

An Annotated List of the False Click Beetles of Virginia (Coleoptera: Eucnemidae)

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ABSTRACT

Thirty-two species of Eucnemidae are documented for the Virginia fauna, seven of them (*Golbachia impressicollis*, *Isarthrus calceatus*, *Rhagomicrus humeralis*, *Euryptychus heterocerus*, *E. ulkei*, *Onichodon orchisides*, and *O. downiei*) for the first time. Fourteen additional species that may occur in the state are also discussed.

Key words: Coleoptera, Eucnemidae, false click beetles, Virginia.

INTRODUCTION

The Eucnemidae is a moderate-sized family of beetles, related to the Elateridae in general body form (including the ability to “click”) and structure of the male genitalia. A distinct and easily-seen difference is the *subterminal*, eccentric attachment of the 2nd antennomere to the first: strictly terminal in elaterids. Species of the family have acquired a variety of special modifications absent from elaterids, such as crests of setae on the meso- and metatibiae, and prominent circular pits on or near the dorsal procoxal condyles.

The classification of North American eucnemids was not well-established prior to publication by Jyrki Muona (2000) of a revision of the Nearctic fauna, which provided diagnoses and keys for all taxon levels, descriptions of all species and drawings for many of them, and full collection data for all specimens examined. With this valuable base-line resource at hand, it is now possible to identify material with confidence and predict which

species may be expected to occur in any given region on the basis of known distributions. In the following pages all citations to “Muona” refer to this revision unless specifically indicated otherwise. As the first step toward a detailed treatment of the Virginia eucnemid fauna, we offer here an annotated list of the 32 species actually documented for the state as well as justification for inclusion [bracketed] of 14 other species that will almost certainly be added with additional collecting, giving a projected total of about 46 likely native resident species of this family (but the case of *Dendrocharis inexpectata* reminds that almost any eucnemid known from eastern North America may turn up in Virginia). Collection data are provided for the seven species here added to the known fauna as well as others represented in recent collections at the Virginia Museum of Natural History (VMNH), the National Museum of Natural History (USNM), and the personal collections of the second author (RLO) and Dr. Arthur V. Evans (AVEC).

In contrast with various other beetle families (e.g.,

Scarabaeidae, Elateridae, Chrysomelidae), the species of Eucnemidae can generally be considered as under-represented in most collections, and many are known from only a handful of specimens despite continent-wide ranges. The majority of species appear to be largely dendrophilous, requiring assiduous “beating” of trees and rearing from dead branches, and most are not attracted to ultraviolet light traps. Several species have been taken in some numbers in Malaise traps. Accumulation of material in local collections (and in major museums as well) has been slow and some time may pass before we can aspire just to having material of all the species likely to occur in Virginia, to say nothing of being able to define their in-state distribution in any detail. Perhaps greater attention to the collection and rearing of larvae would be a fruitful course to pursue.

One point about the biology of eucnemids mentioned repeatedly throughout Muona’s paper is that a number of species are extremely rare over extensive ranges, and some have not been collected in recent decades (one for over a century). Perhaps the extensive deforestation of North America since 1800 is a contributing factor by reducing the number of obligatory host trees.

Muona’s description of rare new species from a few localities in Maryland, Indiana, and Florida reflects the retarded condition of our knowledge of these beetles. Even new taxa may be found in Virginia, an incentive for increased attention to our local fauna.

The arrangement of taxa at all levels in the following list follows that of Muona’s monograph.

EUCNEMIDAE

Perothopinae

Perothops mucida (Gyllenhal)

Widespread in eastern United States from Maine to Florida. Mount Vernon, Fairfax Co. (USNM) is the only known Virginia locality, however.

Phyllocerinae

[*Anelastes drurii* Kirby]

Continent-wide in range; in the southeast recorded from Florida to North Carolina (Raleigh) and thus likely to be discovered in the Southside or Tidewater regions of Virginia.

Pseudomeninae

Schizophilus subrufus (Randall)

Widespread but not common in eastern United States, recorded by Muona from East Falls Church, Fairfax Co.

