

Euoniticellus intermedius (Coleoptera: Scarabaeidae: Scarabaeinae: Tribe Coprini): Its Presence and Relative Abundance in Cattle Pastures in Northcentral Florida

Authors: Wood, Lois A., and Kaufman, Phillip E.

Source: Florida Entomologist, 91(1) : 128-130

Published By: Florida Entomological Society

URL: [https://doi.org/10.1653/0015-4040\(2008\)091\[0128:EICSST\]2.0.CO;2](https://doi.org/10.1653/0015-4040(2008)091[0128:EICSST]2.0.CO;2)

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

***EUONITICELLUS INTERMEDIUS* (COLEOPTERA: SCARABAEIDAE: SCARABAEINAE: TRIBE COPRINI): ITS PRESENCE AND RELATIVE ABUNDANCE IN CATTLE PASTURES IN NORTHCENTRAL FLORIDA**

LOIS A. WOOD AND PHILLIP E. KAUFMAN

Entomology and Nematology Department, University of Florida, Gainesville, FL 32611-0620 USA

Several species of dung beetles have been introduced into pasture habitats around the world to improve the efficiency at which manure is processed (Fincher 1986). Benefits of this tactic include reducing survival of dung-breeding pest flies and gastrointestinal parasites of livestock, returning nutrients to the soil, and physically moving manure off the fouled forage (Anderson et al. 1984).

Efforts to monitor populations and track the spread of introduced beetles have varied with species and localities. The Afro-Asian dung beetle, *Onthophagus gazella* F. (Family Scarabaeidae, Subfamily Scarabaeinae, Tribe Onthophagini) was introduced into several states (TX, CA, AR, GA, and MS) of the continental United States in the 1970s (Fincher 1981). Subsequent surveys recorded its presence and spread (Fincher et al. 1983; Hunter & Fincher 1985; Howden & Scholtz 1986; Fincher et al. 1986; Howden & Howden 2001). Currently, it is found in every state across the southern U.S. and up the east coast as far north as North Carolina. It also occurs throughout most of Mexico and into northern Guatemala (Rivera-Cervantes & Garcia-Real 1991; Montes de Oca & Halffter 1998; Bertone et al. 2005).

Another less-studied introduced dung beetle is the Afro-Tropical species, *Euoniticellus intermedius* (Reiche) (Family Scarabaeidae, Subfamily Scarabaeinae, Tribe Coprini) (Fig. 1). It was released in California, probably in 1978, in Texas in 1979, and in Georgia in 1984 (Fincher 1981, 1986; Montes de Oca & Halffter 1998). Its establishment in Texas and California was documented in the mid-1980s (Blume 1984; Fincher 1986), but further distribution patterns in the United States are not accurately known. Almquist (2001) reported new collection records of *E. intermedius* in northcentral Florida, based on a museum specimen collected in Suwannee County in 2001, and afterwards, collecting it himself at one site in Alachua County and collecting it again, with P. E. Skelley, at another site (same county). These collection data are included in the updated, electronic version of A Distributional Checklist of the Beetles of Florida (<http://www.fsca-dpi.org/Coleoptera/Mike/intro44.htm>), originally published in hardcopy form (Peck & Thomas 1998).

Euoniticellus intermedius was not released in Mexico, but its spread throughout that country is well-documented. The species was first recorded in north-central Mexico in 1992 and northwestern

Mexico in 1994 (Montes de Oca & Halffter 1998). Those and subsequent surveys have recorded *E. intermedius* in 15 of Mexico's 32 states, from the northern border with the United States, to the southern border with Guatemala (Montes de Oca et al. 1994; Navarrete-Heredia 2001; Morales et al. 2004).

