A Checklist of the Darkling Beetles (Insecta: Coleoptera: Tenebrionidae) of Maryland, with Notes on the Species Recorded from Plummers Island Through the 20th Century

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A Checklist of the Darkling Beetles (Insecta: Coleoptera: Tenebrionidae) of Maryland, with Notes on the Species Recorded from Plummers Island Through the 20th Century

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Abstract.—Species occurrences of darkling beetles (Coleoptera: Tenebrionidae) are listed for the historically collected locality of Plummers Island, Maryland, on the Potomac River just upstream from Washington, D.C. The list is compared to that of the currently known Maryland species, which includes a number of new state records and range extensions. Notes on some of these occurrences and the absence of certain species are discussed. Maryland records from multiple sources now total 128 species of this family of insects. Plummers Island records, from the beginning of the 20th century to the present, include nearly 50% of the state's fauna, and an additional 25% of the state's tenebrionids are expected there.

Key words.—Inventory, historical records, Potomac River, Chesapeake and Ohio Canal National Historical Park.

The fifth largest family of beetles, with approximately 19,000 described species worldwide, Tenebrionidae are a dominant part of many insect faunas, from deserts to rainforests. Current classification includes the former families Alleculidae and Lagriidae and a number of recent status and nomenclatural changes (Bouchard et al. 2005). Nearly 200 genera and 1200 species occur in North America (Aalbu et al. 2002). With a great diversity of body form and size in adult and larval stages, ''darkling beetles'' have become specialized in many substrates, including soil, sand, rotten wood, woody fungi, and nests of other animals (ants, bees, termites, mammals, birds); a few are pests of stored grain and dry food products, and some eat lichens and live green plants. Caves and buildings may be inhabited by species which feed on bat guano and other organic material. Most species in forested areas feed either on fungi or rotten wood, but some tree-hole specialists and soil surface and nest scavengers also are represented. Species of desert and dry scrub habitats generally are scavengers living on or in sandy soils under leaf litter. The rock outcrops, dry slopes, sand deposits, and mixed mesic forest habitats on Plummers Island offer a good variety of these habitats.

Of value as ecologic and biodiversity indicators, most Tenebrionidae are rather specific in habitat ''preference'' and sensitive to habitat change, especially the flightless species (Steiner 1999). A working checklist of Maryland species is presented here, in order to compare the state's diversity with that of the historically collected locality of Plummers Island. The successional history of the Island, with a review of the species records in 25-year intervals since 1901, are examined in this study. Notes and discussions on the occurrence or absence of certain taxa are given.

Maryland has a great variety of habitats with distinct faunal elements, including ocean beach and dunes, sandy scrub, shale and serpentine barrens, rock outcrops, low southern hardwoods, and coniferous forests. Most of the tenebrionid species recorded from the state are widespread over much of eastern North America, but some are known to have boreal distributions and occur in the higher elevations of the western counties, while others are restricted to the southern coastal plain, some reaching the northern limits of their range in Maryland.

