalis</i> Mannerheim	*		*	*		*	*
<i>E. truncatella</i> Mannerheim		*	*			*	*
<i>E. umbrosa</i> Horn	*					*	*
Carpophilinae Erichson, 1842							
<i>Carpophilus antiquus</i> Melsheimer	*	*			*	*	*
<i>C. brachypterus</i> (Say)	*	*	*		*	*	*
<i>C. corticinus</i> Erichson		*	*		*		*
<i>C. discoideus</i> LeConte	*		*			*	
<i>C. freemani</i> Dobson	*				*		*
<i>C. hemipterus</i> (Linnaeus)	*	*			*	*	*
<i>C. lugubris</i> Murray	*	*		*	*	*	*
<i>C. marginatus</i> Erichson			*	*	*		
<i>C. marginellus</i> Motschulsky					*	*	*
<i>C. melanopterus</i> Erichson	*	*					*
<i>C. pallipennis</i> (Say)	*	*					
<i>C. sayi</i> Parsons	*	*		*	*	*	*
Amphicrossinae Kirejtshuk, 1986							
<i>Amphicrossus ciliatus</i> (Olivier)		*		*	*	*	*
Nitidulinae Latreille, 1802							
<i>Stelidota coenosa</i> Erichson			*		*		*
<i>S. geminata</i> (Say)	*	*			*		*
<i>S. octomaculata</i> (Say)		*	*	*	*	*	*
<i>Omosita colon</i> (Linnaeus)		*	*	*	*	*	*
<i>O. discoidea</i> (Fabricius)						*	*
<i>Nitidula bipunctata</i> Linnaeus		*	*	*	*	*	*
<i>N. carnaria</i> (Schaller)		*	*			*	*
<i>N. rufipes</i> (Linnaeus)		*	*			*	*
<i>N. ziczac</i> Say		*	*		*	*	*
<i>Prometopia sexmaculata</i> Say		*			*	*	*
<i>Lobiopa setosa</i> Harold	*	*	*				*
<i>L. undulata</i> (Say)		*		*	*	*	*

Table 1 (continued).

Species:	IL	IN	MI	MN	OH	SC	WI
<i>Phenolia grossa</i> (Fabricius)		*	*	*	*	*	*
<i>Amphotis ulkei</i> LeConte							*
<i>Thalycra concolor</i> LeConte			*			*	*
<i>T. orientalis</i> Howden		*	*		*		*
<i>Pocadius helvolus</i> Erichson		*			*	*	*
<i>Cychramus adustus</i> Erichson		*	*	*	*	*	*
<i>Aethina tumida</i> Murray		*	*	*	*		*
<i>Pallodes austrinus</i> Leschen		*					*
<i>P. pallidus</i> (Beauvois)		*	*		*	*	*
<i>Cyllodes biplagiatus</i> LeConte		*	*			*	*
<i>Psilopyga histrina</i> LeConte		*			*		*
<i>P. nigripennis</i> LeConte		*			*		
Meligethinae Thomas, 1859							
<i>Meligethes canadensis</i> Easton						*	
<i>M. nigrescens</i> Stephens		*			*	*	*
<i>M. saevus</i> LeConte	*			*		*	*
<i>M. simplipes</i> Easton		*			*	*	*
Cillaeinae Kirejtshuk & Audisio, 1986							
<i>Colopterus maculatus</i> (Erichson)				*	*	*	*
<i>C. niger</i> (Say)	*	*			*		*
<i>C. semitectus</i> (Say)	*	*	*		*	*	*
<i>C. truncatus</i> (Randall)	*	*	*	*	*	*	*
<i>C. unicolor</i> (Say)			*				*
<i>Conotelus obscurus</i> Erichson		*			*	*	*
Cryptarchinae Thomas, 1859							
<i>Cryptarcha ampla</i> Erichson	*	*	*	*	*	*	*
<i>C. concinna</i> Melsheimer		*		*	*	*	*
<i>C. strigatula</i> Parsons		*	*	*	*		*
<i>Glischrochilus confluentus</i> (Say)		*	*	*	*	*	*
<i>G. fasciatus</i> (Olivier)		*	*	*	*	*	*
<i>G. moratus</i> Brown						*	
<i>G. obtusus</i> (Say)	*	*	*	*	*		*
<i>G. quadrisignatus</i> (Say)	*	*		*	*	*	*
<i>G. sanguinolentus</i> (Olivier)	*	*		*	*	*	*
<i>G. stepmanni</i> Brown			*	*	*	*	*
<i>G. vittatus</i> (Say)						*	*
Cybocephalinae							
<i>Cybocephalus nigritulus</i> LeConte		*	*		*		