Melasinae

Melasis pectinicornis Melsheimer

Generally distributed over eastern United States; recorded by Muona from Fairfax and King & Queen counties and the City of Chesapeake. VMNH has specimens from *Essex Co.*: 1.5 km SE of Dunnsville, 11 April 1991, Malaise trap, D. R. Smith (1) and *King & Queen County*, without specific locality, 24 February 1940, L. A. Hetrick (2). Collectively these records imply a distribution in the Coastal Plain.

[*Isorhipis nubila* (Bonvouloir)]

A rarely collected species apparently restricted to southeastern United States, this beetle was documented by Muona for Alabama, Florida, Georgia, and South Carolina. It is therefore not unlikely that it occurs also in the Tidewater region of our state.

Isorhipis ruficornis (Say)

Listed from Fairfax and Montgomery counties by Muona, and also recorded from the former by Evans (2008). The record for Virginia Beach by Van Horn (1909) was apparently based on a misidentified specimen of the following species.

Isorhipis obliqua (Say)

The most commonly collected eucnemid in eastern United States according to Muona, who listed specimens from Bath and Mecklenburg counties and the City of Norfolk. We have seen material from Chesterfield, Clarke, Essex, Dickenson, Henrico, Louisa, Northampton, Powhatan, Rockingham, and Sussex counties, reflecting a pervasive statewide range in Virginia. Virtually all of the 35 VMNH specimens were taken in Malaise traps during May and June.

According to J. Muona (*in litt.* to RLO) the larva illustrated by Van Horn (1909, figs. 1-3) under the name *Tharops ruficornis* is actually a specimen of *I. obliqua*.

[*Hylocharis nigricornis* (Say)]

With the known range extending from Massachusetts to Iowa, this species is a likely candidate for discovery in our western mountains.

[*Xylophilus cylindricornis* (Horn)]

This uncommon beetle occurs primarily in western North America, with a few isolated records cited by Muona for Kentucky, New Hampshire, New York, and West Virginia (Hardy Co.: W. Northeimer, in Malaise trap). The last-named site raises the likelihood that *X. cylindricornis* occurs sporadically in western Virginia.

[*Xylophilus crassicornis* Muona]

A very rare species known only from the female holotype collected at Annapolis, Maryland, thus a probable resident of the Virginia Coastal Plain.

[*Hylis frontosus* (Say)]

Recorded from Maryland and North Carolina, this species will surely be collected in Virginia.

***Hylis terminalis* (LeConte)**

This beetle is recorded from Quebec to Michigan, southward in the Atlantic states to North Carolina. Muona saw a single specimen labeled only "Va." VMNH has specimens from *Accomack Co.*: Chincoteague National Wildlife Refuge, 10-26 June 1998, A. C. Chazal, (1) and *Franklin Co.*: Rt. 623 bridge at end of Philpott Reservoir, 25 May 2000, A. C. Chazal (1), suggesting a probable statewide distribution.

***Dirrhagofarsus lewisi* (Fleutiaux)**

Muona examined only 38 specimens of this species, from Georgia, West Virginia, and Pennsylvania, and assented to the suggestion of Ford & Spilman (1979) that *D. lewisi* is a recent adventive species from Japan. Material in the VMNH collection was taken from the sea coast to as high as 3800 ft. (1158 m) in the Blue Ridge. Apparently the beetle has successfully established itself as a permanent member of our fauna, to which it was recently added on the basis of specimens captured on the Virginia side of the Potomac River Gorge in Fairfax County (Evans, 2008).

City of Virginia Beach: First Landing State Park, 23 June-6 July 2003, R. Vigneault (1). Pendleton Navy Base, Lovett's Marsh, in pitfall, 28 June 1989, K. A. Buhlmann

(1). *City of Richmond*: Westhampton, at house lights, April-August 1990-95, Wendy H. Mitchell (6). *Cumberland Co.*: 2 km S of Columbia, pitfalls, 15 July-15 August 1990, J. C. Mitchell (3). *Essex Co.*: 1.5 km SE of Dunnsville, Malaise trap, 14 June 1991, D.R. Smith (1). *Greensville Co.*: 1.2 mi. S of Dahlia, Rt. 301, 6 June 2002, UV trap, K. L. Derge (1). *Floyd Co.*: Buffalo Mountain Natural Area Preserve, SE of Willis, 20 June 2001, UV trap, S. M. Roble (2). *Louisa Co.*: 4 miles S of Cuckoo, Malaise trap, 8-12 June 1988, D. R. Smith (3). *Northampton Co.*: Savage Neck Dunes Natural Area Preserve, Eastville, 20 May-23 June 2003, A. C. Chazal and S. M. Roble (2). *York Co.*: Grafton Ponds, in pitfall, 11 June 1990, C. A. Pague (1).

