

**A PRELIMINARY REVISION OF THE GENUS *EPITRIX* FOUDRAS  
(COLEOPTERA: CHRYSOMELIDAE: GALERUCINAE: ALTICINI)  
IN AMERICA NORTH OF MEXICO**

by

Anthony Martin Deczynski

A thesis submitted to the Faculty of the University of Delaware in partial fulfillment of the requirements for the degree of Honors Bachelor of Science in Entomology with Distinction

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## ABSTRACT

The genus *Epitrix* is revised for America north of Mexico. Eight new species are described, *E. californica*, *E. gentneri*, *E. capsica*, *E. floridana*, *E. rufa*, *E. ovalis*, *E. centralis* and *E. variabilis*. The Mexican species *E. robusta* Jacoby and eastern Palearctic *E. pubescens* (Koch) are newly reported from the United States. Additional distributional and host plant records are reported and a key is provided for all species. Additional research is needed for a full revision of the fauna North of Mexico because additional species are certain to be found. This thesis is not issued for permanent scientific records and is disclaimed for the purposed of zoological nomenclature in the sense of The Code of Zoological Nomenclature article 8.2 (ICZN, 1999).



## Chapter 1

### INTRODUCTION

*Epitrix* Foudras, 1860, is a genus of minute flea beetles which feed on plants in the family Solanaceae and have a worldwide distribution. Several species are major pests on crops including tomatoes (*Solanum lycopersicum* Linnaeus), potatoes (*Solanum tuberosum* Linnaeus), eggplant (*Solanum melongena* Linnaeus), and tobacco (*Nicotiana tabacum* Linnaeus) (Capinera 2001). The damage caused by these beetles is twofold: the larvae feed on root systems and the adults on leaves and stems (Seeno & Andrews 1972). In America north of Mexico there are currently twelve described species and many more that remain undescribed. As of yet there has been no work published that treats the entire fauna north of Mexico, although some describe species present in specific areas within the United States, or compare a limited number of similar species (Gentner 1944, Seeno and Andrews 1972, White and Barber 1974, Downie and Arnett 1996). Seeno and Andrews (1972) provide descriptions, keys, diagrams of spermatheca, and distributional maps within the state for all species known from California. Downie and Arnett (1996) include a key to species of the Northeast United States based purely on external characteristics, although without illustrations, and White and Barber (1974) contrast the two similar species *Epitrix hirtipennis* (Melsheimer) and *Epitrix fasciata* Blatchley complete with descriptions and illustrations. Most other species from North America are known only from their original descriptions. State records for all described species are given by Riley and colleagues (2003), and host plant records are summarized by Clark and colleagues

(2004). The presence of additional species is noted by Flowers and colleagues (1994) who recognized an undescribed species from Florida. Riley and colleagues (2002) note that the genus is in need of revision and that there are four to five possibly undescribed species in the southern United States. Fully understanding the diversity of this genus will help us to better understand its ecology and may have agricultural implications. Prior to 1944 the species *Epitrix cucumeris*, a common pest on Solanaceous crops, was believed to be transcontinental. However it was noticed that in Washington and Oregon states these beetles caused significantly more damage to the potato tubers than they did elsewhere. L. G. Gentner studied this phenomenon and concluded that the root damaging beetles were a separate species, and described it as *Epitrix tuberis*. In order to understand agricultural implications such as this we need to first clarify the taxonomy of the genus. The goal of this thesis is to revise the genus *Epitrix* in America north of Mexico by providing complete and parallel descriptions of all known species, and describing any available new species.

## **Chapter 2**

### **METHODS**

Specimens were examined from and deposited in the following collections:

AMDC – Anthony M. Deczynski Collection, Cranford, NJ.

BYU – Monte L. Bean Life Sciences Museum, Brigham Young University,  
Provo, UT.

EGRC – Edward G. Riley Collection, College Station, TX.

FMNH – Field Museum of Natural History, Chicago, IL.

PDA – Pennsylvania Department of Agriculture, Harrisburg, PA.

UDCC – Insect Reference Collection, Department of Entomology and Wildlife  
Ecology, University of Delaware, Newark, DE.

Diagnostic descriptions are provided for all species following the format used by Konstantinov et al. (2011) and listed in the order they appear in the dichotomous key. Measurements were taken for three specimens of each sex for each species (when available) with a Nikon SMZ-1500 Digital Imaging Workstation with Nikon DS-U1 digital camera and NIS Elements Imaging software (version 3.0). All measurements are given in millimeters (mm). Total body length was measured from the tip of the head to the apex of the elytra and given as the mean and range. The greatest widths of the elytra and pronotum are given as the mean and also as an average ratio of pronotum width: elytra width. Elytra width was measured using the greatest width of the left elytron and doubled. The mean ratio of greatest pronotum width: greatest pronotum length is also presented.

The following habitus photos were taken in the Field Museum of Natural History using a Microptics XLT system with a Canon EOS 40D camera and CF4 lens using a sheet of paper to provide diffuse lighting. Images were stacked using CombineZP® and edited in Adobe Photoshop®: figures 2a, 5a, 7a, 9a, 11a, 14a, 18a, 19a, 20a and 21a. The aedeagus photos in figures 9cd, 11cd and 21cd were taken using the same system with an A10X lens. The spermathecal images of figures 2b, 5b, 7b, 9b, 11b, 14b, 18b, 20b and 21b were taken in the Field Museum of Natural History using a Leitz Dialux 20 differential interference contrast compound microscope and stacked using CombineZP®. All other images were taken at the University of Delaware using a Nikon SMZ-1500 Digital Imaging Workstation with Nikon DS-U1 digital Camera and NIS Elements Imaging software (version 3.0). Image compilations were created using GIMP 2® software (version 2.8).