Conotelus obscurus Erichson – Rauterberg (1888) provided the first Wisconsin record; we encountered it feeding and mating deep within flowers of *Calystegia sepium* (Linnaeus). Sandy prairie habitat. June-August. **NW**: Bayfield; **SC**: Dane, Rock; **SE**: Kenosha.

Cryptarchinae Thomas

Cryptarcha ampla Erichson – Rauterberg (1888) collected this species at sap flows of *Quercus* sp., while McMullen and Shenefelt (1961) recovered it from banana traps. Our wide variety of associations included: Lindgren funnel traps baited with banana or bread dough and fermenting brown sugar (the most successful strategy), cantaloupe traps, flight intercept traps, human dung/malt/molasses pitfall traps, light traps, Malaise traps, soil at the base of a fermenting oak tree wound, a willow tree damaged by a species of *Ster-*

nochetus (Coleoptera: Curculionidae), on rotting peaches, and one specimen of *C. ampla* was reared from a stem of *Asclepias syriaca* Linnaeus collected in a sandy prairie surrounded by oaks. Northern dry forest, northern wet mesic forest, oak savanna, pine/oak barrens, sandy oak barrens, and southern mesic hardwood forest. April-October. **NW**: Barron, Burnett, Douglas, Polk, Sawyer, Washburn; **NC**: Marathon, Oneida; **NE**: Florence, Forest, Marinette, Oconto, Shawano; **WC**: Jackson, Monroe; **C**: Juneau, Marquette, Portage, Waupaca, Wood; **EC**: Fond du Lac, Outagamie, Winnebago; **SW**: Crawford, Grant, Richland, Trempealeau; **SC**: Columbia, Dane, Green, Iowa, Lafayette, Sauk; **SE**: Jefferson, Kenosha, Ozaukee, Racine, Waukesha.

Cryptarcha concinna Melsheimer – Rauterberg (1888) collected this species under bark, and McMullen and

Shenefelt (1961) collected it at banana traps. During our survey specimens came from Lindgren funnel traps baited with banana or bread dough and fermenting brown sugar, and flight intercept traps. Northern dry forest, northern mesic forest, oak savanna, pine/oak barrens, sandy oak barrens, and southern mesic hardwood forest. April-September. **NW:** Barron, Burnett, Douglas; **NE:** Forest, Marinette; **C:** Juneau, Wood; **SW:** Grant, Richland; **SC:** Columbia, Iowa, Lafayette, Sauk; **SE:** Racine.

Cryptarcha strigatula Parsons – Rauterberg (1888) collected this species under bark; we took it at Lindgren funnel traps baited with banana or bread dough and fermenting brown sugar, and one specimen was taken from a natural tree wound. Northern dry forest, oak savanna, pine/oak barrens, sandy oak barrens, and southern mesic hardwood forest. May-September. **NW:** Burnett, Douglas, Polk, Washburn; **NE:** Marinette; **WC:** Jackson, Monroe; **C:** Juneau, Marquette, Wood; **SW:** Grant, Richland; **SC:** Columbia, Iowa, Lafayette, Sauk; **SE:** Waukesha.

Glischrochilus confluentus (Say) – Katovich and Ostry (1998) recorded this species from Wisconsin. We found it under scat on fallen *Quercus* sp., under bark of fallen *Quercus* sp., from a moist decaying fungus on a fallen tree, and one specimen was collected on *L. sulphureus*. May-November. **WC:** Dunn, St. Croix; **SC:** Iowa, Sauk.

