The Helopini (Coleoptera: Tenebrionidae) of Virginia

Warren E. Steiner, Jr.
Department of Entomology, NHB-187
Smithsonian Institution
Washington, D.C. 20560

Abstract

Recent field work and examination of museum collections has led to the discovery that Virginia has seven species of the Tribe Helopini (Coleoptera: Tenebrionidae), more than most neighboring states. Virginia specimen data for species of the two currently recognized genera, Helops Fabricius and Tarpela Bates, are given, with a brief diagnosis of each species. Digital images of male specimens of each species are included, with notes on life history and habitats. Helops carolina Manee, 1924, is a junior synonym of Helops aereus Germar, 1824 (new synonymy). Tarpela americana Beauvois, 1805, and T. undulata LeConte, 1866, confused in some earlier literature, are considered to be distinct species.

Key words: biogeography, darkling beetles, habitats, Helops, new synonymy, rare species, Tarpela, Tenebrionidae.

Helopini are a speciose tribe of darkling beetles (Tenebrionidae) with members distributed primarily throughout the Northern Hemisphere and occurring in north temperate to tropical regions. In North America, the majority of species occur in the southwestern U.S. and Mexico. Of the 44 described U.S. species (Aalbu et al. 2002) (currently placed in three genera: Helops Fabricius, Tarpela Bates, Nautes Pascoe), only 11 occur east of the Mississippi River, including two undescribed Helops from Florida (Peck and Thomas 1998). The specimen records presented in this study will in part contribute to the knowledge of the diversity and distribution of the tenebrionid fauna of Virginia, a survey of which has long been desired by Richard L. Hoffman, Curator of Recent Invertebrates at the Virginia Museum of Natural History. On the occasion of his 80th birthday, this study is dedicated to him.

Tarpela and Helops, the two genera currently recognized in eastern states north of Florida, are not well defined; the tribe needs a worldwide revision. The pro- and mesosternal characters separating Tarpela and Helops in keys (Downie and Arnett 1996, Aalbu et al. 2002) are difficult to observe and interpret, but the species are easily separated. All U.S. Tarpela species, at one time placed under Helops, are fully winged (Horn 1870), whereas the majority of Helops species are flightless, with associated meso-and metasternal features. All eastern species have some degree of metallic coloration and are separated from members of other tribes by the following combination of characters: Eyes transverse, vertically elongate and parallel-sided, bulging; antennae with simple setiform sensoria; labrum transverse with prominent band of clypeal membrane across base; tarsomeres ventrally with densely pubescent pads that are more pronounced to broadly dilated in males. Median setose patches on the abdominal sterna are present in males of some Helops species. One notable field character for helopines is the distinctive death-feint posture of the beetles, with antennae held parallel and forwardly outstretched while legs are held tightly against the body.

The life history of helopines is not well known. Adults have been observed feeding on lichens on tree trunks at night (Steiner 1999) and can be collected in numbers on trees at dark, primarily in spring and early summer. Tarpela species fly to artificial lights. During the day, beetles hide under leaf litter and fallen wood at the bases of trees, and appear to be most common in well-drained sites with minimal humus depth and often with moss patches on the ground around trees. They may also hide under loose bark of dead standing wood. Burlap bands around trunks (for monitoring and control of gypsy moths) often harbor clusters of adult beetles. Larvae and pupae inhabit the soil (Steiner 1995, 1999) but are rarely collected. Species are probably univoltine; adults do not survive a full year (but may emerge during warmer winter periods, December to March in the
southern Coastal Plain). Captive female Helops spp. have been observed ovipositing in bark crevices and the young larvae tunneled into soil to begin development, apparently feeding on dead plant material.

Most of the specimens examined in this study are deposited in either the Virginia Museum of Natural History, Martinsville (VMNH), or the U.S. National Museum, Smithsonian Institution, Washington, DC (USNM); a few others cited are in the collections of Cornell University, Ithaca, New York (CUIC) and the Canadian Museum of Nature, Ottawa, Ontario (CMN). Label data are for the most part given verbatim, with commas inserted for clarity; inferred parts of abbreviated dates and names are bracketed, and breaks between labels are separated by a forward slash. The abbreviation VDNH on labels denotes collections made by staff of the Division of Natural Heritage, Virginia Department of Conservation and Recreation.