Whole specimens were examined pointed with a dissecting microscope using a piece of Mylar® to create diffuse lighting to better see microsculpture, punctures, and pubescence. Specimens were relaxed by boiling in clean water on a microscope slide using heat from a disposable lighter. Dissections were made under a dissecting microscope either dry or submerged in 70% ethanol. Aedeagi were removed from the body by tearing the abdominal tergites with a probe and were mounted onto the center of the point with the rest of the specimen with the apex hanging off. Spermathecae were also removed by tearing the abdominal tergites, and were cleared in hot 10% KOH, followed by a rinse in water and transfer to glycerin. Spermathecae were permanently stored in glycerin-filled microvials pinned with the rest of the specimen.

Previous distributional data is based on the records listed in Riley and colleagues (2003). Records that were observed during this study are listed in the

species descriptions with new records in bold followed by a list of previous records not seen in this study. Records noted by Riley and colleagues (2003) as dubious are excluded. Distribution data is listed with records from Canada first, followed by U.S. records (states and provinces alphabetical), and additional New World records. Abbreviations for Canadian Provinces and American States are given in Appendix A.

Host plant records are based on Clark and colleagues (2002). Records observed in this study are listed in alphabetical order with new records in bold. All additional records not seen in this study are listed next in alphabetical order. Records that Clark and colleagues regarded as dubious are excluded from this study. Plant taxonomy is based on the classification used in the online PLANTS database at the time of this work (USDA 2014).

This thesis is not issued for permanent scientific records and is disclaimed for the purposed of zoological nomenclature in the sense of The Code of Zoological Nomenclature article 8.2 (ICZN, 1999).

## Chapter 3

### MORPHOLOGICAL TERMINOLOGY

This work follows the morphological terminology of Konstantinov and colleagues (2011), with the following additions or modifications. The term “antebasal impression” is used for the transverse impression along the caudal margin of the pronotum. Spermathecal terminology is revised to include the term “spermathecal spout” (or simply “spout” when used in context of the spermatheca) to refer to the sclerotized tube connecting the receptacle to the spermathecal duct. This had previously been referred to as the “spermathecal duct” under the assumption that it is a heavily sclerotized part of the duct (e.g., Furth 1994). Seeno and Andrews (1972) referred to the structure as the “sclerotized duct” versus the “unsclerotized duct” which refers to the structure traditionally referred to as the spermathecal duct. However, it appears that the spout is derived from the receptacle rather than the spermathecal duct. In the rest of the Chrysomelidae the spermatheca possess an accessory gland that is connected to the point of attachment between the receptacle and spermathecal duct (Jolivet and Verma 2002). In the Alticini this gland is present directly apical to the end of the spout. The spout is also typically sclerotized to the same extent as the receptacle of the spermatheca, so a more parsimonious view is that it retained its sclerotization rather than adapting it independently. In addition, in some species of Alticini the spout becomes abruptly narrowed at the apex, forming a clear point of attachment for the spermathecal duct that resembles the attachment of the duct to the receptacle in other Chrysomelidae.

## Chapter 4

### RESULTS

In this study 22 species of *Epitrix* were found in America north of Mexico, 10 more than previously known. Eight of these species appear to be new to science and are described here. The 8 new species are *Epitrix floridana* from southern Florida, *Epitrix californica* from southern California, *Epitrix centralis* and *Epitrix variabilis* from west of the Appalachians and east of the Mississippi River, *Epitrix capsica* and *Epitrix ovalis* from Texas, and *Epitrix gentneri* and *Epitrix rufa* from south-central U.S. The Mexican species *Epitrix robusta* Jacoby was found to be present in southern Texas. *Epitrix pubescens* (Koch) is adventive into the northeastern United States from its native range in the western Palearctic. New state records were also found for many of the previously described species and are listed in the species descriptions.

The undescribed species *Epitrix capsica* was found to be associated with peppers in the genus *Capsicum*. Clark and colleagues (2004) list records of five species of *Epitrix* feeding on this genus: *Epitrix brevis* Schwarz, *Epitrix subcrinita* (J. L. LeConte), *Epitrix cucumeris* (Harris), *Epitrix tuberis* Gentner and *Epitrix hirtipennis* (F. E. Melsheimer). Damage to *Capsicum* appears to typically be negligible despite the fact that they are all major pests of other solanaceous crops, so the exclusive association of *Epitrix capsica* with *Capsicum* appears to be unique. Additional new host plant records for other species are included in the species descriptions.

This thesis is described as a “preliminary” revision of the genus *Epitrix* north of Mexico because I have not examined sufficient specimens to ensure that the 22 species described here represent the complete fauna north of Mexico. In particular parts of the southern United States need much more thorough study for additional species, especially southern Florida and southern California. Flowers and colleagues (1994) reported an undescribed species of *Epitrix* nr. *solani* from Manatee County, Florida feeding on *Physalis angustifolia* which was not encountered in this study. No specimens of *Epitrix similaris* were observed in this study; diagnostic characters for this species are based on Gentner (1944), Seeno and Andrews (1972) and OEPP/EPPO (2011). A more thorough study is needed before a complete revision can be published.



## Chapter 5

### DESCRIPTION OF *EPITRIX* FOUDRAS

*Epitrix* Foudras, 1860:308.

#### **Type Species:**

*Epitrix atropae* Foudras, 1860, by subsequent designation of Maulik (1926).

#### **Etymology:**

Derived from the combination of the Greek prefix “*epi-*” meaning “on” or “upon” and the Greek “*thrix*” meaning “of hair” referring to the conspicuous setae on the elytra of this genus (Brown 1956).