In Jun 2005, we initiated a 2-year survey to document the diversity and seasonal occurrence of dung beetles in pastures at 3 study sites around Gainesville, Florida, using the baited pitfall trap method described in Bertone et al. (2005). The bait for each site was prepared by collecting fresh cow dung from that site, measuring 55-ml portions, and setting each portion on a 21-cm² paper towel which was then stapled into a pouch. These were frozen (-20°C) until needed. When deployed, the dung pouches were clipped to a hardware cloth platform, which positioned the bait over a 9 cm diameter funnel that sat at ground level and extended into a 9 cm diameter PVC canister with a screened bottom. The entire trap assembly was positioned into a semi-permanently installed 35-cm length of 10.6-cm diameter PVC pipe. Baited traps were placed at field sites at least every 3 weeks. Traps were recovered from field sites following a 24-h bait exposure and captured beetles were returned to the laboratory for identification and enumeration. Ten traps were placed along pasture fence lines at each of 3 sites (30 total traps). Traps were at least 20 m apart. Beetles were identified with the keys of Woodruff (1973). Species verification was performed by Michael C. Thomas and Paul E. Skelley of the Florida Department of Agriculture and Consumer Services, Bureau of Entomology.

In this note we report numbers of *E. intermedius* collected at our 3 cattle pasture sites from Jun 2005 through Jun 2007, a period of 25 months. The relative abundance of *E. intermedius* is described for the 6-month interval for which we have 2 seasons of data (Aug through Jan). This interval was chosen because it encompasses the months during which *E. intermedius* was most abundant.

Site 1, first sampled on Jul 21, 2005, is the University of Florida's Santa Fe River Ranch, located in northern Alachua County, which pastures beef cattle. During the first year of the survey (Jul 2005 through Jun 2006), peak collections occurred in Oct, with a total of 213 *E. intermedius* collected from Sep 2005 through May 2006. Ten out of 15