Species Accounts

Helops aereus Germar

Fig. 1

Pear-shaped and with elytra somewhat inflated, this species is faintly purplish metallic, shining, 6-9 mm in length; elytral striae are of closely spaced or fused punctures in furrows; intervals are very feebly convex, smooth, with very fine scattered punctures. The pronotum is widest at about the basal one-third to middle. Flight (hind) wings are vestigial, about half the length of the elytra. Males have median patches of golden hairs on the basal and second abdominal sternae.

The distribution of this common species has been roughly mapped and includes many eastern states but it does not reach Florida (Steiner 1999); Downie and Arnett (1996) listed it for Virginia. Beetles can be observed in numbers on tree trunks in open woodlands on warm spring nights. They seem to be most abundant at drier forest edges or gaps.

Helops carolina Manee (1924), described (apparently as a weevil) from Southern Pines, North Carolina, and listed in catalogs (Brimley 1938, Gebien 1943), is recognized here as a junior subjective synonym of Helops aereus Germar, 1824 (NEW SYNONYMY). The description does not include a type designation or label data, but the stated “Length, 7.5-8 mm,” suggests that Manee had at least two specimens at the time. In the USNM there are three determined (probably by T. J. Spilman, ca. 1970) specimens, one labeled “TOPOTYPE,” collected by Manee, all on “III-12-20.” Comparison of these specimens with many H. aereus from other localities, including characteristics of male genitalia, show that they are only smaller-than-average individuals of H. aereus. Two additional specimens labeled “southern Pines, N.C., A. H. Manee” are in the Casey Collection; both lack a collection date (but were donated to USNM upon Casey’s death in 1925) and were identified by Casey as Helops aereus. Even Casey, notorious for species-level “splitting,” did not separate these out among specimens from other localities.

Specimens examined:

[Accomack Co.]: Accomac, Dieke / III.31.1940 / G. H. Dieke Coll’n. 1965 (1); same data except VI.12.1940 (1).
[Arlington Co.]: Arlington: at Chain Bridge, 23 April 1983, W. Steiner, A. Gerberich, E. Bishop & J. Boyd (1); Glencarlyn, 1-VII-[19]06, F. Knab (1); Rosslyn, coll. F. H. Chittenden (3).
[Campbell Co.]: 7 km S Lynchburg, 25 March 1986, J. R. Mawdsley (1); same data except 13 June 1987 (1).
[Cumberland Co.]: 2 km SW of Columbia / clearcut North, 2 Mar 1990, J. C. Mitchell (1); same data except 1 May 1990 (1), 17 May 1990 (3); 5.5 km SW of Columbia / clearcut South, 12 M[ar]ch 1990, J. C. Mitchell (1); same data except Sept 30 1990 (1); same data except pinewoods, 17 Mar 1990 (1), 1 May 1990 (1), 2 Sept 1990 (2); 7 km SW of Columbia / 17 March 1990, J. C. Mitchell (1); same data except 1 May 1990 (2).
M. Greene collection (2); Franconia, Huntley Meadows area, 19 March 1989 / W. E. Steiner & J. M. Swearingen collectors (5); same date except 8 April 1990 (2), 5 April 1996 (4), 20 March 2002 (2); Great Falls, 27 VI (no year given), D. H. Clemons collector (1); same locality except 15-V-1915 (no other data) (1); same locality except 10 April 1988, colls. W. E. Steiner, J. M. Swearingen et al. (3); Turkey Run Park, slope S of Lot C-2, 38°57′N, 77°09′W, 6 April 2008 / Under dry leaves at base of beech trunk, mossy ground, Coll. W. E. Steiner & J. M. Swearingen (4).

**Franklin Co.**: Rocky Mount, 37°0′N, 79°54′W, 6 September 1995, coll W. E. Steiner / Found dead when collected (1 hind body).

**Fauquier Co.**: Belvoir / IV 8, 1935 / G. H. Dieke Coll’n. 1965 (2); same data except IV.12.1941 (1).


[Lee Co.], Pennington Gap, Coll. Hubbard & Schwarz (1).