#### **Diagnosis:**

Color variable, black to pale testaceous, some rufous, some with patterns on elytra, some with metallic luster; either smooth or with alutaceous microsculpture; size small, less than 3mm; body covered in setae.

Head usually hypognathous; rounded or elongate, slightly convex in profile; labium rectangular, clypeus sometimes elongate; frontal ridge usually produced, narrow, and extending between antennae; vertex of head usually smooth with scattered punctures and setae; eyes approximately moderate in size and slightly produced.

Antennae filiform; 11 segmented; scape larger than second antennomere; antennomeres 7-11 larger than 2-6; apical antennomere with concavity on lateral side of apex.

Pronotum transverse; may be relatively flattened or highly convex; disk in punctures; setae present along margins; lateral sides often bearing serrations; anterior

angles usually obliquely truncated; antebasal impression often present along base of disk; posterior margin arcuate, usually with single sinuations between edge and center. Prosternum convex; fully separating coxae; coxal cavities closed behind; usually with punctures and setae.

Elytra with punctures arranged into striae; long setae arranged in rows, one or two rows between striae; developed humeral callosities usually present; wide epipleura. Wings always present. Venter with punctures and setae.

Hind femora greatly enlarged; tibia approximately as long as femora; flattened laterally; hind tibia with single spine on apex; tarsi 4-4-4; tarsomere 3 bilobed; all tarsi with setae on underside; first metatarsomere approximately as long as rest combined; tarsal claws divergent, simple.

**Distribution:**

Worldwide, most species in New World (Konstantinov and Vandenberg 1996).

**Host Plants:**

Mostly Solanaceae (Konstantinov and Vandenberg 1996).

## Chapter 6

### PRELIMINARY KEY TO *EPITRIX* IN AMERICA NORTH OF MEXICO

1. Body black.....2
- 1'. Color variable, pale testaceous to dark rufous.....14
  
2. Body length always distinctly larger than 2mm; antebasal impression weak; pronotal punctures not dense; southern Texas.....*Epitrix robusta* Jacoby
- 2'. Usually 2mm or less; if longer either with distinct antebasal impression or pronotal punctures dense.....3
  
3. Body length 1.5mm or shorter.....4
- 3'. Body length longer than 1.5mm.....5
  
4. Broad species; antebasal impression distinct; eastern US and Canada.....
- .....*Epitrix brevis* Schwarz
- 4'. Not distinctly broad; antebasal impression indistinct; southern California.....
- .....*Epitrix californica* sp. nov.
  
5. Broad and rounded species; vertex of head covered in dense wrinkles.....
- .....*Epitrix lobata* Crotch
- 5'. Shape variable; vertex of head without wrinkles.....6
  
6. Body with bronze luster; antebasal impression weak; western US.....
- .....*Epitrix subcrinita* (LeConte)
- 6'. Body without bronze luster; antebasal impression variable.....7
  
7. Pronotum with distinct serrations on lateral ridge and antebasal impression distinct.....8
- 7'. If pronotum with noticeable serrations on lateral ridge then antebasal impression indistinct.....11
  
8. Impression on last ventrite; southern US.....*Epitrix gentneri* sp. nov.
- 8'. Without impression on last ventrite.....9
  
9. Pronotum more densely punctate, punctures separated by half diameter or less; western US and Canada..... *Epitrix tubaris* Gentner
- 9'. Pronotum less densely punctate, punctures separated by more than diameter.....10

10. Sides subparallel; extreme southern Texas; on *Capsicum*....*Epitrix capsica* sp. nov.  
10'. Sides more arcuate.....11
11. Pronotal punctures narrower; eastern North America....*Epitrix cucumeris* (Harris)  
11'. Pronotal punctures wider; California.....*Epitrix similaris* Gentner
12. Front and middle femora pale testaceous; pronotum alutaceous; antebasal  
impression with clear lateral margins.....*Epitrix pubescens* (Koch)  
12'. Front and middle femora at least partially darkened; pronotum not alutaceous;  
antebasal impression obscured by dense punctures.....13
13. More elongate species; common agricultural pest.....*Epitrix fuscula* Crotch  
13'. Shorter more robust species; southern Florida.....*Epitrix floridana* sp. nov.
14. Minute species, approximately 1mm long; pale testaceous without darker  
transverse band on elytra; Florida.....*Epitrix solani* (Blatchley)  
14. If less than 1.5mm in length elytra usually with darker transverse band.....15
15. Length 2mm or greater; elytra without darker transverse band.....16  
15'. Length less than 2mm, if longer then elytra with darker transverse band.....18
16. Eyes slightly produced, not elongate; head only slightly elongate; eastern and  
central US and Canada.....*Epitrix humeralis* Dury  
16'. Eyes not produced, elongate; head elongate; southern US.....17
17. Color pale testaceous; dull.....*Epitrix flavotestacea* Horn  
17'. Color dark rufous; glossy.....*Epitrix rufa* sp. nov.
18. Body highly elongate ovoid; pronotum highly convex and about same width as  
elytra; elytra without darker transverse band; Texas.....*Epitrix ovalis* sp. nov.  
18'. Not as above.....19
19. Sides subparallel; elytra with darker transverse band.....  
.....*Epitrix hirtipennis* (Melsheimer)  
19'. Sides usually arcuate; if subparallel then elytra without darker transverse  
band.....20
20. Sides arcuate but body not highly convex; elytra usually with darker transverse  
band; southern US.....*Epitrix fasciata* Blatchley  
20'. Body highly convex; central US.....21

21. Larger species; always with sides arcuate; head hypognathous.....  
.....*Epitrix centralis* sp. nov.
- 21'. Smaller species; form variable; head hypo-prognathous.....  
.....*Epitrix variabilis* sp. nov.

