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Madagascar Beetle, *Leichenum canaliculatum variegatum* (King) (Insecta: Coleoptera: Tenebrionidae)[1]

James C. Dunford and Warren E. Steiner[2]

The Featured Creatures collection provides in-depth profiles of insects, nematodes, arachnids and other organisms relevant to Florida. These profiles are intended for the use of interested laypersons with some knowledge of biology as well as academic audiences.

Introduction

The Madagascar beetle, *Leichenum canaliculatum variegatum* (Klug) 1833, presumably a native to Madagascar, was first found in the United States in 1906 at Mobile, AL, and was first known to occur in Florida in 1920 (Spilman 1959).



Figure 1. Adult Madagascar beetle, Leichenum canaliculatum variegatum (Klug).
Credit: Sean McCann, University of Florida

Leichenum canaliculatum variegatum is presently a member of the tenebrionid subfamily Opatrinae. The opatrine lineage is best represented in the Ethiopian and Palearctic faunal regions, and only a small percentage (~14%) of the known genera occur in the New World (Aalbu and Triplehorn 1985). Aalbu and Triplehorn (1985) redefined the opatrine tribes and removed *Leichenum* from Opatrini and the genus is currently the only representative of the tribe Leichenini in the United States (Aalbu et al. 2002).

Gridelli (1939) revised the genus and gave subspecies status to *variegatum*, but because of this beetle's cosmopolitan distribution and likely introduced status in many countries, it is not clear why this designation has been provided for *Leichenum canaliculatum*, originally described by Fabricius in 1798 (see Synonymy). It should be noted that many authors do not recognize *Leichenum canaliculatum variegatum* when listing this species and various combinations of the names listed in the synonymy below appear in the literature.

Synonymy

[taken from the Australian Faunal Directory 2007]

Leichenum Dejean, 1834 [previously credited to Blanchard 1845, (Bouchard et al. 2005)]

Leichenum Dejean, 1834

Endothina Carter, 1924

Lichenum auctorum

Leichenum canaliculatum (Fabricius, 1798)

Opatrum canaliculatum Fabricius, 1798

Opatrum canaliculatum variegatum Klug, 1833

Leichenum pulchellum Küster, 1849

Leichenum variegatum Küster, 1849

Leichenum argillaceum Motschulsky, 1863

Lichenum foveistrium Marseul, 1876

Lichenum seriehispidum Marseul, 1876

Lichenum gebieni Reitter, 1906

Endothina squamosa Carter, 1924

Distribution

Country records include, but are likely not limited to, the following: Australia, Botswana, Cameroon, Chad, Cuba, France, Gambia, Guadeloupe, India, Italy, Japan, Kenya, Liberia*, Mozambique, Namibia, Niger, Nigeria, Senegal, Somalia, South Africa, Spain, Sri Lanka, Sudan, Tanzania, Thailand, and Vietnam* (Marcuzzi 1984, Penrith 1984, Ferrer 2002, Peck 2005, Steiner 2005, Australian Faunal Directory 2007).

In the United States, this species has been found in coastal areas of Alabama [Mobile and Baldwin Counties (Löding 1945)]; Georgia [Camden*, Charlton, and Thomas* Counties (Spilman 1959)]; Mississippi [George, Harrison*, Jackson, and Stone Counties (Spilman 1959)]; North Carolina [Columbus*, Dare*, Hyde*, and New Hanover Counties (Spilman 1959)]; South Carolina [Anderson, Barnwell, Florence, Horry, and Sumter Counties (Kirk 1969, Kirk 1970), Oconee County (Spilman 1959)]; and in Florida. Additional locality records undoubtedly occur in public and private insect collections.

In Florida, it occurs throughout the state. Confirmed Florida records include the following counties (from Peck and Thomas 1998): Alachua, Broward, Clay, Dade, Dixie, Duval, Hardee, Highlands, Indian River, Lake, Lee, Levy, Marion, Orange, Palm Beach, Polk, St. Lucie, and Santa Rosa. Spilman (1959) also reported it in Florida from Escambia, Hendry, Manatee, Putnam, Wakulla, and Washington counties. Additional Florida records, taken from label data on specimens housed in the Florida State Collection of Arthropods (as of April 2007), include the following counties: Monroe and Okaloosa. The junior author included records from Collier* and Franklin* counties.