**Louisa Co.**: 4 mi S Cuckoo / 26 IV-4 V 1988, Malaise trap, D. R. Smith (1).

**Lunenburg Co.**: Juniper Cr[eek]., 4 mi N Rehoboth / 6 June 1991, VMNH survey (1).

**New Kent Co.**: Quinton, 28 April 1984 / W. E. Steiner, A. G. Gerberich & J. Boyd collectors (1).


**Stafford Co.**: Fredericksburg, 28 April 1984 / W. E. Steiner, A. G. Gerberich & J. Boyd collectors (1).

**City of Virginia Beach**: Munden Point, 2 mi S Creeds / 18 June 1990, N. L. Bland & K. A. Buhlmann, 90-47 (1).


*Helops cisteloides* Germar

Fig. 2

Beetles are 10-13 mm in length, spindle-shaped, uniformly purplish bronze, with elytral striae of irregularly spaced punctures, some elongate; intervals are nearly flat, smooth, with small, randomly scattered punctures. The pronotum is widest at about the apical one-third. Flight wings are vestigial, less than one third the length of the elytra. Males have median patches of fine golden hairs on all abdominal sternae and the apical sternum is setose in both sexes.

*Helops cisteloides* is widespread in spite of its flightlessness. Reported from Ohio to Missouri and Louisiana, and Florida (Downie and Arnett 1996), it is also frequent in the southeastern Coastal Plain, based on unpublished state records in USNM which include occurrences from New Jersey to northern Florida. It is reported from the Carolinas (Brimley 1938, Kirk 1969, 1970), Maryland (Steiner 2008), Liberty County, Florida (Peck and Thomas 1998); the first Virginia records are presented here. The species appears to be restricted to localized areas of sandy soil “barrens” in the northeastern part of its range.
Specimens examined:

City of Suffolk: South Quay Pine Barrens, 7 km SSE of Franklin, 33°36′N, 76°55′W, 20 July 2003 / W. E. Steiner, J. M. Swearingen et al. collectors (1, found dead as fragments).

Isle of Wight Co.: Blackwater Ecological Preserve, Antioch Pines [natural] [area] [preserve], burned unit #1, 30 April 2002, P. Koury, pit fall trap (1); same data except unburned unit, 6 July 2002 (1); 6 km S Zuni at Blackwater River, 12 April 1989, W. E. Steiner (12); 7 km S Zuni, Blackwater Eco[logical]. Preserve / pine savanna, C. A. Pague, 30 Jan. 1985 (1); Zuni Pine Barrens / 14 March 1995, S. M. Roble (1).


Helops gracilis Bland

Fig. 3

This species probably belongs to a group of primarily western U.S. species. The slender body form, 6.5-10 mm in length, with uniformly purplish bronze color and somewhat dull luster, and elytral striae of distinct linear punctate grooves and intervals flat and smooth, will distinguish this species. The pronotum is widest at about mid-length. Flight wings appear to be fully developed. Males lack the median patches of fine golden hairs on abdominal sterna and both sexes are similar in form, unlike the other eastern Helops.

Helops gracilis was described from New Jersey; Downie and Arnett (1996) listed only that state for its known distribution, but Leonard (1928) had reported it from two localities on Long Island, New York, and a Maryland specimen (Steiner 2008) was recorded by T.J. Spilman (unpubl. data, USNM) as well as one labeled North Carolina. The recent report of its occurrence in coastal New Brunswick, Canada (Majka et al. 2008) is noteworthy; the single known specimen was collected in 1939. Rare in collections, most specimens are from pine barrens and bog localities in New Jersey, but with little or no label data as to habitat. The specimens cited here, representing a new state record for Virginia, were found under dry loose bark of a fire-killed Loblolly Pine (Pinus taeda L.) in a transitional area between low swamp forest and open sand gaps. The author has also found a series under bark of a fallen Atlantic White Cedar (Chamaecyparis thyoides [L.] B.S.P.) in New Jersey, also at the edge of a bog and open sand barrens.

Specimens examined:

Isle of Wight Co.: 6 km S Zuni at Blackwater River, 12 April 1989, W. E. Steiner (6).