## Chapter 7

### SPECIES DESCRIPTIONS

#### *Epitrix robusta* Jacoby

*Epitrix robusta* Jacoby, 1891:288.

**Type Locality:** Chilpancingo in Guerrero, Mexico.

**Diagnosis:**

Body completely piceous; total body length 2.33-2.40mm; antebasal impression of pronotum weak; pronotal punctures separated by 1/2 diameter, small; mouthparts broad; two rows of setae between elytral striae; 10 striae on elytra.

**Description:**

Total body length, mean=2.37mm (2.33-2.40, n=2); width of elytra, mean=1.35mm (1.32-1.38, n=2); ratio of width to length of pronotum, mean=1.52 (1.49-1.55, n=2); ratio of greatest width of elytra to greatest width of pronotum, mean=1.38 (1.36-1.39, n=2).

Body completely piceous; hind femora dark testaceous, becoming lighter towards apex; front and middle femora testaceous; tibia, tarsi and antennae testaceous; body smooth.

Head hypognathous; mouthparts broad; eyes slightly produced and moderately large in size; frontal ridge slightly produced, extending into broad rounded angle between antennae; vertex with few large punctures near eyes.

Pronotum transverse; evenly convex; covered with large distinct punctures separated by approximately 1/2 their diameter or less, denser towards center; lateral

ridges with small serrations separated by approximately their length; antebasal impression weakly present; basal margin of pronotum arcuate with a single sinuation between center and edge; greatest length at center; lateral margins with fringes of long setae separated by approximately same distance as serrations, posterior margin with setae present mostly towards lateral sides; anterior angles truncated; prosternal process with large dense punctures and scattered long setae.

Elytra with 10 distinct striae; 1 ending at basal 1/2; 7-9 interrupted by humeral callosities; punctures separated by approximately their diameter; two rows of setae between striae; setae separated by approximately 1/2 their length; lateral margins slowly arcuate over entire length. Venter with scattered minute punctures and short setae.

Aedeagus laterally curved on basal 1/3; straight for apical 2/3; narrowed on apical 1/2; apex directed slightly ventrally; ventrally basal opening slightly wider; sides subparallel; apical 1/5 rounded to small apical truncated projection.

Spermathecal pump attached to side of receptacle apex; pump approximately 1/2 length of receptacle; rounded in approximately 90° angle; apex slightly expanded. Receptacle wide and short; with small inward sinuation externally. Spermathecal spout relatively narrow; attached to center of receptacle base; extending to middle of receptacle; basal half divergent from receptacle with apical half convergent; gland attachment highly produced.

**Distribution:** TX; Mexico.

**Host Plants:** Unknown.

**Notes:**

*Epitrix robusta* was described from Mexico but is here reported from southern Texas. *Epitrix robusta* can be separated from *gentneri* by its typically larger size, weaker antebasal impression, and lack of an impression on the apical ventrite. It can be separated from *Epitrix fuscula* by its more southern range and its less dense pronotal punctures.

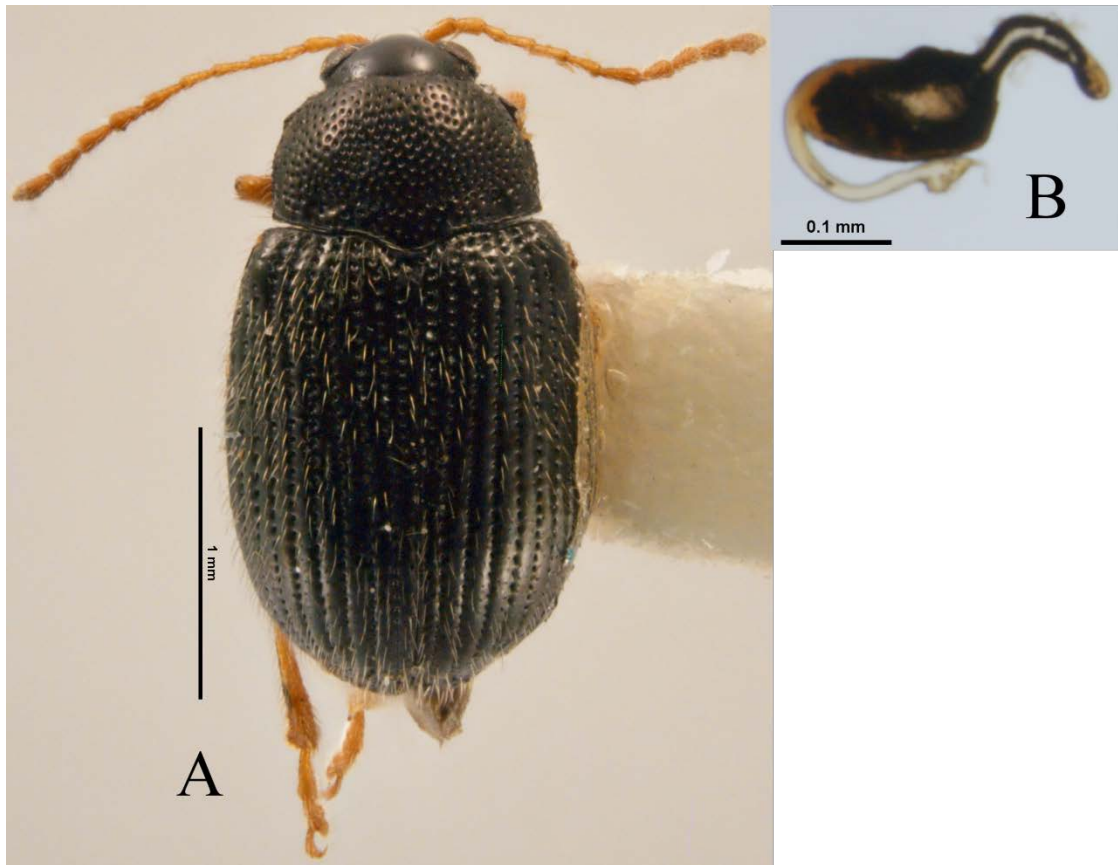


Figure 1 *Epitrix robusta* Jacoby; A, habitus, dorsal; B, spermatheca.