*specimens in collection of U.S. National Museum of Natural History, Smithsonian Institution



Figure 2. Florida distribution—April 2007.
Credit: James C. Dunford, University of Florida

Description

The beetle does not closely resemble any other tenebrionid species in Florida and should be readily recognized. However, a native tenebrionid, *Ammodonus fossor* (LeConte), inhabiting similar sandy habitats that could potentially occur in Florida (especially in the Panhandle) does superficially resemble *Leichenum canaliculatum variegatum*. *Ammodonus fossor* is known throughout much of the eastern United States, and at present the southernmost locality records include Alabama (Löding 1945), South Carolina, and Texas (Kirk 1969, Steiner 2000).

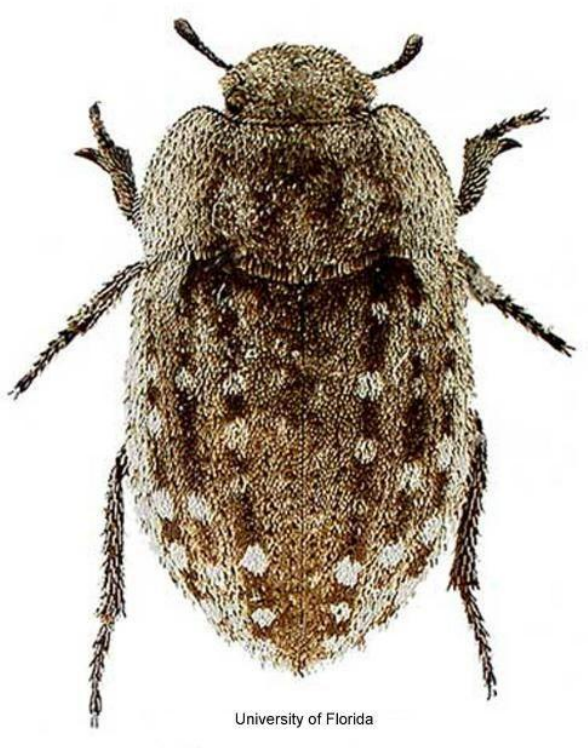


Figure 3. Adult *Ammodonus fossor* (LeConte), a native tenebrionid beetle.
Credit: Warren E. Steiner, Jr., U.S. National Museum of Natural History, Smithsonian Institution

Adult

The *Leichenum canaliculatum variegatum* adult is oval and approximately 5 mm (0.2 in) in length. The body appears gray, although it is actually mottled with black, gray, brown, and whitish spatula-shaped, scale-like setae. This mottling is sometimes variable, depending on the number of these scale-like setae that have been rubbed off. The eyes are globose and slightly emarginated, with erect setae between facets. The setae located between the facets are hypothesized to protect the eyes from damage when they burrow into the sand (Medvedev

1973). The antennae are short with a clearly defined 4-segmented club on the apical half.

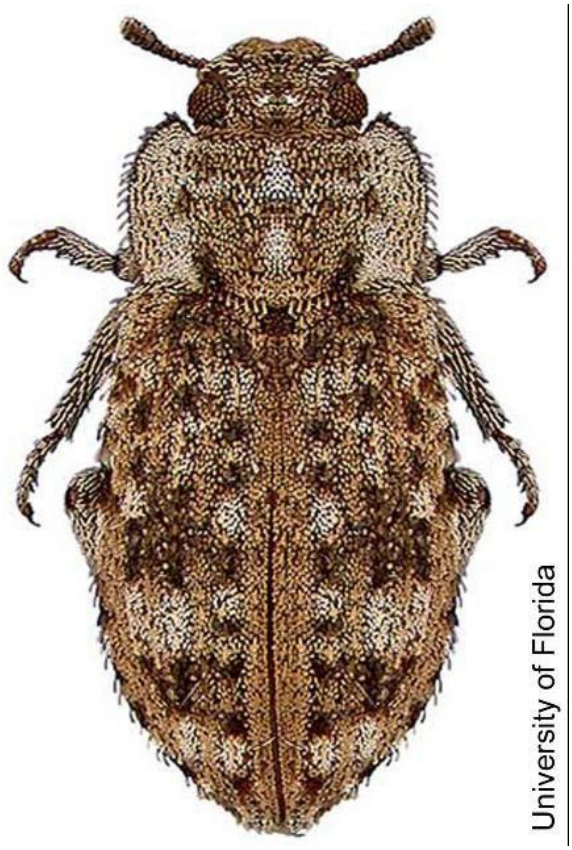


Figure 4. Adult Madagascar beetle, *Leichenum canaliculatum variegatum* (Klug).
Credit: James C. Dunford, University of Florida