Methods

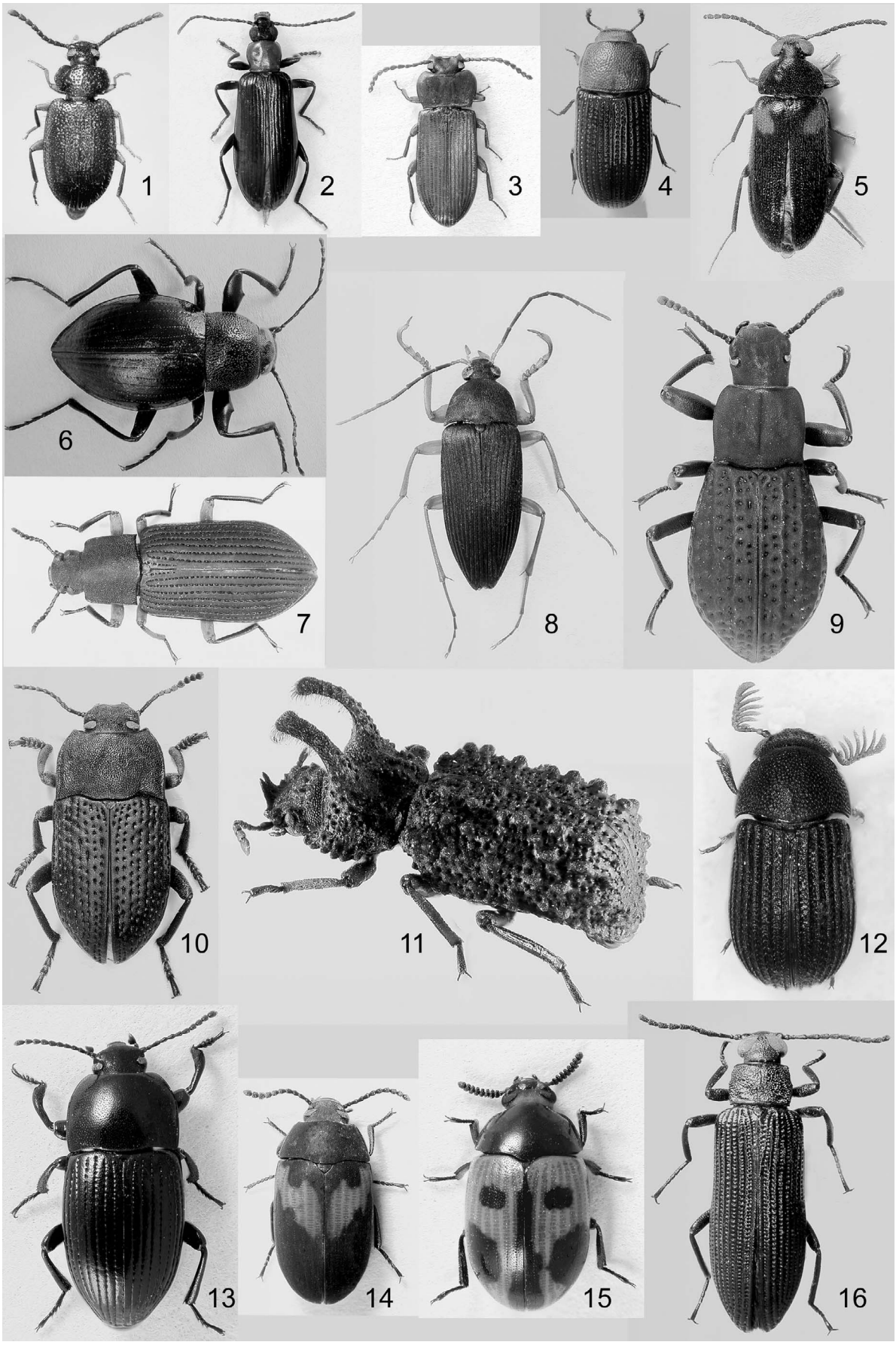
A checklist of the species of Tenebrionidae known from Maryland has been compiled from all known literature records and specimens examined over many years, including specialized focused fieldwork and examination of material in the National Museum of Natural History (USNM), Smithsonian Institution, and other museum collections. Many species records are to be substantiated in future treatments of selected taxa, along with details of habitats and life histories. The Plummers Island specimen records were obtained by the survey of pinned material in the USNM, literature records in revisionary studies, a manuscript list in the files of T. J. Spilman (data

Table 1.—Tenebrionidae recorded from Maryland, listed alphabetically by genus and species. Subfamilial and tribal classification follows Aalbu et al. (2002) and Bouchard et al. (2005). N = native; A= adventive; P.I.= Plummers Island; x = confirmed record; e = species expected to occur on Plummers Island.