*Epitrix brevis* Schwarz

*Epitrix brevis* Schwarz, 1878:367.

**Type Locality:** Florida, USA.

**Diagnosis:**

Body dark testaceous to piceous; total body length 1.31-1.63mm; antebasal impression of pronotum absent to weak; pronotal punctures separated by their diameter, small; one row of setae between elytral striae; 11 striae on elytra. Receptacle without distinct constriction, spout slightly sclerotized, contiguous and parallel with receptacle at apex.

**Description:**

Total body length, mean=1.47mm (1.31-1.63, n=6); width of elytra, mean=0.92mm (0.82-0.98, n=6); ratio of width to length of pronotum, mean=1.61 (1.53-1.68, n=6); ratio of greatest width of elytra to greatest width of pronotum, mean=1.45 (1.42-1.51, n=6).

Body dark testaceous to piceous; front of head often pale; femora dark testaceous, often becoming lighter towards apex; tibia, tarsi and antennae pale testaceous.

Head hypo-prognathous; mouthparts broad; eyes produced and moderate in size; frontal ridge triangular, broad, and flat, extending into long acute angle between antennae; vertex with few punctures near eyes.

Pronotum short; evenly convex; evenly covered with small distinct punctures separated by approximately their diameter; area between punctures smooth; lateral ridges with minute serrations separated by approximately twice their length; antebasal impression weak to absent; basal margin of pronotum arcuate with a single sinuation between center and edge; greatest length at center; lateral and posterior margins with

fringes of long setae separated by approximately length of serrations; anterior angles obliquely truncated; prosternal process with large dense punctures and scattered long setae.

Elytra with 11 distinct striae, 1 ending at basal  $\frac{1}{2}$ , 8-9 interrupted by weak humeral callosities; punctures separated by  $\frac{1}{2}$  diameter or less; single row of setae between striae; setae separated by approximately their length; lateral margins very slowly curved over basal  $\frac{2}{3}$ , narrowing to rounded apex on apical  $\frac{1}{3}$ . Venter with scattered small punctures mostly towards sides; scattered short setae; last ventrite unmodified.

Aedeagus laterally weakly curved over entire length; narrowed on apical  $\frac{1}{2}$ ; apex straight; ventrally basal opening subequal in width; sides subparallel; apically narrowed to small apical rounded projection.

Spermathecal pump attached to center of receptacle apex; pump approximately  $\frac{1}{3}$  length of receptacle; angled  $90^\circ$  slightly prior to center; apex not expanded. Receptacle rounded to widest point on basal  $\frac{1}{3}$ ; apical  $\frac{2}{3}$  narrowed to apex. Spermathecal spout relatively narrow; attached to center of receptacle base; extending across  $\frac{1}{3}$  of receptacle; basal  $\frac{3}{4}$  forming small loop; apical  $\frac{1}{4}$  parallel with receptacle; gland attachment not produced.

**Distribution:** DE, FL, IL, KS, MD, MO, NC, NJ, OH, PA, SC, TX, WV.

Also reported from ON; AL, GA, IA, KY, LA, MI, OK, RI, TN, VA, WI.  
(Riley et al. 2003).

**Host Plants:** *Datura stramonium* L., *Physalis* sp., *Solanum aethiopicum* L., *S. lycopersicum* L., *S. melongena* L., and *S. tuberosum* L.

Also reported from *Capsicum frutescens* L., *Physalis alkekengi* L., *P. ixocarpa* Hornem, *P. longifolia* Nutt., *P. pubescens* L., *Solanum americanum* P. Mill., and *S. dulcamara* L. (Clark et al. 2004).

**Notes:**

*Epitrix brevis* can be separated from *lobata* by its much smaller size, less convex body, and smaller pronotum. It can be separated from *californica* by its range, its smaller pronotum, rounded dorsal profile, and the presence of a weak antebasal impression.