***Microrhagus audax* Horn**

Widespread but uncommonly collected, in the experience of Muona, who saw one specimen from this state, labeled only "Va." VMNH has the following specimens: *Cumberland Co.*: 7 km SW of Columbia, pitfalls, 2 September 1990, J. C. Mitchell (1). *Dickenson Co.*: Breaks Interstate Park, 10-14 June 2002, R. Vigneault (1). *Essex Co.*: 1.5 km SE of Dunnsville, Malaise trap, 2-11 July 1991, D. R. Smith (2). *Louisa Co.*: 4 miles S of Cuckoo, 26 April-4 May 1988, Malaise trap, D. R. Smith (1).

***Microrhagus pectinatus* LeConte**

The range of this species is continent-wide (British Columbia to Nova Scotia), extending southward in the Appalachian region as far as northern Georgia. It was recorded by Muona from Virginia on the basis of a specimen with no precise locality data. VMNH specimens are from near sea level to about 3500 feet (1067 m): *Bedford Co.*: Sharp Top Mountain, Peaks of Otter, UV trap, 13 June 2001, J. C. Ludwig (1). *Essex Co.*: 1.5 km SE of Dunnsville, Malaise trap, 29 April 1981 (1), 4-14 May 1993 (1), D. R. Smith. *Louisa Co.*: 4 miles S of Cuckoo, Malaise trap, 25 April-13 May 1988, D. R. Smith (2).

***Microrhagus subsinuatus* LeConte**

Widespread over much of eastern North America (but rare or absent from most of the southeastern states), this species was recorded by Muona from Alexandria, Fairfax, and Fluvanna counties, Virginia. VMNH collections add the following records: *Cumberland Co.*: 2 km S of Columbia, pitfalls, 16 June 1990, J. C. Mitchell (1). *Dickenson Co.*: Breaks Interstate Park, 1-14 July 2000, R. Vigneault (1). *Floyd Co.*: Laurel Fork Creek, 3.3 miles

W Blue Ridge Parkway, 17 June 2007, S. M. Roble (1).
Henry Co.: Martinsville, 15 July 2005, R. L. Hoffman (1).
Louisa Co.: 4 miles S of Cuckoo, Malaise trap, 14-26
 May 1988, D. R. Smith (1).

***Microrhagus triangularis* (Say)**

Widespread and common in eastern North America, and apparently statewide in Virginia. Muona saw USNM material from Lee and York counties, and the cities of Chesapeake and Virginia Beach. Our records are from Appomattox, Clarke, Dickenson, Essex, Fairfax, Floyd, and Patrick counties. Numerous specimens were taken in Malaise traps in Essex County, 14 June to 26 July.

***Golbachia impressicollis* (Bonvouloir)**

New State Record, New Northernmost Record

Material available to Muona defined a range extending from Louisiana and southern Florida to Wilmington, North Carolina. Four VMNH specimens extend this range some 200 km northward as far as the Eastern Shore of Virginia. *City of Chesapeake*: Northwest River Park, ca 5 mi. SE of Hickory, 5-16 July 2004, R. Vigneault (1). *City of Suffolk*: South Quay pine barrens, ca 6 mi. S of Franklin, UV trap, 23 July 2002, S. M. Roble & C. S. Hobson (1). *City of Virginia Beach*: False Cape State Park, UV trap in oak-pine woods, 3 August 2005, S. M. Roble (1). *James City Co.*: York River State Park, 27 July 2006, Chazal and Erdle (AVEC 1). *Northampton Co.*: Savage Neck Dunes Natural Area Preserve, Eastville, Malaise trap, 28 July-27 August 1999, S. M. Roble (1).