	Taxon	Subfamily	Tribe	N-A	P.I.	Expected
1	*Adelina pallida* (Say)	Diaperinae	Diaperini	N		e
2	*Alaetrinus minimus* (Beauvois)	Opatrinae	Platynotini	N	x	
3	*Alobates morio* (F.)	Stenochiinae	Cnodalonini	N		e
4	*Alobates pennsylvanica* (De Geer)	Stenochiinae	Cnodalonini	N	x	
5	*Alphitobius diaperinus* (Panzer)	Tenebrioninae	Alphitobiini	A		e
6	*Alphitophagus bifasciatus* (Say)	Diaperinae	Diaperini	A	x	
7	*Ammodonus fossor* (LeConte)	Opatrinae	Opatrini	N		
8	*Anaedus brunneus* (Ziegler)	Lagriinae	Goniaderini	N	x	
9	*Androchirus erythropus* (Kirby)	Alleculinae	Alleculini	N	x	
10	*Arthromacra aenea* Melsh.	Lagriinae	Lagriini	N	x	
11	*Blaps lethifera* Marsham	Tenebrioninae	Blaptini	A		
12	*Blaps mucronata* Latreille	Tenebrioninae	Blaptini	A		
13	*Blapstinus fortis* LeConte	Opatrinae	Opatrini	N		
14	*Blapstinus metallicus* (F.)	Opatrinae	Opatrini	N		e
15	*Blapstinus moestus* Melsh.	Opatrinae	Opatrini	N		
16	*Bolitophagus corticola* Say	Bolitophaginae	Bolitophagini	N	x	
17	*Bolitotherus cornutus* (Panzer)	Bolitophaginae	Bolitophagini	N	x	
18	*Bothrotes canaliculatus* (Say)	Pimeliinae	Epitragini	N		
19	*Capnochroa fuliginosa* Melsh.	Alleculinae	Alleculini	N	x	
20	*Centronopus calcaratus* (F.)	Tenebrioninae	Centronopini	N	x	
21	*Corticeus cavus* (LeConte)	Hypophloeinae	Hypophloeini	N		e
22	*Corticeus parallelus* (Melsh.)	Hypophloeinae	Hypophloeini	N		e
23	*Corticeus thoracicus* (Melsh.)	Hypophloeinae	Hypophloeini	N		e
24	*Cynaeus angustus* (LeConte)	Diaperinae	Diaperini	A		e
25	*Diaperis nigronotata* Pic	Diaperinae	Diaperini	N		e
26	*Diaperis maculata* Olivier	Diaperinae	Diaperini	N	x	
27	*Dioedus punctatus* LeConte	Phrenapatinae	Penetini	N	x	
28	*Eleates depressus* (Randall)	Bolitophaginae	Bolitophagini	N		e
29	*Eutochia picea* (Melsh.)	Tenebrioninae	Ulomini	N	x	
30	*Gnatocerus cornutus* (F.)	Diaperinae	Diaperini	A		
31	*Gnatocerus guatemalensis* (Champion)	Diaperinae	Diaperini	N		e
32	*Gnatocerus maxillosus* (F.)	Diaperinae	Diaperini	N		e
33	*Gondwanocrypticus obsoletus* (Say)	Diaperinae	Crypticini	N		
34	*Gondwanocrypticus platensis* (Fairmaire)	Diaperinae	Crypticini	A		
35	*Haplandrus ater* (LeConte)	Tenebrioninae	Alphitobiini	N		e
36	*Haplandrus fulvipes* (Herbst)	Stenochiinae	Cnodalonini	N	x	
37	*Helops aereus* (Germar)	Tenebrioninae	Helopini	N	x	
38	*Helops cisteloides* Germar	Tenebrioninae	Helopini	N		
39	*Helops gracilis* Bland	Tenebrioninae	Helopini	N		
40	*Hymenochara rufipes* (LeConte)	Alleculinae	Alleculini	N	x	
41	*Hymenorus communis* LeConte	Alleculinae	Alleculini	N	x	
42	*Hymenorus discretus* Casey	Alleculinae	Alleculini	N		e
43	*Hymenorus humeralis* LeConte	Alleculinae	Alleculini	N	x	
44	*Hymenorus illusus* Fall	Alleculinae	Alleculini	N	x	
45	*Hymenorus inopiatus* Fall	Alleculinae	Alleculini	N		
46	*Hymenorus niger* (Melsh.)	Alleculinae	Alleculini	N	x	
47	*Hymenorus obesus* Casey	Alleculinae	Alleculini	N	x	
48	*Hymenorus obscurus* (Say)	Alleculinae	Alleculini	N		e
49	*Hymenorus perforatus* Casey	Alleculinae	Alleculini	N	x	
50	*Hymenorus picipennis* Casey	Alleculinae	Alleculini	N		e
51	*Hymenorus pilosus* Melsh.	Alleculinae	Alleculini	N	x	
52	*Hymenorus sobrinus* Casey	Alleculinae	Alleculini	N		
53	*Hymenorus tenellus* Casey	Alleculinae	Alleculini	N		
54	*Hymenorus* sp. 1	Alleculinae	Alleculini	N		
55	*Hymenorus* sp. 2	Alleculinae	Alleculini	N		
56	*Idiobates castaneus* (Knoch)	Tenebrioninae	Tenebrionini	N	x	
57	*Isomira iowensis* Casey	Alleculinae	Alleculini	N	x	
58	*Isomira pulla* (Melsh.)	Alleculinae	Alleculini	N	x	
59	*Isomira quadristriata* Couper	Alleculinae	Alleculini	N	x	
60	*Isomira sericea* (Say)	Alleculinae	Alleculini	N	x	
61	*Isomira valida* Schwarz	Alleculinae	Alleculini	N	x	
62	*Latheticus oryzae* Waterhouse	Tenebrioninae	Triboliini	A		e
63	*Lobopoda erythrocnemis* (Germar)	Alleculinae	Alleculini	N		e

Table 1.—Continued.