Glischrochilus fasciatus (Olivier) – Rauterberg (1888) provided the first Wisconsin record. McMullen *et al.* (1960) collected this species from oak wilt mycelial mats and tree wounds of healthy *Q. ellipsoidalis*, and McMullen and Shenefelt (1961) collected this species from banana traps. Our associations included: cantaloupe traps, flight intercept traps, Lindgren funnel traps baited with banana or bread dough and fermenting brown sugar, Malaise traps, pitfall traps, on rotting fruit, corn, mammalian dung, carrion, under bark of *Juglans cinerea* Linnaeus, *Populus* sp., *Quercus* sp., at sap flows of *Quercus* sp., from large shelf fungus growing on an old growth (100 yr +) maple tree. One curious specimen data label alluded to this specimen having burrowed into a man's cheek and causing a boil. Field near honey bee hives, hemlock forest, northern dry forest, northern wet mesic forest, oak savanna, pine/oak barrens, sandy oak barrens, and southern mesic hardwood forest. March-October. **NW:** Barron, Bayfield, Burnett, Douglas, Polk, Sawyer, Washburn; **NC:** Marathon, Oneida, Price, Vilas; **NE:** Door, Florence, Forest, Marinette, Oconto, Sha-

wano; **WC:** Chippewa, Eau Claire, Monroe; **C:** Green Lake, Marquette, Portage, Waupaca, Wood; **EC:** Fond du Lac, Outagamie, Winnebago; **SW:** Crawford, Grant, Richland, Trempealeau; **SC:** Columbia, Dane, Green, Iowa, Lafayette, Rock, Sauk; **SE:** Kenosha, Ozaukee, Racine, Walworth, Waukesha.

Glischrochilus obtusus (Say) – Rauterberg (1888) collected this species under bark near a sap flow, McMullen and Shenefelt (1961) recovered it from banana traps. We found it at Lindgren funnel traps baited with banana or bread dough and fermenting brown sugar, flight intercept traps, and banana traps. Northern dry forest, pine/oak barrens, sandy oak barrens, oak/maple/pine forest, oak savanna, and southern mesic forest. May-October. **NW:** Burnett, Douglas, Polk, Washburn; **NE:** Marinette; **WC:** Eau Claire, Monroe; **C:** Juneau, Marquette, Wood; **EC:** Manitowoc; **SW:** Grant, Richland; **SC:** Dane, Iowa, Lafayette, Sauk.

Glischrochilus quadrisignatus (Say) – McMullen *et al.* (1960) collected this species from oak wilt mycelial mats, and McMullen and Shenefelt (1961) took it at banana traps. We sampled this ubiquitous species from a wide variety of traps and associations including: cantaloupe traps, flight intercept traps, Lindgren funnel traps baited with banana or bread dough and fermenting brown sugar, Malaise traps, pitfall traps, on rotting fruit, corn, mammalian dung, carrion, wounded trees, under bark, under bark of *Prunus serotina* Ehrhart, from a willow associated with species of *Sternochetus* and its damage, from large shelf fungus growing on an old growth (100 yr +) maple tree, and one specimen was feeding on flowers of *T. vulgare* along with other nitidulids. Cranberry marsh, field near honey bee hives, hemlock forest, northern dry forest, northern wet mesic forest, oak savanna, pine/oak barrens, sandy oak barrens, and southern mesic hardwood forest. April-October. **NW:** Barron, Bayfield, Burnett, Douglas, Polk, Sawyer, Washburn; **NC:** Marathon, Oneida, Price; **NE:** Door, Florence, Forest, Marinette, Oconto, Shawano; **WC:** Chippewa, Dunn, Eau Claire, Jackson, Monroe; **C:** Green Lake, Marquette, Portage, Waupaca, Wood; **EC:** Fond du Lac, Manitowoc, Outagamie, Winnebago; **SW:** Crawford, Grant, Richland; **SC:** Columbia, Dane, Green, Iowa, Lafayette, Rock, Sauk; **SE:** Jefferson, Kenosha, Ozaukee, Racine, Walworth, Waukesha.