Muona's drawing of the forebody in lateral aspect does not indicate the antennal groove clearly; we herewith provide a sketch (Fig. 1) made from a slightly more ventrolateral view that shows the abrupt anterior obliteration of the very shallow groove. The subocular surface is, however, concave and may serve as a rudimentary groove.

[*Adelothyreus dejeani* Bonvouloir]

Confirmed range is from Florida to Louisiana. However, if the record for Maryland by Horn (1886) can be confirmed, the species would become a likely candidate for discovery in Virginia also.

[*Adelothyreus downiei* Muona]

Known only from Indiana, Oklahoma, Pennsylvania, and West Virginia. The record for Morgan County in the last-named state permits the assumption that this very rare species may be found in western Virginia.

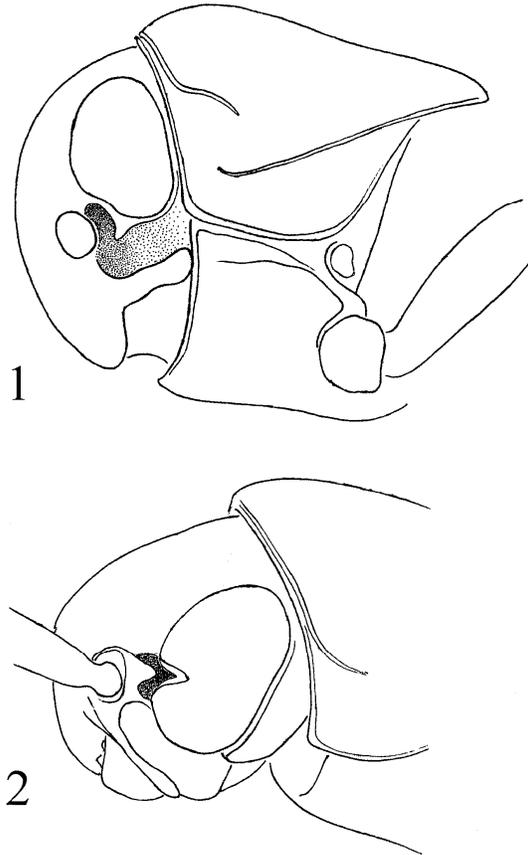


Fig. 1. *Golbachia impressicollis*. Ventrolateral aspect of forebody to show anterior obliteration of the shallow thoracic antennal groove, and the distinct subocular groove continuous with the postantennal sensory pit. Fig. 2. *Entomophthalmus rufiolus*. Lateral aspect of head showing the prominent notch in the eye immediately adjacent to the postantennal sensory pit. The subocular (genal) surface is only slightly excavated as a rudimentary antennal groove.

***Entomophthalmus rufiolus* (LeConte)**

Another fairly common species that is widespread in eastern United States. Muona cited a USNM specimen from Shenandoah County. VMNH has material from three additional localities: *City of Richmond*: Westhampton, house lights, June-July 1991, Wendy H. Mitchell (1). *Buchanan Co.*: Grassy Fork, Va. Rt. 80 at KY state line, 28 June 1991, J. M. Anderson (1). *Essex Co.*: 1.5 km SE of Dunnsville, Malaise trap, April 1987 (1), 2 July 1991 (1), 11 July 1991 (4), 26 July 1991 (1), D. R. Smith.

Nowhere in Muona's monograph is there any reference to the condition of the eyes in this species, a curious fact since the derivation of the generic name basically means "cut-eyes". Inspection of specimens

shows that there is in fact a relatively prominent notch of the eye outline immediately adjacent to the deep postantennal sensory pit, as shown in our drawing (Fig. 2). This condition appears to be unique, at least in the North America fauna, and constitutes a definite and easy to see generic recognition character. Bonvouloir obviously had a good reason for his choice of a name for the genus to which this beetle belongs.

Rhagomicrus humeralis (Say)
New State Record

Although recorded from many eastern states, this species was not represented by Virginia specimens in material examined by Muona. It is apparently not abundant, as our single specimen was captured at a site from which a number of eucnemid species have been collected. *Essex Co.*: 1.5 km S of Dunnsville, 11 July 1991, Malaise trap, D. R. Smith (1).