	Taxon	Subfamily	Tribe	N-A	P.I.	Expected
64	*Lobopoda nigrans* (Melsh.)	Alleculinae	Alleculini	N		e
65	*Lobopoda punctulata* (Melsh.)	Alleculinae	Alleculini	N	x	
66	*Lyphia tetraphylla* (Fairmaire)	Tenebrioninae	Triboliini	A		e
67	*Meracantha contracta* (Beauvois)	Tenebrioninae	Amarygmini	N	x	
68	*Merinus laevis* (Olivier)	Stenochiinae	Cnodalonini	N	x	
69	*Microcrypticus scriptum* (Lewis)	Diaperinae	Crypticini	A		
70	*Mycetochara analis* (LeConte)	Alleculinae	Alleculini	N		e
71	*Mycetochara binotata* (Say)	Alleculinae	Alleculini	N	x	
72	*Mycetochara foveata* (LeConte)	Alleculinae	Alleculini	N		
73	*Mycetochara fraterna* (Say)	Alleculinae	Alleculini	N	x	
74	*Mycetochara haldemani* (LeConte)	Alleculinae	Alleculini	N	x	
75	*Mycetochara* sp. 1	Alleculinae	Alleculini	N		
76	*Mycetochara* sp. 2	Alleculinae	Alleculini	N		
77	*Mycetochara* sp. 3	Alleculinae	Alleculini	N		
78	*Myrmechixenus lathridioides* Crotch	Diaperinae	Myrmechixenini	A		
79	*Neatus tenebrioides* (Beauvois)	Tenebrioninae	Tenebrionini	N	x	
80	*Neatus* n. sp.	Tenebrioninae	Tenebrionini	N		e
81	*Neomida bicornis* (F.)	Diaperinae	Diaperini	N	x	
82	*Palorus ratzeburgii* (Wissmann)	Tenebrioninae	Palorini	A		
83	*Palorus subdepressus* (Wollaston)	Tenebrioninae	Palorini	A		
84	*Paratenetus fuscus* LeConte	Lagriinae	Goniaderini	N		
85	*Paratenetus punctatus* Spinola	Lagriinae	Goniaderini	N	x	
86	*Pentaphyllus pallidus* LeConte	Diaperinae	Diaperini	N		e
87	*Phaleria picipes* Say	Diaperinae	Phaleriini	N		
88	*Phaleria testacea* Say	Diaperinae	Phaleriini	N		
89	*Platydema americana* Lap. & Brl.	Diaperinae	Diaperini	N		
90	*Platydema ellipticum* (F.)	Diaperinae	Diaperini	N	x	
91	*Platydema erythrocerum* Lap. & Brl.	Diaperinae	Diaperini	N	x	
92	*Platydema excavatum* Say	Diaperinae	Diaperini	N	x	
93	*Platydema flavipes* (F.)	Diaperinae	Diaperini	N		e
94	*Platydema laevipes* Haldeman	Diaperinae	Diaperini	N		e
95	*Platydema micans* Zimm.	Diaperinae	Diaperini	N		e
96	*Platydema picilabrum* Melsh.	Diaperinae	Diaperini	N	x	
97	*Platydema ruficolle* Lap. & Brl.	Diaperinae	Diaperini	N	x	
98	*Platydema ruficorne* (Sturm)	Diaperinae	Diaperini	N	x	
99	*Platydema subcostatum* Lap. & Brl.	Diaperinae	Diaperini	N	x	
100	*Platydema teleops* Triplehorn	Diaperinae	Diaperini	N	x	
101	*Polypleurus perforatus* (Germar)	Stenochiinae	Cnodalonini	N	x	
102	*Prateus fusculus* LeConte	Lagriinae	Goniaderini	N		e
103	*Pseudocistela amoena* (Say)	Alleculinae	Alleculini	N		e
104	*Pseudocistela brevis* (Say)	Alleculinae	Alleculini	N		e
105	*Pseudocistela marginata* (Ziegler)	Alleculinae	Alleculini	N	x	
106	*Rhipidandrus paradoxus* (Beauvois)	Tenebrioninae	Bolitophagini	N	x	
107	*Schoenicus puberulus* LeConte	Pimeliinae	Epitragini	N		
108	*Statira basalis* Horn	Lagriinae	Lagriini	N		
109	*Statira gagatina* (Melsh.)	Lagriinae	Lagriini	N	x	
110	*Strongylium crenatum* Mäklin	Stenochiinae	Stenochiini	N	x	
111	*Strongylium tenuicolle* (Say)	Stenochiinae	Stenochiini	N	x	
112	*Strongylium terminatum* (Say)	Stenochiinae	Stenochiini	N	x	
113	*Tarpela americana* (Beauvois)	Tenebrioninae	Helopini	N	x	
114	*Tarpela micans* (F.)	Tenebrioninae	Helopini	N	x	
115	*Tarpela venusta* (Say)	Tenebrioninae	Helopini	N		e
116	*Tenebrio molitor* L.	Tenebrioninae	Tenebrionini	A	x	
117	*Tenebrio obscurus* F.	Tenebrioninae	Tenebrionini	A		e
118	*Tharsus seditiosus* LeConte	Tenebrioninae	Triboliini	N		e
119	*Trachyscelis aphodioides* Latreille	Diaperinae	Trachyscelini	A		
120	*Tribolium castaneum* (Herbst)	Tenebrioninae	Triboliini	A	x	
121	*Tribolium confusum* Jac. du Val	Tenebrioninae	Triboliini	A		
122	*Tribolium madens* (Charpentier)	Tenebrioninae	Triboliini	A		
123	*Uloma imberbis* LeConte	Tenebrioninae	Ulomini	N	x	
124	*Uloma impressa* Melsh.	Tenebrioninae	Ulomini	N	x	
125	*Uloma mentalis* Horn	Tenebrioninae	Ulomini	N	x	
126	*Uloma punctulata* LeConte	Tenebrioninae	Ulomini	N	x	
127	*Xylopinus aenescens* LeConte	Stenochiinae	Cnodalonini	N		e
128	*Xylopinus saperdoides* (Olivier)	Stenochiinae	Cnodalonini	N	x	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which he extracted from a card file of species records collected in the early years of the Washington Biologists' Field Club), and new material obtained by recent fieldwork through 2005 (Malaise traps, blacklights on hanging sheets, and collecting by hand). The list includes a few species represented only by larvae, in cases where no adult specimens were found. A total of 424 tenebrionid specimens from Plummers Island was examined in this study.