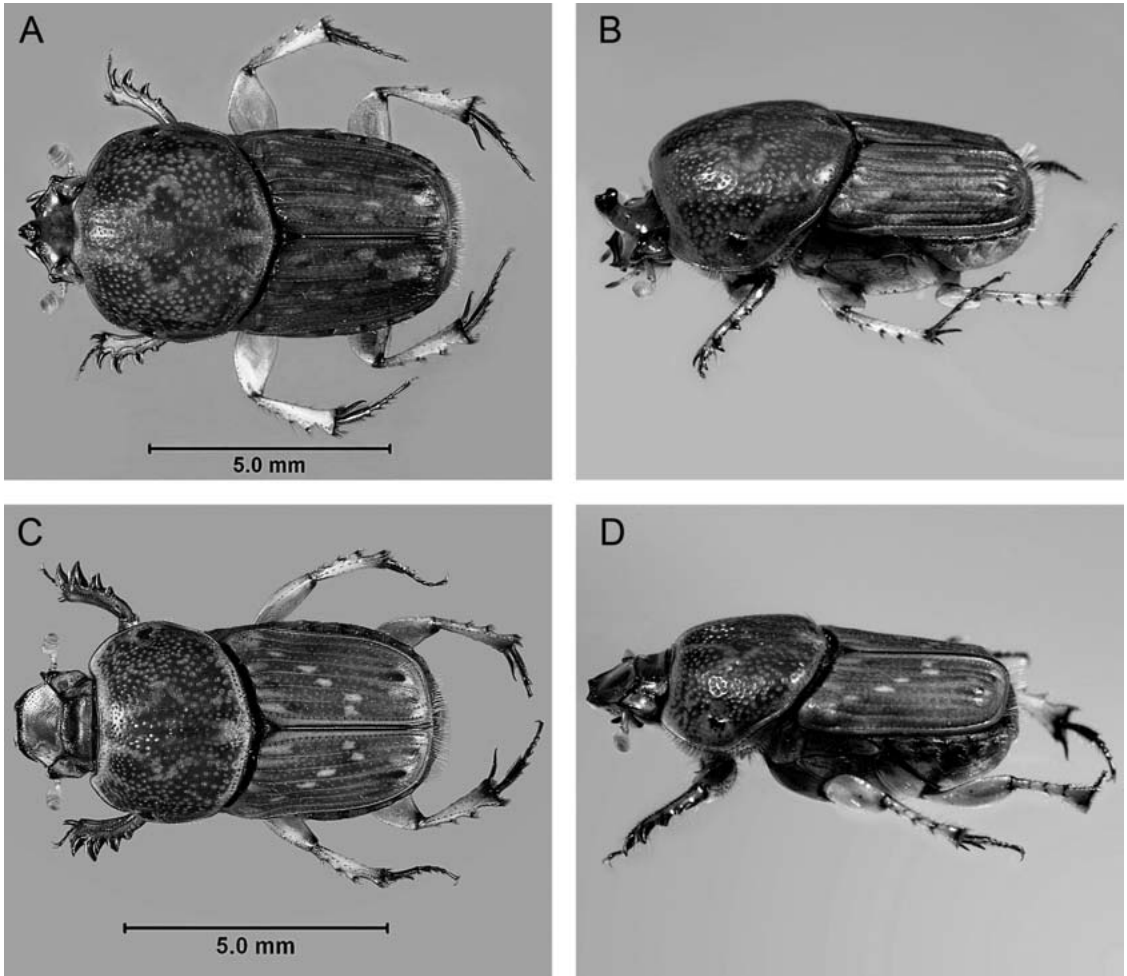


Fig. 1. Male (a, b) and female (c, d) *Euoniticellus intermedius* (Reiche) collected in northcentral Florida, 2005. Image by L. Buss, editing by J. Medley, University of Florida.

sampling dates (between Aug 2005 and Jan 2006) yielded *E. intermedius*. Of those 100 pitfall trap placements, 45 traps caught a total of 200 individuals. This number comprised 7.6% of the total Scarabaeidae captured in that specific 6-month interval. During the second year, 586 *E. intermedius* were collected from Jul 2006 through Jun 2007, with a peak in late Oct 2006. Nine out of 10 sampling dates between Aug 2006 and Jan 2007 yielded *E. intermedius*. Of those 90 pitfall traps, 40 caught a total of 549 individuals. This was considerably more than in the previous year's 6-month interval (200) and also comprised a greater percentage (16.9%) of the total Scarabaeidae captured during that comparative interval.

Site 2 was first sampled on July 19, 2005, and is a privately-owned dairy in eastern Gilchrist County. During the first year, a total of 19 *E. intermedius* were captured between Sep and Nov 2005. This comprised 2.3% of the total Scarabaeidae

trapped from Aug 2005 to Jan 2006. Eight out of the 15 sampling dates (80 traps) yielded 11 *E. intermedius*. The highest number of *E. intermedius* collected (9) was in mid-Oct. During the second year, 31 individuals were captured between Aug and Dec 2006, peaking in early Oct, and again comprised 2.3% of the total beetles caught between Aug 2006 and Jan 2007. This represented 10 sampling dates of which 6 yielded beetles. Of the 60 pitfall traps placed, only 13 yielded *E. intermedius*. A total of 10 beetles were captured from Mar through Jun 2007.

A privately-owned beef cattle ranch in southern Alachua County served as Site 3 and was first sampled on Jun 17, 2005. *Euoniticellus intermedius* was not collected at this site during the first year, and only 3 individuals were collected during the second year, all in Dec 2006. This constituted 1.9% of the total number of Scarabaeidae caught between Aug 2006 and Jan 2007.

These collection data indicate that *E. intermedius* is well-established in some sites in northcentral Florida and has an autumn/winter seasonality (but with diminished collections in Mar, Apr, and May). Our plans are to continue monitoring the relative dynamics of *E. intermedius* over the next 2 years.

SUMMARY

The introduced dung beetle, *Euoniticellus intermedius* (Reiche) originally released in California, Texas, and Georgia and subsequently reported in northcentral Florida in 2001, was collected from 3 cattle ranches in Alachua and Gilchrist Counties, Florida. We report on the seasonality of this beetle over a two-year period. The beetle was found principally between Aug and Jan with the largest collections recorded during Oct of both 2005 and 2006. The numbers of beetles collected increased from 2005 to 2006, suggesting that this beetle may be firmly established in this part of Florida.

