

SURVEY OF FOOD PREFERENCES OF SOME NO. AMERICAN CANTHONINI (COLEOPTERA: SCARABAEIDAE)¹

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ABSTRACT: The food preferences of some species of North American Canthonini are discussed and pertinent literature sources cited.

DESCRIPTORS: Coleoptera; *Canthon*, s. str., *Boreocanthon*; *Melanocanthon*; *Glaphyrocantthon*; *Pseudocanthon*; food preferences; association with rodents.

The food preferences of most North American Canthonini are either unknown or unrecorded and there is a paucity of this information because most museum specimens bear no habitat or host data. During a recent field trip to Colorado, North Dakota and South Dakota, Gordon made several observations on *Boreocanthon praticola* (LeConte). As a result of these observations, we decided to search the literature and examine museum specimens for additional food preference data.

Most papers dealing with food and/or habitat preferences have been written by Eric Matthews and refer primarily to West Indian or Neotropical species (e.g., Matthews, 1966; Halffter and Matthews, 1966). Papers by Brown (1927), Matthews (1963), Robinson (1948), and Woodruff (1973) present necessary information on food and habitat preferences of North American Canthonini, but two of these papers are not generally known and do not appear in recent bibliographies.

The genus *Canthon* Hoffmannsegg has recently been split into several genera and subgenera. Doubts have been expressed by Matthews (1966) and Howden (1966) as to the validity of some of these proposed taxa. Although we share some of these doubts, several of the recently recognized taxa appear to form distinct biological and morphological units. For the purposes of this paper we are using the most recent classification prepared by Halffter and Martinez (1966-1970).

The sight of specimens of *Canthon*, s. lat., rolling dung balls is a common one, especially some of the large species of *Canthon*, s. str., which

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roll balls made of cow or horse dung. Because of this it has been generally assumed that most or all species of *Canthon*, s. lat., either made their balls from cow or horse dung, or had no dung preference. Robinson (1948) and Woodruff (1973) listed a few examples of dung preference, but Robinson's observations have not become generally known.

Specimens of *Boreocanthon praticola* (LeConte) were taken by Gordon in early June 1970, in prairie dog burrows in southwestern North Dakota in large numbers feeding on prairie dog pellets buried in the prairie dog mound. An occasional specimen was found inside the mouth of the prairie dog burrow. No dung ball formation or rolling was observed. In August 1973, a similar situation was observed at a prairie dog town eleven miles west of Nunn, Colorado. Here *praticola* was extremely common feeding on and in prairie dog pellets, which were usually buried in the mound. In addition to feeding, in three instances pairs of *praticola* were observed rolling whole pellets away from a mound, making no attempt to fashion a ball. Two identical observations were made at a prairie dog town in Theodore Roosevelt National Park, Medora, North Dakota, two weeks later. Here bison dung was available in large quantities and in all stages of deterioration in the prairie dog town. Here specimens of *praticola* were present in large numbers inside the burrow mouth and were flying from burrow to burrow. The mounds were very dry and packed and obviously not a suitable habitat for *praticola* at that particular time. In spite of careful examination, no specimens of *praticola* could be found at bison dung, or was there any evidence that dung balls had been formed from any of the chips. A brief stop was made at a prairie dog town in Wind Cave National Park, Hot Springs, South Dakota. Here *praticola* was taken commonly inside the mouth of the prairie dog burrow, but no dung rolling activity was observed. In all three areas, the prairie dog involved was *Cynomys ludovicianus ludovicianus* (Ord), or the black-tailed prairie dog.

Based on Gordon's observations, it seems reasonable to presume that the food preference of *praticola* is not bison dung, as has been generally assumed, but prairie dog dung. However, because Brown (1927) reported this species at the excrement of horses and cattle in addition to prairie dogs, we suspect that other food types may be used when preferred dung is not available. Gordon observed *praticola* rolling balls of cow dung in Santa Cruz Co., Arizona, in July 1972. It should be noted here that *praticola* was the only species of *Canthon*, s. lat., found associated with prairie dog towns from southeastern Utah to southwestern North Dakota. It is likely that *praticola* is the only species of *Canthon*, s. lat., utilizing the prairie dog dung niche.

Boreocanthon and *Melanocanthon* form a group of small, mostly black, dull species which appear to have similar food preferences. The following

records bear this out. Robinson (1948) observed *Melanocanthon bispinatus* (Robinson) and *Boreocanthon probus* (Germar) rolling deer pellets in New Jersey. Robinson's actual statement was "rolling balls of deer droppings" but a paratype of *bispinatus* in the USNM collection has an entire deer pellet pinned with it. Whether Robinson realized that *bispinatus* had not formed a ball but simply rolled an entire pellet is not known. Woodruff (1973) recorded *probus* as "in" rabbit pellets at Gainesville, Florida. At Clemson, South Carolina, 30 April 1931, Cartwright observed *probus* utilizing rabbit pellets. Among sparse weeds on a fan of sand formed by a rain of the night before, 84 specimens were collected rolling rabbit pellets in all directions. The area covered was not more than 10 by 15 feet. Brown (1927) found *Boreocanthon lecontei* (Harold) common in very sandy Oklahoma localities using rabbit droppings. The species was active during the early part of the morning and spent the remainder of the day with its' food in vertical burrows. We suspect that members of this group, while having a definite preference for the type of dung discussed above, would utilize many kinds of dung (cow, horse, human, etc.) if the preferred dung were not available. Woodruff (1973) recorded *Boreocanthon depressipennis* (LeConte) as being a fairly common species in cow dung in open, sandy pastures. Robinson (1948) recorded *Melanocanthon granulifer* (Schmidt) as rolling balls of cow dung in a pasture at Romeo, Florida. Gordon observed *Boreocanthon melanus* (Robinson) and *B. puncticollis* (LeConte) rolling balls of cow dung in a pasture at Tumacacori, Arizona, in July 1972.