Results

Maryland occurrences.—The checklist of 128 species of Tenebrionidae known from Maryland (Table 1) includes 109 native (N) and 19 adventive (A) species. Some of the latter were reported only once from the state and probably never became established, e.g., *Microcrypticus scriptum* (Kaszab 1975); historic records of *Trachyscelis aphodioides,* an adventive species, on beaches of the Chesapeake Bay, represent the northernmost occurrences of this beetle, which apparently disappeared from the United States (Steiner 2004a). Others are cosmopolitan stored-product pests, some of which may occur ''in the wild'' as well as in human structures. Maryland specimens of the two species of *Palorus* and *Myrmechixenus lathridioides* are unknown, but these species are included here based on specimen records from Washington, D.C.

Many of the native species are known to be widespread in the region (Downie & Arnett 1996), but a surprising number, many very common in collections, are reported here for Maryland for the first time. Examples of the state's diverse Tenebrionidae are illustrated in Figs. 1–16. A few unidentified or undescribed species also are known. A few additional species are expected to be found in Maryland, having been recorded from adjacent states. Some reach their known northern limits in the tidewater area of Virginia (Hoffman et al. 2002). Unexpected Maryland occurrences continue to be discovered in museum collections and via fieldwork; *Eleates depressus,* a species thought to be boreal, recently was reported (Steiner 2004b) and *Lobopoda erythrocnemis,* not known north of the Carolinas and Tennessee (Campbell 1966), is among several southern species newly reported here.