Larva

The larva resembles a small wireworm in general appearance. The description provided in St. George (1930) included morphological characters that are associated with members of the Opatrinae (Leichenini) but no adult association and definitive species determination was made. However, the junior author confirmed the description provided by St. George by examining larvae and pupae that were reared from captive adults. The length of the mature larva is 12 mm (0.47 in).



Figure 5. Larva of the Madagascar beetle, *Leichenum canaliculatum variegatum* (Klug). (Lateral view, head on left.)
Credit: Warren E. Steiner, Jr., U.S. National Museum of Natural History, Smithsonian Institution

Head

The dorsal half of the head capsule is not setose but the lateral margins and ventral half is slightly setose. The ocelli are arranged in a single transverse group on each side. The clypeus bears two spines and two setae, one of each on each side. The labrum bears two spines, one on each side, or six spines, three on each side. The back of the mandible opposite of the cutting edge is slightly sharp, and opposite the molar area there is a membranous elevation bearing one or two setae anteriorly and many short, thick spines posteriorly. The apices of both mandibles are bifid with an additional dorsal tooth between the apex and the molar part.

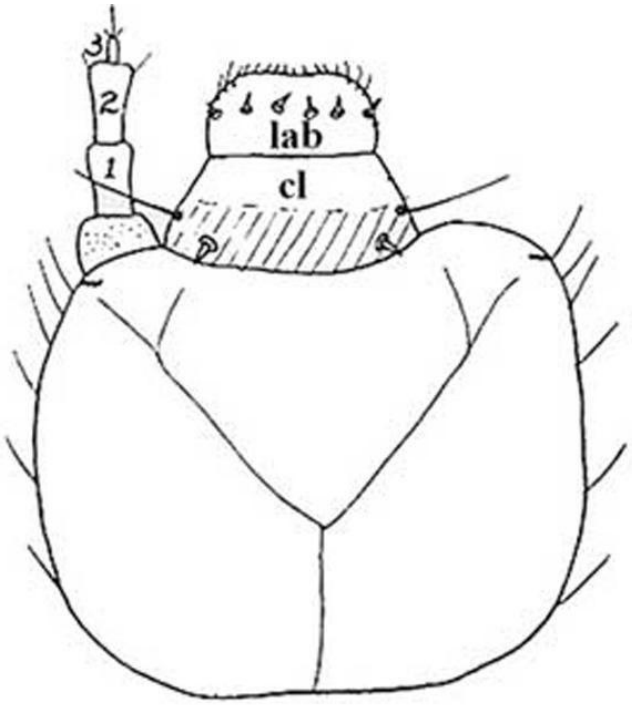


Figure 6. Larval head, *Leichenum c. variegatum*.
Credit: St. George 1930

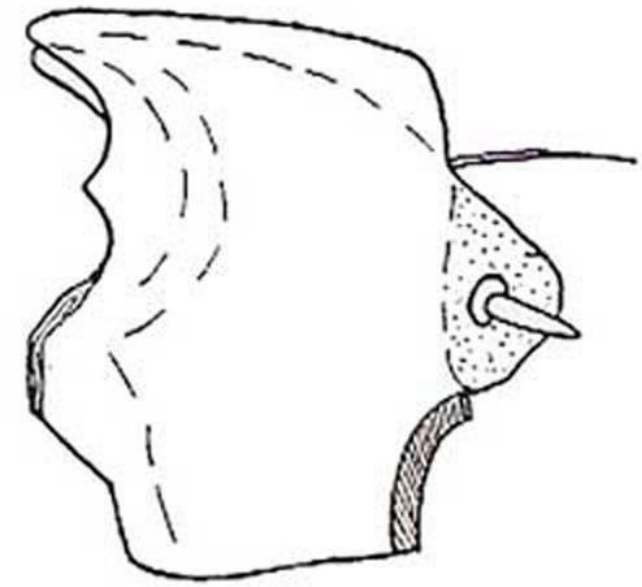


Figure 7. Larval mandible, *Leichenum canaliculatum variegatum*.
Credit: St. George 1930

Thorax

The prothoracic legs are larger than the other two pairs.