Rhagomicrus bonvouloiri (Horn)

Although this species is generally distributed in eastern North America, the known localities are relatively few and dispersed. Muona saw Virginia material only from Shenandoah County (USNM), to which we can add another: *Appomattox Co.*: Holiday Lake State Park, 14-28 June 1999, R. Vigneault (RLO 1).

Sarpedon scabrosus Bonvouloir

Although represented on both sides of the continent, this species is not recorded south of Virginia and Tennessee. Specimens in USNM are from Fairfax and Nelson counties.

Eucneminae

Dendrocharis inexpectata Muona

This relatively large eucnemid was known from only two specimens taken in Florida and Texas until it was found in southeastern Virginia several years ago. Details of this capture, comments on some discrepancies in the original description, and drawings of structural details have been published separately (Hoffman, 2008). *City of Virginia Beach*: First Landing State Park, 23 June-7 July 2003, R. Vigneault (2).

Stethon pectorosus LeConte

Although documented for nearly all of the eastern states, this species has only recently been reported for

Virginia, at the Potomac River Gorge, Fairfax County (Evans, 2008). Two additional collections are from *Appomattox Co.*: Holiday Lake State Park, 14-28 June 1999, R. Vigneault (RLO 5), and *Chesterfield Co.*: 63310 Qualla Road, Chesterfield, March-September 2003, C. R. McClung (AVEC 1).

[*Eucnemis americana* Horn]

This rare species occurs on the Pacific Coast and eastern North America, north of the latitude of New Jersey and Indiana. A record for Westmoreland Co., Pennsylvania, suggests the possibility of its eventual capture in the mountains of western Virginia.

Macraulacinae

Euryptychus heterocerus (Say)
New State Record, New Southern Record

Considered by Muona to be “a rare eastern species”, with most of the specimens he examined being taken prior to 1930. Its range extends from New York to Wisconsin and Oklahoma, the VMNH material from Virginia being southernmost for the Atlantic Coast states. *Fauquier Co.*: Bull Run Mountains, UV light, 30 July 1998, A. C. Chazal, C. S. Hobson, G. Fleming (3).

Euryptychus ulkei (Horn)
New State Record

A more southern species than the foregoing, *E. ulkei* has nonetheless been documented for southern Ohio and western Pennsylvania, anticipating its eventual discovery in Virginia: *City of Chesapeake*: Northwest River Park, 5 miles SE of Hickory, 30 July 1999, R. Vigneault (RLO 1).

Onichodon orchesides Newman
New State Record

Widespread in the northern states and adjacent Canada (Quebec to North Dakota) but more sporadic southward (Arkansas, Mississippi, North Carolina); Virginia specimens were not recorded by Muona. Material at hand (VMNH except as noted) is from a statewide transect: *City of Virginia Beach*: False Cape State Park, UV light, 17 August 1998, S. M. Roble (1); First Landing State Park, 23 June-7 July 2003, R. Vigneault (1), 16-17 June 2007, M. E. Dougherty (AVEC 1). *Patrick Co.*: west end of Philpott Reservoir, Rt. 624, UV trap, A. C. Chazal (1). *Dickenson Co.*: Breaks Interstate Park, 1-14 July 2000, R. Vigneault (1).

[*Onichodon canadensis* (Brown)]

Recorded from as near as Snyder Co., Pennsylvania, this northern species is a possible member of our fauna.

[*Onichodon rugicollis* (Fall)]

Having been found only 35 miles (56 km) south of the Virginia state line at Durham, North Carolina, this austral species may be considered a probable resident in our "Southside" counties.

Onichodon downiei Muona
New State Record

This recently-described species is known from "Maryland" and western Pennsylvania, anticipating its discovery in northern or western Virginia. We confirm that possibility with a record for *Appomattox Co.*: Holiday Lake State Park, 14-28 June 1999, R. Vigneault (RLO 2).

Fornax bicolor (Melsheimer)

Accounted to be a rare southeastern species by Muona, who adds "most records from other areas are old or very old." Only single collections were cited by him for most states, including only Nelson County for Virginia. VMNH has three specimens: *Essex Co.*: 1.5 km SE of Dunnsville, Malaise trap, 26 June 1991, D. R. Smith (1). *Nottoway Co.*: Fort Pickett, Twin Lakes, UV in pine forest, 10 June 1999, A. C. Chazal (1). *City of Virginia Beach*: First Landing State Park, UV trap, without date [June or July 2006], P. Bedell and A. C. Chazal (1).