Helops sulcipennis LeConte

Fig. 4

Beetles are similar in form to H. aereus but have the elytral intervals distinctly raised; the very heavily punctate pronotum is widest just anterior to middle. Body length ranges from 7-12 mm. Appendages are relatively long when compared to those of H. aereus; flight wing condition is similar. Males lack median patches of golden hairs on the abdominal sterna except for the apical one which bears a transverse brush of hairs; in females the brush is reduced and divided at the middle.

The distribution of this southern Appalachian species was mapped and discussed by Steiner (1999), who reported it from Virginia for the first time. In Virginia, it is known only from the single collection from Mt. Rogers.

Specimens examined:


Tarpela americana (Beauvois)

Fig. 5

Beetles vary greatly in size (8-15 mm long) and are more parallel-sided than other species; the metallic polished elytra and pronotum are for the most part uniformly purplish but with greenish to bronze margins. Elytral striae are distinct and unbroken; intervals are flat and randomly, finely punctate. The undulate lateral margins of the pronotum are diagnostic.

Downie and Arnett (1996) listed T. undulata (LeConte) for Virginia but this is undoubtedly a misidentification, probably based on suspected synonymy among the two species (Horn 1870, Leng 1920). Notes and identifications by T. J. Spilman (USNM) and comparative studies by the author indicate that the two are distinct, with T. undulata being restricted to the Florida Peninsula and T. americana having a more widespread distribution in the eastern states. Both species are very similar but the form of the male genitalia is quite different.

Specimens examined:

Alexandria Co. [now Arlington Co.]: Maywood, May 25, 1916 / W. L. McAtee Collector (1); same data except
June 5, 1916 (1).


Campbell Co.: 7 km S. Lynchburg, 2 June 1987, J. R. Mawdsley (1); same data except 13 June 1987 (1), 22 May 1988 (1).


Dickenson Co.: Breaks Interstate Park / 1-13 July 2000, Robert Vigneault (3); same locality except 20-25 May 2001, Robert Vigneault & Paul Harrison (1).


[Fauquier Co.]: Warrenton (no date given) / F. W. Poos Collector (1); [county label only] IV 8, 1935 / G. H. Dieke Coll’n. 1965 (2); same data except IV.12.1941 (1).


[City of Richmond]: U. of Richmond, 7-28 1936, Pastore Coll. (1); same locality except 7/21 1978, Kim Tam Coll. (1).


Tarpela micans (Fabricius)

Fig. 6

The largest (12-19 mm long) and most conspicuous helopine in the region, this species is recognized by the metallic “oily rainbow” coloration, especially on the elytra which are longitudinally striped with blending colors. Blatchley (1910) referred to it as “Our most brilliant member of the family.” Pads of the front and middle tarsi are conspicuously dilated in males.

This is the only Tarpela species known to occur in Canada (Bousquet and Campbell 1991) and it occurs widely (Downie and Arnett 1996), as far south as northern Alabama (Löding 1945), but previously has not been reported from Virginia.

Specimens examined:

Alexandria Co. [now Arlington Co.]: Maywood, April 29, 1916 / W. L. McAtee Collector (1).


Campbell Co.: 7 km S. Lynchburg, 15 April 1985, J. R. Mawdsley (4); same data except 7 June 1988 (1).

Caroline Co.: Bowsies Pond, 6 km NW Bowling Green, 28 April 1984 / W. E. Steiner, A. G. Gerberich & J. Boyd collectors (2).

Charles City Co.: 8 km S Holdcroft at Morris Creek, 28 April 1984 / Under leaf litter at base of Quercus alba / W. E. Steiner, A. G. Gerberich & J. Boyd collectors (2).


Clarke Co.: 4.1 mi. W. Paris, Hwy. 50 at Shenandoah Riv[er]. ca. 400′, 3-4.Vii.1970 / UV & White lite, T. L.