Abdomen

The abdominal spiracles are annular (ring-shaped) in shape. The ninth abdominal segment is shorter than the eighth, subconically produced and obtusely pointed. The lateral margins bear two to eleven setae on each side and additional scattered, fine setae elsewhere on the segment; the tergum otherwise without setae but with one anterior and one posterior pair of setae; the sternum bears a few setae, often arranged in a transverse row. There are also two distinct pairs of stout, dark setae near the apex.

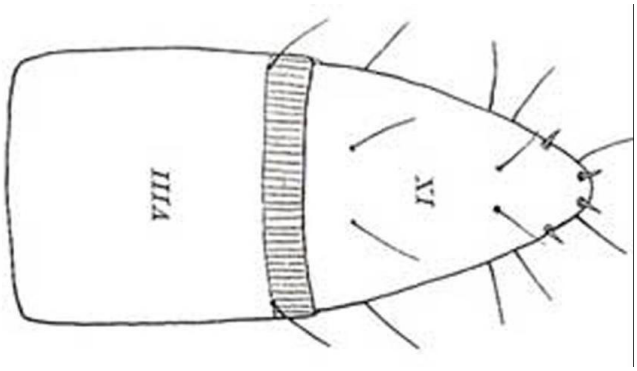


Figure 8. Abdominal segments VIII and IX, *Leichenum canaliculatum variegatum* larva.
Credit: St. George 1930



Figure 9. Ninth abdominal segment of the larva of the Madagascar beetle, *Leichenum canaliculatum variegatum* (Klug). (Dorsal view.)
Credit: Warren E. Steiner, Jr., U.S. National Museum of Natural History, Smithsonian Institution

Pupa

Steiner (1995) provided a partial description of the pupa. The urogomphi (paired processes from the posterior end of the tergum of the ninth abdominal segment) are fused into a long spine-like process and the tip ends in two small round lobes. The pupa is 6 mm (0.24 in) in length, including the fused urogomphi.



Figure 10. Pupa of the Madagascar beetle, *Leichenum canaliculatum variegatum* (Klug). (Lateral view, head on left.)
Credit: Warren E. Steiner, Jr., U.S. National Museum of Natural History, Smithsonian Institution



Figure 11. Pupa of the Madagascar beetle, *Leichenum canaliculatum variegatum* (Klug). (Ventral view, head on left.)
Credit: Warren E. Steiner, Jr., U.S. National Museum of Natural History, Smithsonian Institution



Figure 12. Fused urogomphi of the pupa of the Madagascar beetle, *Leichenum canaliculatum variegatum* (Klug).
Credit: Warren E. Steiner, Jr., U.S. National Museum of Natural History, Smithsonian Institution

Habits and Biology

The adult beetles are attracted to light (specifically mercury vapor lights on some specimen labels), and this offers a good survey procedure. Baited or unbaited pitfall traps may also work. The beetle seems to occur more commonly in sandy areas, along beaches (occasionally taken under boards or debris), lake and river shorelines, and has been recorded from March to November, although it probably occurs throughout the year (Woodruff 1963). Steiner noted that he has collected adults in areas of very open, mostly bare, dry, loose sand with minimal vegetation and never on the tidal zone of a beach but above it on low dunes or sand flats behind dunes. Often these are "disturbed" or "waste" areas such as edges of heavily used paths and mowed areas. Adults usually hide under small piles of leaf litter in sand depressions (as do *Ammodonus fossor* adults) and at the crowns of small plants in sand; they do not seem to burrow very deep. They can be found foraging on the sand at night or occasionally during cooler times of day.

Economic Importance

We have no definite record of damage being caused by this beetle, but it has often been incriminated by its presence. Both adults and larvae are found in the soil and both stages probably feed on roots of plants. It has been recorded in Bermuda grass, cotton, soil among turnips and rutabagas, feeding on nap of rugs, and associated with damaged peach trees and *Amaryllis* bulbs (Spilman 1959, St. George 1930).

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[2] James C. Dunford, alumnus (Ph.D., 2007) UF/IFAS Department of Entomology and Nematology; Warren E. Steiner; UF/IFAS Extension, Gainesville, FL 32611.

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