Glischrochilus sanguinolentus (Olivier) – Rauterberg (1888) reported this species feeding on flowing

sap from freshly cut trees, while McMullen *et al.* (1960) collected it from oak wilt mycelial mats, and McMullen and Shenefelt (1961) took it at banana traps. We sampled it widely from Lindgren funnel traps unbaited or baited with banana and fermenting brown sugar, flight intercept traps, Malaise traps, sap of maple, on recently cut *Acer* sp., and within the gills of *P. ostreatus* along with *C. biplagiatus* and *G. siepmanni*. Northern mesic hardwood forest, southern mesic hardwood forest, hemlock forest, northern dry forest, oak savanna, pine/oak barrens, and sandy oak barrens. March-November. **NW:** Barron, Bayfield, Burnett, Douglas, Polk, Sawyer, Washburn; **NC:** Marathon, Oneida, Price, Vilas; **NE:** Florence, Forest, Marinette, Shawano; **WC:** Eau Claire, Jackson, Monroe; **C:** Juneau, Marquette, Waupaca, Wood; **SW:** LaCrosse, Richland; **SC:** Columbia, Dane, Green, Lafayette, Sauk; **SE:** Kenosha, Milwaukee, Racine, Waukesha.

Glischrochilus siepmanni Brown – Wisconsin was included in the distribution recorded by Downie and Arnett (1996). We found it at Lindgren funnel traps baited with banana and fermenting brown sugar, flight intercept traps, banana traps, an incidental recovery from a cantharidin bait trap, human dung/malt/molasses baited pitfall traps, Malaise traps, and within the gills of *P. ostreatus*, along with *C. biplagiatus* and *G. sanguinolentus*. Northern wet mesic forest, northern dry forest, pine/oak barrens, sandy oak barrens, and southern mesic hardwood forest. April-October. **NW:** Bayfield, Burnett, Douglas, Polk, Sawyer, Washburn; **NC:** Marathon, Oneida; **NE:** Florence, Forest, Marinette, Oconto, Shawano; **WC:** Monroe; **C:** Juneau, Waupaca, Wood; **EC:** Fond du Lac; **SC:** Columbia, Dane, Green, Iowa, Lafayette, Sauk; **SE:** Ozaukee.

Glischrochilus vittatus (Say) – We recovered specimens of this species from an ethanol and alpha-pinene baited Lindgren funnel trap and a single specimen from a banana trap. Wood yard by red pine logs and mixed pine woods. March-April, October. **NC:** Marathon; **C:** Wood.

Potential Wisconsin Species

The following species have distributions that could potentially extend into Wisconsin. This list is based on known distributions, published literature, and specimens examined during the course of this study. The most pertinent literature relating to the development of this list includes Dury (1902), Blatchley

(1910), Leng (1920), Parsons (1943), McNamara (1991), Downie and Arnett (1996), and Williams *et al.* (1997). Each species is followed by state(s) and province(s) from which it is currently known and that are reasonably close to Wisconsin (i.e. Illinois, Indiana, Iowa, Manitoba, Michigan, Minnesota, Ohio, Ontario, and Quebec).

NITIDULIDAE

Epuraeinae

Epuraea adumbrata Mannerheim (Ontario, Quebec)
Epuraea fulvescens Horn (Ohio, Ontario, Quebec)
Epuraea horni Crotch (Illinois, Indiana, Ohio, Ontario, Quebec)
Epuraea obtusicollis Reitter (Indiana, Manitoba, Quebec)

Carpophilinae

Carpophilus discoideus LeConte (Illinois, Michigan, Ontario)
Carpophilus marginatus Erichson (Iowa, Michigan, Minnesota, Ohio)
Carpophilus pallipennis (Say) (Illinois, Indiana)

Nitidulinae

Psilopyga nigripennis LeConte (Indiana, Ohio)

Meligethinae

Meligethes canadensis Easton (Manitoba, Ontario, Quebec)

Cryptarchinae

Glischrochilus moratus Brown (Manitoba, Ontario, Quebec)

Cybocephalinae

Cybocephalus nigrifulus LeConte (Indiana, Michigan, Ohio)