REFERENCES CITED

- ALMQUIST, D. 2001. New dung beetle (Coleoptera: Scarabaeidae) records for Florida. *Insecta Mundi* 15: 150.
- ANDERSON, J. R., R. W. MERRITT, AND E. C. LOOMIS. 1984. The insect-free cattle dropping and its relationship to increased dung-fouling of rangeland pastures. *J. Econ. Entomol.* 77: 133-141.
- BERTONE, M., J. GREEN, S. WASHBURN, M. POORE, C. SORENSON, AND D. W. WATSON. 2005. Seasonal activity and species composition of dung beetles (Coleoptera: Scarabaeidae and Geotrupidae) inhabiting cattle pastures in North Carolina. *Ann. Entomol. Soc. Amer.* 98: 309-321.
- BLUME, R. R. 1984. *Euoniticellus intermedius* (Coleoptera: Scarabaeidae): Description of adults and immatures and biology of adults. *Environ. Entomol.* 13: 1064-1068.
- FINCHER, G. T. 1981. The potential value of dung beetles in pasture ecosystems. *J. Georgia Entomol. Soc.* 16: 301-316.
- FINCHER, G. T. 1986. Importation, colonization, and release of dung-burying scarabs. *Biological Control of Muscoid Flies. Misc. Pub. Entomol. Soc. Amer.* 61: 69-76.
- FINCHER, G. T., R. R. BLUME, J. S. HUNTER, AND K. R. BEERWINKLE. 1986. Seasonal distribution and diel flight activity of dung-feeding scarabs in open and wooded pasture in east-central Texas. *The South-west Entomol. Suppl.* No. 10: 1-35.
- FINCHER, G. T., T. B. STEWART, AND J. S. HUNTER III. 1983. The 1981 distribution of *Onthophagus gazella* Fabricius from releases in Texas and *Onthophagus taurus* Schreber from an unknown release in Florida (Coleoptera: Scarabaeidae). *The Coleopterists Bull.* 37: 159-163.
- HOWDEN, H., AND A. HOWDEN. 2001. Change through time: A third survey of the Scarabaeinae (Coleoptera: Scarabaeidae) at Welder Wildlife Refuge. *The Coleopterists Bull.* 55: 356-362.
- HOWDEN, H. F., AND C. H. SCHOLTZ. 1986. Changes in a Texas dung beetle community between 1975 and 1985 (Coleoptera: Scarabaeidae, Scarabaeinae). *The Coleopterists Bull.* 40: 313-316.
- HUNTER, J. S. III, AND G. T. FINCHER. 1985. Five new state records for the Afro-Asian dung beetle *Onthophagus gazella* (Coleoptera: Scarabaeidae). *J. Entomol. Sci.* 20: 24-25.
- MONTES DE OCA, E., S. ANDUAGA, AND E. RIVERA. 1994. Presence of the exotic dung beetle *Euoniticellus intermedius* (Reiche) (Coleoptera: Scarabaeidae). *The Coleopterists Bull.* 48: 244.
- MONTES DE OCA, E., AND G. HALFFTER. 1998. Invasion of Mexico by two dung beetles previously introduced into the United States. *Stud. Neotrop. Fauna & Environment* 33: 37-45.
- MORALES, C. J. M., R. R. NAJERO, AND L. DELGADO. 2004. Primer registro de *Euoniticellus intermedius* (Reiche, 1849) y datos nuevos de distribucion de *Digitonthophagus gazella* (Fabricius, 1787) e *Hybosorus illigeri* Reiche, 1853 (Coleoptera: Hybosoridae) para el estado de Chiapas. *Dugesiana* 11: 21-23.
- NAVARRETE-HEREDIA, J. L. 2001. New Mexican state records for *Oniticellus rhinocerus* Bates and *Euoniticellus intermedius* (Reiche) (Scarabaeidae: Scarabaeinae). *The Coleopterists Bull.* 55: 500.
- PECK, S. B., AND M. C. THOMAS. 1998. A distributional checklist of the beetles (Coleoptera) of Florida. *Arthropods of Florida and Neighboring Land Areas. Vol. 16. Florida Dept. of Agriculture and Consumer Services.*
- RIVERA-CERVANTES, L. E., AND E. GARCIA-REAL. 1991. New locality records for *Onthophagus gazella* Fabricius (Coleoptera: Scarabaeidae) in Jalisco, Mexico. *The Coleopterists Bull.* 45: 370.
- WOODRUFF, R. E. 1973. The Scarab Beetles of Florida (Coleoptera: Scarabaeidae) Part I. The Laparosticti (Subfamilies: Scarabaeinae, Aphodiinae, Hybosorinae, Ochodaeinae, Geotrupinae, Acanthocerinae). *Arthropods of Florida and Neighboring Land Areas. Vol. 8: 1-220.*