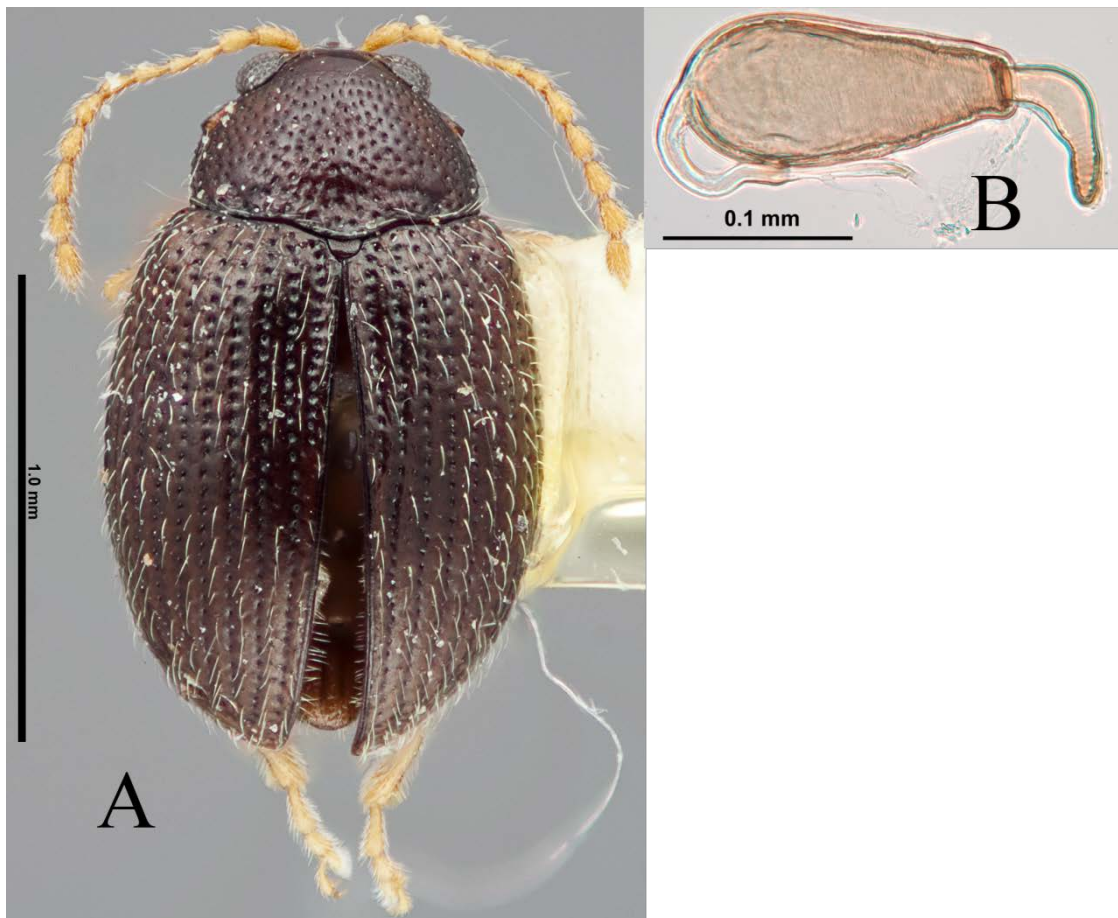


Figure 2 *Epitrix brevis* Schwarz; A, habitus, dorsal; B, spermatheca.

*Epitrix californica* sp. nov.

**Diagnosis:**

Body dark testaceous to piceous; total body length 1.23-1.39mm; antebasal impression of pronotum absent to weak; pronotal punctures separated by their diameter, small; one row of minute setae between elytral striae; 11 striae on elytra.

**Description:**

Total body length, mean=1.30mm (1.23-1.39, n=3); width of elytra, mean=0.76mm (0.70-0.80, n=3); ratio of width to length of pronotum, mean=1.59 (1.49-1.68, n=3); ratio of greatest width of elytra to greatest width of pronotum, mean=1.27 (1.26-1.27, n=3).

Body dark testaceous to piceous; femora dark testaceous, often becoming lighter towards apex; tibia, tarsi and antennae pale testaceous.

Head hypo-prognathous; mouthparts broad; eyes indistinctly produced and moderate in size; frontal ridge arcuate, very broad, and flat, extending into wide projection with a rounded apex between antennae; vertex with few punctures near eyes.

Pronotum transverse; evenly convex; evenly covered with small distinct punctures separated by approximately their diameter; area between punctures smooth; lateral ridges with minute serrations separated by approximately 3 times their length; antebasal impression weak to absent; basal margin of pronotum arcuate; greatest length at center; margins with scattered short setae; anterior angles obliquely truncated; prosternal process with small scattered punctures and short setae.

Elytra with 11 distinct striae, 1 ending at basal 1/3, 7-9 interrupted by weak humeral callosities; punctures separated by 1½ diameter; single row of minute setae between striae; setae separated by approximately three times length; lateral margins

slowly curved over basal 2/3, narrowing to rounded apex on apical 1/3. Venter with scattered small punctures and short setae; last ventrite unmodified.

Aedeagus laterally nearly straight over entire length; narrowed on apical 1/2; apex directed slightly ventrally; ventrally basal opening subequal in width; sides subparallel; apically abruptly rounded to small apical truncated projection.

Female unknown.

**Distribution:** CA.

**Host Plants:** Unknown.

**Etymology:** Derived from “California”, the only state in which it is known to occur.

**Notes:**

*Epitrix californica* is known from a single series of three male specimens collected by pitfall trap in Mitchell Caverns State Park, San Bernadino County, CA. It can be separated from *similaris* by its smaller size and the lack of a distinct antebasal impression. It can be separated from *brevis* by its range, its larger pronotum, and it always lacks an antebasal impression.



Figure 3 *Epitrix californica* sp nov.; A, habitus, dorsal.

### *Epitrix lobata* Crotch

*Epitrix lobata* Crotch, 1873:72.

**Type Locality:** South Carolina, USA.

**Diagnosis:**

Body completely piceous; total body length 1.77-1.99mm; antebasal impression of pronotum small, limited to near center; pronotal punctures separated by approximately their diameter, moderate; two rows of setae between elytral striae; 11 striae on elytra.

**Description:**

Total body length, mean=1.86mm (1.77-1.99, n=8); width of elytra, mean=1.20mm (1.12-1.32, n=8); ratio of width to length of pronotum, mean=1.74 (1.54-1.74, n=8); ratio of greatest width of elytra to greatest width of pronotum, mean=1.36 (1.24-1.50, n=8).