Glaphyrocanthon is a genus of mostly tropical species with only *viridis viridis* (P. de B.) extending into the U.S. Woodruff (1973) lists a single observation of *viridis* rolling a rabbit pellet near Citico, Tennessee. This species has been observed by Cartwright at various bird droppings in South Carolina woods and at chicken droppings at Jocassee, South Carolina. In Payne County, Oklahoma, Brown (1927) found *viridis* constructing and rolling balls of human excrement and rabbit droppings.

Pseudocanthon is a highly distinctive genus with a single species occurring in North America. Cartwright found it at chicken droppings at Jocassee, S.C. Woodruff (1973) recorded four specimens in a dung chamber of a packrat [*Neotoma floridana smalli* Sherman] on Key Largo, Florida. *P. perplexus* (LeConte) is relatively common in collections as it is often attracted to light, but, until Woodruff's observation, no tenable supposition as to host preference had been proposed. The distribution of *perplexus* is quite similar to that recorded in Hall and Kelson (1959) for *Neotoma* spp. in eastern and southern United States.

At least some species of *Canthon*, s. str., are not as restricted in their dung preferences as members of the other genera discussed above. *Canthon pilularius* (L.) is commonly observed rolling balls of cow and

horse dung, but has also been observed rolling balls made from human dung (Matthews, 1963). Brown (1927) confirmed the use of horse and cattle dung. W. T. Davis (1910) reported *Canthon chalcites* (Haldeman) at Clayton, Georgia, using pig manure. A pair was observed forming a ball from human dung at Paris, Virginia, by Gordon. At South Carolina mountain localities Cartwright collected this species in mule and cow dung. *Canthon vigilans* LeConte has unusually large eyes and is active at night. At Meredith, South Carolina, early in the morning before the dew was off the grass, Cartwright found fresh cow dung showing abandoned balls and extensive work by *Canthon*, but he found no beetles then in the dung. Specimens of *vigilans*, each with a ball of cow dung, were found under fresh push-ups of dirt located in a circle 5 to 15 feet from the dung. Brown (1927) reported *vigilans* frequently at the excrement of horses and cattle in Oklahoma, on soil containing little or no sand. Gordon observed *Canthon imitator* Brown rolling balls of cow dung at Tumacacori and Sonoita, Arizona, in July 1972. Also at Tumacacori were thousands of specimens of *Canthon indigaceus* LeConte rolling balls of cow dung. The bottom of a concrete irrigation ditch was paved with these balls which had fallen in and could not be gotten out by the beetles.

Fungi and dead animals are also attractive to various species of *Canthon*, s. lat. In Cartwright's notes are the following: *Melanocanthon bispinatus* Robinson, Beaufort, South Carolina, under dead chicken; Walterboro, 3 under dead toad; Hamton, under fungi. *Boreocanthon probus* and *Canthon pilularius*, Govan, South Carolina, under dead snake. *Glaphyrocانthon viridis*, Clemson, South Carolina, 3 on fungi. There are numerous records in the literature of species of *Canthon*, s. lat. being attracted to fungi, carrion and rotting fruit.

From the available data, it appears that the large species belonging to the genus *Canthon* are the most specialized members of *Canthon*, s. lat., in that they seem to always form dung balls rather than utilize preformed balls. Members of the genera *Boreocanthon* and *Melanocanthon* have a decided tendency to utilize preformed dung pellets (e.g., deer dung, rodent dung, etc.) and at least some species definitely prefer this type of dung to dung which must be formed into a ball. It seems reasonable to assume that the habit of utilizing preformed dung balls would be more primitive than the habit of forming dung balls. The ease with which a preformed dung pellet can be rolled is obvious and rolling these would be a logical early step in the development of the ball forming habit. The Canthonini are, in general, a highly successful group of beetles as evidenced by the wide distribution of most species and the abundance with which they often occur. One reason for this success could be that most of the species are not restricted to one type of food but can use nearly any available food. As indicated above, many species have definite preferences but in the absence of the preferred food will accept any reasonable substitute.

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2069. Suppression of *Phloeotrogus* Motschulsky, 1863 (Insecta, Coleoptera, SCOLYTIDAE).
2070. Suppression of *Anodius* Motschulsky, 1860 (Insecta, Coleoptera, SCOLYTIDAE).
2071. Suppression of *Leiparthrum* Wollaston, 1854 (Insecta, Coleoptera, SCOLYTIDAE).
2072. Suppression of *Olonthogaster* Motschulsky, 1866 (Insecta, Coleoptera, SCOLYTIDAE).
2073. Suppression of *Cardium boreale* Broderip & Sowerby, 1829 (Mollusca: BIVALVIA CARDIIDAE).
2074. Suppression of *Plyctolophus ducrops* Bonaparte, 1850 (Aves).
2075. Designation of type-species for *Megasternum* Mulsant, 1844 and *Cryptopleurum* Mulsant, 1844 (Insecta, Coleoptera, HYDROPHILIDAE).
2077. Validation of *Pseudoboa nigra* (Dumeril, Bibron and Dumeril, 1854) (Reptilia, Serpentes).
2078. Designation of type-species of *Platyrhacus* Koch, 1847 (Diplopoda).

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