Statira croceicollis Mäklin was reported as occurring in Maryland by Downie & Arnett (1996), probably based on the record listed by Parsons (1975), but it is not included in the present list because it involves a misidentification. A Maryland specimen in the USNM identified as *S. croceicollis* by Parsons is actually *Statira gagatina* (Fig. 2), a more common and widespread species. The two species need careful study with examination of type material; *S. croceicollis* may be a valid species (Florida specimens are smaller and brightly colored) or only a southern variant of *S. gagatina.* An additional *Statira* species, however, *S. basalis,* a coastal plain species of sandy areas, is reported here for the first time in Maryland.

Plummers Island occurrences.—The list of 62 species recorded from Plummers Island in 25-year intervals (Table 2) includes mostly species known to be indigenous. This represents a subset of the species expected to occur there. Based on knowledge of the distributions and habitats of the species known from Maryland, an additional 33 species (Table 1, right column) can be expected to occur, or previously may have occurred on the Island. The sporadic collecting during the last 105 years has detected nearly 50% of the state's known fauna on the Island. Figuring in potential occurrences, as much as 75% of the state's species may be expected on Plummers Island.

Only three cosmopolitan stored-product pests, *Alphitophagus bifasciatus, Tenebrio molitor,* and *Tribolium castaneum,* were recorded during the first 25 years but not detected again; the latter two were listed for the Island by Spilman, but specimens have not been examined. No other adventive species have been detected on Plummers Island.

Collecting by coleopterists H. S. Barber, E. A. Schwarz, and others in the early years of Washington Biologists' Field Club detected 53 of the 62 species recorded from the Island. As seen in similar documentation for other beetle groups (e.g., Erwin 1981, Staines 2004), there was less intense sampling during the middle years of the 20th Century (1926–1975). Only 10 tenebrionid species are documented for this long period, and all had been taken previously. Recent (1976–2006) efforts by the author and colleagues, using UV lights, Malaise traps, and focused hand-collecting, have documented 29 of the 53 species and added 8 new records (all Alleculinae). The use of blacklights on warm summer nights was par-

←

Figs. 1–16. Selected Tenebrionidae known from or near Plummers Island, Maryland, representing most of the subfamilies and diversity of the Mid-Atlantic fauna. Actual length of beetles is given in millimeters. Fig. 1, *Anaedus brunneus,* 4.8 mm; Fig. 2, *Statira gagatina,* 7.7 mm; Fig. 3, *Adelina pallida,* 5.8 mm; Fig. 4, *Dioedus punctatus,* 3.2 mm; Fig. 5, *Mycetochara fraterna,* 6.2 mm; Fig. 6, *Meracantha contracta,* 11.5 mm; Fig. 7, *Haplandrus fulvipes,* 10.8 mm; Fig. 8, *Androchirus erythropus,* 9.8 mm; Fig. 9, *Polypleurus perforatus,* 12.9 mm; Fig. 10, *Alaetrinus minimus,* 8.7 mm; Fig. 11, *Bolitotherus cornutus,* 12.9 mm; Fig. 12, *Rhipidandrus paradoxus,* 2.4 mm; Fig. 13, *Eutochia picea,* 7.9 mm; Fig. 14, *Platydema ellipticum,* 6.3 mm; Fig. 15, *Diaperis maculata,* 6.7 mm; Fig. 16, *Strongylium crenatum,* 9.5 mm.

Table 2.—Tenebrionidae recorded from Plummers Island in 25-year intervals.