Body completely piceous; femora dark testaceous, becoming lighter towards apex; tibia, tarsi and antennae pale testaceous.

Head hypognathous; mouthparts slightly elongate; eyes slightly produced and moderate in size; frontal ridge triangular and produced, extending into narrow angle between antennae; vertex irregularly covered with dense striae.

Pronotum transverse; extremely convex; evenly covered with moderate distinct punctures separated by approximately their diameter; area between punctures smooth; lateral ridges without serrations; antebasal impression small, limited to near center; basal margin of pronotum arcuate with a single sinuation between center and edge; greatest length at center; lateral margins with spaced fringes of minute setae, posterior margin with fewer setae present mostly towards lateral sides; anterior angles with

small angular projection; prosternal process with large dense punctures and scattered setae.

Elytra with 11 distinct striae; 1 ending prior to basal  $\frac{1}{2}$ ; 8-9 interrupted by small weak humeral callosities; punctures separated by  $\frac{1}{2}$  diameter; two rows of setae between striae; setae separated by approximately  $\frac{3}{4}$  their length; lateral margins highly curved with widest point near center. Venter with scattered small punctures mostly towards sides; scattered short setae; last ventrite unmodified.

Aedeagus laterally weakly curved over entire length; narrowed on apical  $\frac{1}{3}$ ; apex straight; ventrally basal opening greater in width; sides slightly convergent towards apex; apically rounded.

Spermathecal pump attached to center of receptacle apex; pump approximately  $\frac{1}{3}$  length of receptacle; rounded  $90^\circ$  slightly prior to center; apex not expanded. Receptacle rounded with slight sinuation near center. Spermathecal spout thin; attached slightly to side of receptacle base; extending across  $\frac{3}{4}$  of receptacle; basal  $\frac{1}{3}$  curved; apical  $\frac{2}{3}$  straight and converging with receptacle; gland attachment not produced.

**Distribution:** NC, TX, WV.

Also reported from FL, GA, OH (Clark et al. 2003).

**Host Plants:** *Physalis* sp.

**Notes:**

*Epitrix lobata* is the only species north of Mexico with a series of irregular striae present on the vertex of the head. It can further be separated from both *floridana* and *fuscata* by the less dense punctures on the pronotum. It can be separated from *brevis* by its larger size, more convex body, and larger pronotum.



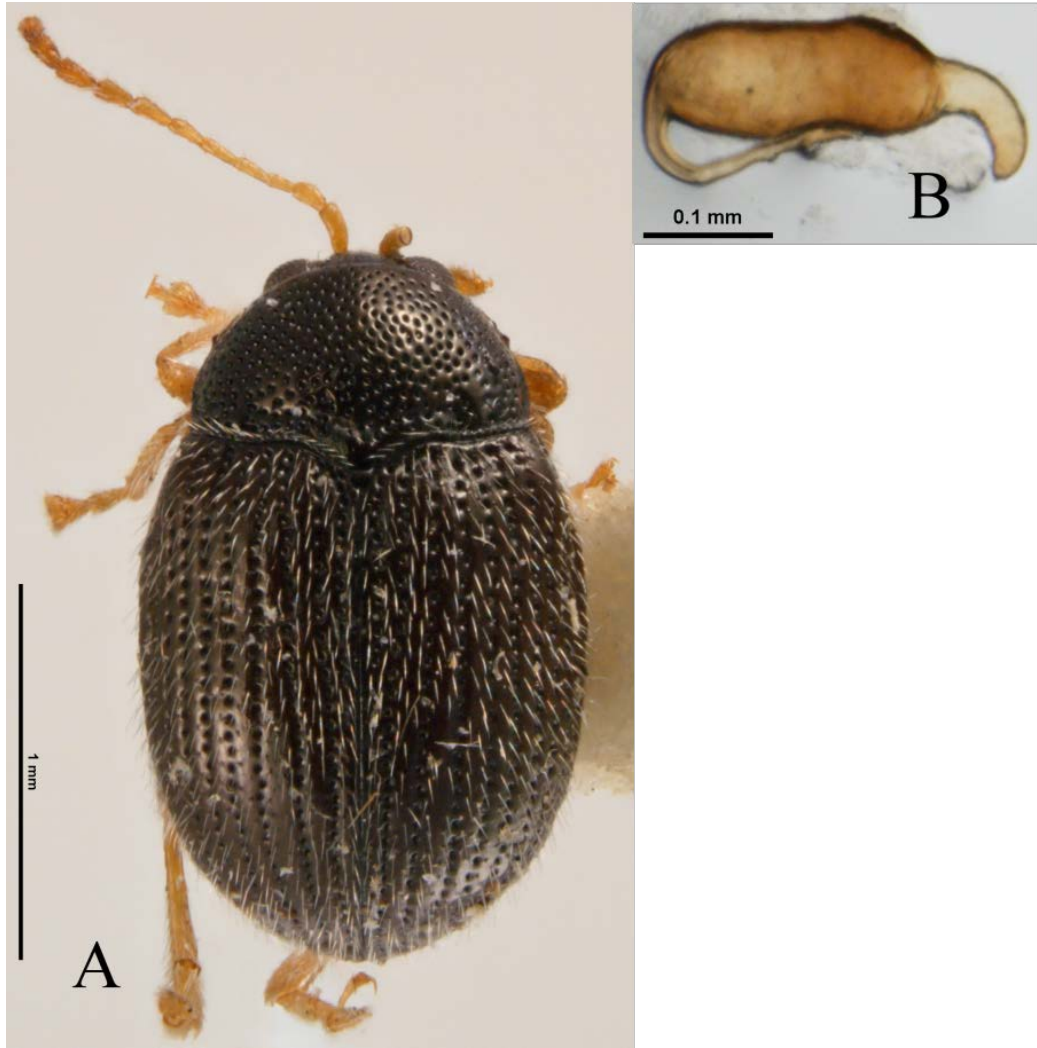


Figure 4 *Epitrix lobata* Crotch; A, habitus, dorsal; B, spermatheca.