Isarthrus rufipes (Melsheimer)

Recorded by Muona from most of the eastern states, including Virginia (Fairfax County). The single specimen we have seen came from a very nearby locality: *Prince William Co.*: Manassas National Battlefield Park, near Stone Bridge, pitfall trap, 26 May-21 June 1999, A. C. Chazal (1).

Isarthrus calceatus (Say)
New State Record

This widespread eastern species has been documented from both north (District of Columbia) and south (Georgia) of Virginia, and was therefore certainly to be expected as a component of our fauna.

Isle of Wight Co.: Zuni Pine Barrens, Blackwater Ecological Preserve, 15 April 2006, A. V. Evans & D. Loomis (AVEC 3).

Dromaeolus badius (Melsheimer)

Known from most of the eastern states, specimens of this species were seen by Muona from Fairfax County, Virginia. VMNH specimens are from *Nottoway Co.*: Piedmont Research Station, Blackstone, 6 July 1977, P. Egan (1) and *York Co.*: ponds at Grafton, 19 October 1990, K. A. Buhlmann (1). An eastern, lowland distribution in the state is thus suggested.

Dromaeolus cylindricollis (Say)

Although widespread in eastern North America, this species apparently does not occur in the southeastern Coastal Plain. It is known from Fairfax, Lee, and Nelson counties (Muona) and the following new locality: *Patrick Co.*: Fairystone State Park, 27 June 1999, R. Vigneault (RLO 1).

Dromaeolus striatus LeConte

Considered by Muona to be "an uncommon, predominantly southeastern species" that he recorded from Fairfax County and the City of Chesapeake. Additional localities are: *Appomattox Co.*: Holiday Lake State Park, 14-28 June 1999, R. Vigneault (RLO 1). *Cumberland Co.*: 5.5 km S of Columbia, pinewoods DF site [pitfalls], 2 September 1990, J. C. Mitchell (2). *Essex Co.*: 1.5 km SE of Dunnsville, Malaise traps, 11 July 1991, D. R. Smith (4). *Louisa Co.*: 4 miles S of Cuckoo, Malaise trap, 28 April-4 May 1986, D. R. Smith (1). *Pittsylvania Co.*: Sandy Level, 8 September 1991, sweeping, R. L. Hoffman (1). *City of Virginia Beach*: First Landing State Park, mesic pitfall site, 18 August 1989, K. A. Buhlmann (1).

[*Dromaeolus punctatus* LeConte]

This species is documented from North Carolina to Tamaulipas, Mexico, dominantly at lower elevations. It probably occurs in Southside Virginia.

[*Dromaeolus turnbowi* Muona]

With a known distribution from West Virginia south to Georgia and Louisiana, this species is a likely resident of our far southwestern counties.

Thambus horni Muona

Another widespread but rarely collected species, with no records for the southeastern states. In the interior of the country, it extends as far south as Texas. Muona listed a single specimen from Arlington Co., Virginia.

***Deltometopus amoenicornis* (Say)**

Characterized by Muona as the most common eastern eucnemid, and recorded by him from Arlington, Campbell, Fairfax, and Nelson counties, *D. amoenicornis* is represented in our material by only a few specimens: *Essex Co.*: 1.5 km SE of Dunnsville, 2 July 1991, Malaise trap, D. R. Smith (1). *James City Co.*: York River State Park, 20 May 2006, A. V. Evans (AVEC 2). *Louisa Co.*: 4 mi. S of Cuckoo, Malaise trap, 6-18 June 1987, D. R. Smith (1). *York Co.*: ponds at Grafton, 19 October 1990, pitfall trap, K. A. Buhlmann (1).