Species (alphabetical order)	1900–1925	1926–1950	1951–1975	1976–present
Alaetrinus minimus (Beauvois)	●			
Alobates pennsylvanica Geer	●			●
Alphitophagus bifasciatus (Say)	●			
Anaedus brunneus (Ziegler)	●		●	●
Androchirus erythropus (Kirby)				●
Arthromacra aenea (Say)	●			●
Bolitophagus corticola Say	●			
Bolitotherus cornutus (Panzer)	●			●
Capnochroa fuliginosa (Melsheimer)	●			●
Centronopus calcaratus (Fabricius)	●			
Diaperis maculata Olivier	●	●		●
Dioedus punctatus LeConte	●			●
Eutochia picea (Melsheimer)	●		●	●
Haplandrus fulvipes (Herbst)	●			●
Helops aereus (Germar)	●		●	●
Hymenochara rufipes (LeConte)				●
Hymenorus communis LeConte	●			●
Hymenorus humeralis LeConte				●
Hymenorus illusus Fall	●			
Hymenorus niger (Melsheimer)				●
Hymenorus obesus Casey				●
Hymenorus perforatus Casey				●
Hymenorus pilosus (Melsheimer)				●
Idiobates castaneus (Knoch)	●			●
Isomira iowensis Casey	●		●	
Isomira pulla (Melsheimer)				●
Isomira quadristriata Couper	●			
Isomira sericea (Say)	●	●		●
Isomira valida Schwarz	●			
Lobopoda punctulata (Melsheimer)	●			
Meracantha contracta (Beauvois)	●			●
Merinus laevis (Olivier)	●			
Mycetochara binotata (Say)	●			
Mycetochara fraterna (Say)	●			
Mycetochara haldemani (LeConte)				●
Neatus tenebrioides (Beauvois)	●			●
Neomida bicornis (Fabricius)	●			
Paratenetus punctatus Spinola	●			●
Platydema ellipticum (Fabricius)	●			●
Platydema erythrocerum Laporte & Brullé	●			●
Platydema excavatum Say	●		●	●
Platydema picilabrum Melsheimer	●			
Platydema ruficolle Laporte & Brullé	●			
Platydema ruficorne (Sturm)	●		●	●
Platydema subcostatum Laporte & Brullé	●			
Platydema teleops Triplehorn	●			
Polypleurus perforatus Germar	●			
Pseudocistela marginata Ziegler	●			
Rhipidandrus paradoxus (Beauvois)	●			
Statira gagatina (Melshimer)	●			●
Strongylium crenatum Maeklin	●			●
Strongylium tenuicolle (Say)	●		●	●
Strongylium terminatum (Say)	●			●
Tarpela americana (Beauvois)	●			●
Tarpela micans (Beauvois)	●			
Tenebrio molitor Linnaeus	●			
Tribolium castaneum (Herbst)	●			
Uloma imberbis LeConte	●			●
Uloma impressa Melsheimer	●	●		●
Uloma mentalis Horn	●		●	
Uloma punctulata LeConte	●			
Xylopinus saperdoides (Olivier)	●			●

ticularly productive in obtaining these specimens. Species turnover from the first quarter century to the most recent, using the formula $T = (e + c)/(b + d)$ where e is the number of apparent extinctions (24), c the number of apparent colonizers (8), b the number of species detected during the first period (53), and d the number of species detected during the last period (38), is 35%. Species loss between these periods is 39%; species gain, 13%.

Discussion

Reasons for the low ''recovery'' rate of species found during the last 30 years could be due to a number of factors, as could the addition of 8 new records. Because collecting efforts are not easily quantified, and with differing equipment (e.g., kerosene lanterns versus UV lights), amount of time spent, and focus of specialists between the first and last quarter of the century, detection of some species may have been affected differentially. There also could be loss or arrival of species during the period as forest succession took place (e.g., Krombein 1963, Erwin 1981, Brown 2001, Staines 2004) or as species respond to warming climate (e.g., Abu-Asab et al. 2001, Hoffman & Steiner 2005). For soil-dwelling Tenebrionidae, shade of forest canopy can affect occurrence of some species (Steiner 1999); for wood and fungus-feeding species, host preferences or restrictions may determine presence or absence. Species turnover (35%) is relatively low compared to that of other insect families studied in a similar manner, i.e. Chrysomelidae (72.6%), Carabidae (45%), and Tortricidae (54%) (Staines 2004).

The apparent ''arrival'' of the 8 species of Alleculinae may be due to maturation of the forest, providing dead wood and tree-holes as larval habitat for some species (Steiner 1995). On the other hand, most collectors pay minimal attention to members of this group of beetles (Steiner 2004c); the use of UV lights by the author, with a focus on sampling this taxon, may have led to their recent detection.

The lack of records for certain common species is somewhat surprising and may be due simply to the limited collecting time and effort spent in examining particular habitats. *Centronopus calcaratus* is very common (Spilman 1962), and larvae have been found in pithy rotten wood and under bark through the winter, yet no recent records from the Island are known. More night collecting during the last decades probably would have yielded specimens of *Adelina pallida* (Fig. 3) and *Neomida bicornis,* both common woodland species that often are attracted to artificial lights. *Neomida bicornis* also is easily found in bracket fungi of many kinds, but these have been difficult to locate on the Island on recent visits; rotting logs have persisted for many years with little

polypore brackets, perhaps an effect of air pollution in the region (e.g., Hale & Lawrey 1979, Lawrey 1993). However, on a visit to Plummers Island on 1 January 2006, clusters of *N. bicornis* were found in a *Polyporus* bracket on the mainland, only a few hundred meters from the Island.