Discussion

Prior to this survey, species richness, habitat and food preferences of Nitidulidae and Kateretidae in Wisconsin were little known and scattered in a few miscellaneous publications. Newly documented associations (e.g. habitat, fungal, flora, ant associations)

have been reported, including many for previously poorly unknown nitidulid and kateretid species. It is hoped this Wisconsin nitidulid and kateretid survey will contribute to various disciplines (e.g. agriculture, forestry, and conservation). More than a quarter of the 78 species documented in this survey are economically significant: *A. tumida* causes extensive economic damage to honey bee hives, *C. lugubris* causes damage to sweet corn, *C. sayi* aids in oak wilt transmission, to name but a few. Connell (1956) commented that *C. lugubris* had, "become abundant in Delaware within the past 20 years". This increase may have been due to changes in agricultural practices such as mechanical harvesting. In the WIRC, before the present (2000-2003) survey, only 35 specimens had been collected in the state, these records coming from 1953 and 1954. During this survey, 476+ Wisconsin specimens were collected, making this species one of the most commonly collected nitidulids in the state. This increase may likewise be related to mechanical harvesting of corn.

A significant number of species show preferences for specific habitats and food resources, such as the association of *P. austrinus* solely with sandy oak barrens, *M. saevus* larvae and adults presumably monophagous on *O. molle*, and *C. biplagiatus* collected exclusively on *P. ostreatus*. Knowing what species occur in a particular habitat and how they interact with other species is essential for habitat management; these data are particularly critical to imperiled habitats such as Wisconsin's prairies, savannas, and old growth forests.

These results are also useful at the larger, and more biologically natural scale of upper Midwestern North America and the Great Lakes region. Our Wisconsin survey forms a natural link to other nitidulid and kateretid lists for Illinois, Indiana, Michigan, Minnesota, Ohio, and south-central Canada. These data (Table 1) were compiled and updated largely from Wickham (1895), Dury (1902), Blatchley (1910), Leng (1920), Parsons (1943), Curl (1955), Skalbeck (1976), Leschen (1988), McNamara (1991), Dowd and Nelsen (1994), Downie and Arnett (1996), Williams *et al.* (1992), Williams *et al.* (1994), Williams *et al.* (1997), Katovich and Ostry (1998), Huang and Lin (2001), and Williams (2002). The south-central Canadian records pertain to nitidulid or kateretid species recorded from Manitoba, Ontario, and Quebec, or any combination of these provinces.

In comparing the nitidulid and kateretid faunas of upper Midwestern North America several distributional trends can be observed; others might be explained in part by sampling artifacts. A few species

exhibit a more southeastern distributional range (e.g. *C. nigrifulus*, *P. nigripennis*); conversely a few species exhibit a more northwestern distributional range (e.g. *G. moratus*, *M. canadensis*). These species could extend into Wisconsin, possibly occurring in the more southern or northern ranges of the state. Several of the new Wisconsin state records now represent the most northern (e.g. *C. niger*, *P. austrinus*), eastern (e.g. *E. linearis*), southern (e.g. *K. pusillus*), or western (e.g. *E. parsonsi*) distributional limits for North America. *Amphotis ulkei* is recorded for the first time in upper Midwestern North America and the Great Lakes region. While several species not collected during the current study, but collected 33-70 years ago in Wisconsin (e.g. *K. pusillus*, *E. populi*, *C. melanopterus*, *O. discoidea*, *T. concolor*, *T. orientalis*, *M. nigrescens*, and *C. unicolor*) could be explained by sampling efforts, they might also represent real changes in the fauna, attributable perhaps to declining habitats or local extirpation. In Ohio, species of *Nitidula* have not been collected for 50-75 years (Williams 1991, Williams, personal communication).

The study conducted by McMullen and Shenefelt (1961) nearly 50 years ago, during the summer of 1954, along with the current Wisconsin nitidulid and kateretid survey (2000-2003) present unique future opportunities for comparative studies. What affect will time (e.g. habitat fragmentation, landscape alteration, chemical inputs, global warming, and other global changes) have on the biodiversity of Nitidulidae/Kateretidae in Wisconsin? Information will continue to be added, and it is hoped that additional surveys will follow and prove to be insightful to address such questions.

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