Fairfax Co.: Alexandria (Rose Hill), VI-13-[19]76, P. A.
Figs. 1-4. 1. Helops aereus. Length 8.5 mm. 2. Helops cisteloides. Length 12 mm. 3. Helops gracilis. Length 9.5 mm. 4. Helops sulcipennis. Length 8 mm.
Opler, at light (1); 4 km SW Clifton at Bull Run, 23 April 1983, W. Steiner, A. Gerberich, E. Bishop & J. Boyd (3) and same data except with second label, Reared from larva in humus under rotten log, em[erged] 29 Aug. 83 (1); at Dead Run, 38°58′N, 77°10′W, 4 May 2006, W. E. Steiner et al. (3); Great Falls, 10 April 1988, colls. W. E. Steiner, J. M. Swearingen et al. (3); Falls Church, July 4, [19]17 / I. N. Gabrielson Collector (1); same locality except 4.28. [19]71, T. J. Spilman (1); Langley, V-[19]04 / Wm. Palmer collector (1); Lincolnia, 30 Apr. 1983, J. Boyd collr. / In leaf litter at night (1); near Plummer[s] Is[land], Md., 13.4.[19]21, H. S. Barber (1); River bend near Forestville, 30.V.[19]55 / on twig of Fagus (1); Springfield, 5-7 June 1976, R. D. Ward (1); 4 km N Vienna at Wolf Trap Farm Park, 38°56′N, 77°16′W, 15 June 1992 / W. E. Steiner & J. M. Swearingen collectors (1).


**Loudoun Co.:** Middleburg, at Goose Creek, 23 April 1983, W. Steiner, A. Gerberich, E. Bishop & J. Boyd (1).


**Stafford Co.:** Fredericksburg / 28 April 1984, W. E. Steiner, A. G. Gerberich & J. Boyd collectors (1); Stafford, 7 May 1960, E. L. Todd (3).

**Warren Co.:** 4 km NNW Linden, 335 m (Skyland Estates), 23 June 1984, W. E. Steiner & T. P. Nuhn (1).

**Washington Co.:** 5 km W Konnarock, 36°39′N, 81°43′W, 1 July 1995, coll. W. E. Steiner & J. M. Swearingen (1, elytron only).

(State label only): May 30 [19]′21, E. A. Preble (1).

_Tarpela venusta_ (Say)

Fig. 7

This is the smallest (7.5-10 mm long) and least frequently collected of the three _Tarpela_ species reported here and is distinct in having the oily metallic coloration of _T. micans_, but with surfaces more polished, and elytral intervals strongly convex. Adult beetles have been observed active on tree trunks and flying during the day as well as after dark.

The species is listed as occurring in Virginia by Leng (1920) but no specific localities have been reported for the state. Like the previous species, it occurs widely (Downie and Arnett 1996), south to the Gulf Coast of Alabama (Löding 1945).

**Specimens examined:**


**Fairfax Co.:** Mt. Vernon, VII-6-1918, Shoemaker Coll. (1); same data except VI-20-[19]20 (5), VII-14-1921 (1), VI-17-1923 (2); same data except [no collector given] VI-26-1916 (1), VI-20-[19]20 (1).

**Greensville Co.:** Fontaine Creek, 1.2 km S Dahlia / 6 June 2002, K. L. Derge, UV, VDNH survey (1).

**Henrico Co.:** Chickahominy River / 4 km upstream Bottoms Bridge / 4 July 1999, Irv T. Wilson, VDNH, UV (2); same data except Wilson Farm, 3 June 2000 (1).

**Nelson Co.:** (no specific locality) June 26, 1915, W. Robinson (1); same data except July 8, 1916 (1).

**City of Richmond:** Westhampton Dist[ric]t, June-July 1991, Wendy Mitchell (1).


County undetermined: Jeff[er]s[on] Nat[j]ional For[est], June 6, 1976, R. C. Froeschner (1).

With the seven species recorded here, Virginia holds the greatest diversity of this tribe for all eastern states, except perhaps neighboring North Carolina. Four of these, _Helops aereus_ and all three _Tarpela_ species, are widespread forest beetles that have been found to co-occur in a number of instances. The other three _Helops_ species are rare in collections, apparently more restricted in distribution and include the sand barren relictuals _H. cisteloides_ and _H. gracilis_, co-occurring at the Zuni barrens, and the southern Appalachian endemic, _H. sulcipennis_, which inhabits mid-elevation forests and reaches its northern limit in southwestern Virginia.

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References Cited


Leonard, M.D. 1928. A list of the insects of New York with a list of the spiders and certain other allied groups. Cornell University Agricultural Experiment Station Memoir 101. 1,121 pp.