The common *Alobates pennsylvanica* has been found throughout the century, but its less common congener, *A. morio,* has not been found on the Island. It occurs on nearby Bear Island and often is associated with dead pine trunks on dry bluffs or shoreline edges; *Pinus virginiana* (Mill.) (Pinaceae) may have been more frequent in the early successional period on Plummers Island but perhaps not common enough to support a population of this beetle.

Two flightless species found during the early years but not in the last decades are *Alaetrinus minimus* (Fig. 10) and *Polypleurus perforatus* (Fig. 9), both of which occur in open woodland gaps (Steiner 1999); the former species has soil-dwelling larvae that live in dry pockets under sunlit leaf litter, while larvae of the latter live in fallen rotten tree branches. The semi-open knoll seen in early photographs of the Island (Shetler et al. 2006) would have provided more suitable habitat for both species than the present situation, now being more shaded by broad-leaf hardwoods. *Polypleurus* also is impacted by removal of natural deadfall wood (e.g., for firewood) which could have been a factor on the Island summit. A third species, *Eutochia picea* (Fig. 13), also wingless and specific to bluffs and slopes in open forest gaps, has persisted in a small area on the southwest-facing rocky slope near the summit, and was last observed on 1 January 2006. All three of these species have been seen recently on Bear Island, which has more extensive areas of suitable habitats on south-facing sandy bluffs.

Other species not found in the latter decades include the largest (to 25 mm long) native tenebrionid in the region, *Merinus laevis.* While sometimes locally common, usually on old live trees with extensive dead exposed wood, it may be declining in numbers throughout the state. *Bolitophagus corticola,* also not found with recent search, is host-specific on *Perenniporia* spp. (Polyporaceae) on rotten logs, especially pine; finding beetles depends on locating the sporadic combination of tree and fungus hosts, which may not occur on a small island or tract for long intervals.

Of interest is the occurrence of all 3 known Maryland species of *Strongylium* on the Island, including *S. crenatum* (Fig. 16), a relatively rare species not identified from Maryland in previous studies (Triplehorn & Spilman 1973). Specimens of all 3 species were taken at blacklights or on tree trunks on 13 July 2002. Members of this large worldwide genus are mostly tropical. Larvae tunnel in dead standing wood and probably in rotten wood in live trees. In Maryland, adults occur from late May to early September and do not overwinter.

Some species may be ''transient'' or represent ''accidental'' occurrences from outside of the local region. These species would be unable to breed at the locality due to climactic or microhabitat restrictions. A few of the cosmopolitan cereal pests may survive in forested situations, e.g., in dry tree-holes or animal nests, but most depend on human dwellings and transportation for persistence. The three adventive species mentioned above were documented only in the first quarter century, when the cabin received more constant use, including probably food storage, by visitors.

Logs and flood debris from the mountain counties may bring insects downriver from higher elevations (Ulke 1902), including species not capable of survival on the Island. The single specimen of the alleculine *Isomira quadristriata* could be an example of this. It is a boreal species, extending southward in the Appalachians and not known from anywhere else in Maryland, except Garrett County. Other boreal species with this distribution pattern, so far not documented for Plummers Island, include *Mycetochara foveata, Platydema americanum,* and an undescribed *Neatus.*

Of the Maryland Tenebrionidae, the sandy soil and beach species (Epitragini and *Phaleria* spp., most Opatrinae, some *Hymenorus* and other Alleculinae) are not known from any sites near Plummers Island and not expected to occur there, with the exception of *Blapstinus metallicus,* known from Bear Island and other sites upstream, and common around the Chesapeake shores and Atlantic coast. This species occurs on sand bars along rivers (Steiner 1999) in Maryland, and habitats on Plummers Island appear periodically suitable (see Krombein 1963: fig. 4) for colonization by this beetle, but scouring winter floods probably remove populations. This species is yet to be found on the Island.

Plummers Island represents a locality of eastern deciduous forest near the fall line on a major river (corridor for dispersal) in the mid-Atlantic region, and a ''middle ground'' for species expected to occur in Maryland and Virginia, lying between the coastal plain and Appalachian range, therefore with the potential of holding southern and northern elements. Its location, history of study, and the recovery and preservation of much of the native vegetation (including both shores of the Potomac) are the probable reasons for the species richness documented. Continued sampling likely will lead to the discovery of additional species and elucidate more detailed patterns of species loss and arrival.

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