***Nematodes atropos* (Say)**

A widespread eastern species, with documentation for Fairfax County and the cities of Chesapeake and Virginia Beach. New records added here are: *Appomattox Co.*: Holiday Lake State Park, 14-28 June 1999, R. Vigneault (RLO 4). *Brunswick Co.*: Fort Pickett, Nottoway River, 10 June 1999, A. C. Chazal & A. K. Foster (1). *Dickenson Co.*: Breaks Interstate Park, 10-14 June 2002 (5) and 1-14 July 2000 (4), R. Vigneault. *Fairfax Co.*: Ellick Natural Area Preserve, UV trap, 21 June 2006, C. S. Hobson (4). *Louisa Co.*: 4 miles S of Cuckoo, 1-12 July 1988, Malaise trap, D. R. Smith (1). *York Co.*: Grafton Ponds, 16 July 1990, K. A. Buhlmann (1). *City of Virginia Beach*: First Landing State Park, 23 June-6 July 2003, R. Vigneault (4); Oceana Naval Air Station, 13 June-26 July 2001, Malaise trap, DNH survey (1).

[*Nematodes collaris* Bonvouloir]

Muona thought that this species might be extinct inasmuch as he had seen only material collected a century earlier, but recent collections from Ohio and Missouri (Otto, unpubl. data) establish that it survives in the midwestern United States. Old captures for Montgomery Co., Maryland, and Sumter Co., South Carolina, and the more recent for Ohio suggest that the species might occur in Virginia. The combination of orange prothorax and projecting apical ventrite make this species easy to recognize.

***Nematodes penetrans* (Say)**

Generally distributed in eastern North America except for the southeastern Coastal Plain, this species is listed by Muona for Fairfax County, and we now add *Appomattox Co.*: Holiday Lake State Park, 14-28 June 1999, R. Vigneault (RLO). *Clarke Co.*: 3 km S of Boyce, 24 October 1991, Malaise trap, D. R. Smith. *Dickenson Co.*: Breaks Interstate Park, 1-14 June 1990 (2), 1-14 July 2002, R. Vigneault (4).

SUMMARY

The majority of the 32 species of eucnemids now documented for Virginia are widespread in eastern North America, although many are known only from a few widely separated states. Several species can be considered as statewide in distribution, but most are known from too few localities to justify any categorization of their instate ranges. Two species represent substantial range extensions northward from Florida (*Dendrocharis inexpectata*) and southern North Carolina (*Golbachia impressicollis*), half a dozen additional “probable” species fall into this same Lower Austral pattern. *Dirrhagofarsus lewisi*, a recently introduced Asiatic species, is now essentially statewide in Virginia, and collected in remote “natural” habitats. The capture of *Fornax bicolor* at three localities confirms the survival of the species, since most of the existing museum material was collected decades ago.

ACKNOWLEDGEMENTS

Much of the VMNH material of this family was collected by Dr. David R. Smith during Malaise trap collecting programs, and by him very generously donated to VMNH. Many specimens were obtained through inventory activities conducted by staff members of the Virginia Division of Natural Heritage and transmitted to VMNH through the good offices of Dr. Steven M. Roble. The authors are indebted to Dr. Arthur V. Evans for contributing records of specimens in his collection. He also scanned the eucnemid material in the National Museum of Natural History for any Virginia specimens added since Muona’s examination of that source.

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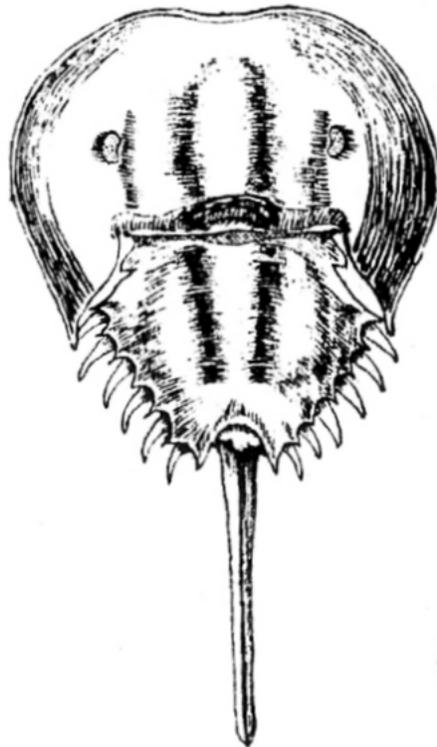
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Horseshoe crab (*Limulus polyphemus*), dorsal aspect.
Original drawing by John Banister.