*Epitrix subcrinita* (LeConte)

*Haltica subcrinita* LeConte, 1857:68.

*Epitrix subcarinata* Crotch, 1873:72 [*lapsus*].

**Type Locality:** San Francisco, California, USA.

**Diagnosis:**

Body completely piceous with bronze luster; total body length 1.76-2.27mm; antebasal impression of pronotum highly reduced; pronotal punctures separated by twice diameter, small; one row of setae between elytral striae; 11 striae on elytra.

**Description:**

Total body length, mean=1.99mm (1.76-2.27, n=6); width of elytra, mean=1.04mm (0.96-1.16, n=6); ratio of width to length of pronotum, mean=1.56 (1.52-1.64, n=6); ratio of greatest width of elytra to greatest width of pronotum, mean=1.43 (1.32-1.49, n=6).

Body completely piceous with bronze luster; femora dark testaceous, often becoming lighter towards apex; tibia and tarsi testaceous; antennae testaceous often becoming darker towards apex.

Head hypo-prognathous; mouthparts slightly broad; eyes slightly produced and moderate in size; frontal ridge triangular and slightly produced, extending into rounded angle between antennae; vertex with few large punctures near eyes.

Pronotum slightly transverse, subquadrate; evenly convex; evenly covered with small distinct punctures separated by approximately twice their diameter; area between punctures smooth; lateral ridges with minute serrations separated by approximately twice their length; antebasal impression highly reduced; basal margin of pronotum arcuate with a single weak sinuation between center and edge; greatest length at center; lateral and hind margins with fringes of long setae separated by

nearly same distance as serrations; anterior angles obliquely truncated; prosternal process with small dense punctures and scattered long setae.

Elytra with 11 distinct striae; 1 ending at basal  $\frac{1}{2}$ ; 8-9 interrupted by humeral callosities; punctures separated by  $\frac{1}{2}$  diameter or less; single row of setae between striae; setae separated by approximately their length; lateral margins slowly curved over basal  $\frac{2}{3}$ , narrowing to rounded apex on apical  $\frac{1}{3}$ . Venter with scattered small punctures mostly towards sides; scattered short setae; last ventrite unmodified.

Aedeagus laterally curved on basal  $\frac{1}{2}$ ; straight for apical  $\frac{1}{2}$ ; narrowed on apical  $\frac{1}{2}$ ; apex directed dorsally; ventrally basal opening subequal in width; sides slightly arcuate over basal  $\frac{5}{6}$  with widest point in center; constricted at apical  $\frac{1}{6}$ ; apical  $\frac{1}{6}$  rounded to pointed obtuse apex.

Spermathecal pump attached to center of receptacle apex; pump approximately  $\frac{1}{3}$  length of receptacle; angled  $90^\circ$  near center; apex not expanded. Receptacle elongate and distinctly inwardly curved. Spermathecal spout moderately thin; attached to side of receptacle base; extending across  $\frac{2}{3}$  of receptacle; basal  $\frac{4}{5}$  distant from receptacle and evenly curved; apical  $\frac{1}{5}$  parallel with receptacle; gland attachment not produced.

**Distribution:** AZ, CA, CO, ID, OR, UT, WA, WY.

Also reported from AB, BC, SK; MT, NV; Mexico. (Riley et al. 2003).

**Host Plants:** Reported from *Capsicum annuum* L., *Datura meteloides* Dunal, *Lycium* sp., *Nicandra physalodes* (L.) P. Gaertn., *Nicotiana alata* Link & Otto, *N. attenuata* Tor. ex Wats. *Physalis francheti* Masters, *P. lobata* J. Torr., *P. longifolia* Nutt., *P. pubescens* L., *Solanum carolinense* L., *S. dulcamara* L., *S. lycopersicum* L., *S.*

*melongena* L., *S. nigrum* L., *S. rostratum* Dunal, *S. triflorum* Nutt., *S. tuberosum* L., and *S. villosum* Mill. (Clark et al. 2004).

**Notes:**

*Epitrix subcrinita* is the only species north of Mexico which has a bronze luster. It can further be separated from *tuberis* and *similaris* by its weak antebasal impression.



Figure 5 *Epitrix subcrinita* LeConte; A, habitus, dorsal; B, spermatheca.

*Epitrix gentneri* sp. nov.

**Diagnosis:**

Body completely piceous; total body length 1.60-2.16mm; antebasal impression of pronotum present; pronotal punctures moderately dense, large; two rows of setae between elytral striae; 11 striae on elytra; large circular impression on last ventrite.

**Description:**

Total body length, mean=1.84mm (1.60-2.16, n=10); width of elytra, mean=1.01mm (0.90-1.08, n=10); ratio of width to length of pronotum, mean=1.62 (1.54-1.71, n=10); ratio of greatest width of elytra to greatest width of pronotum, mean=1.37 (1.28-1.44, n=10).

Body completely piceous; femora mostly piceous, often becoming testaceous towards apex; tibia and tarsi completely testaceous; antennae testaceous with apical antennomeres sometimes darker.

Head hypo-prognathous; mouthparts moderately broad; eyes slightly produced and moderate in size; frontal ridge narrow and produced, extending between antennae in broad rounded angle.

Pronotum transverse; evenly convex; moderately densely covered with large distinct punctures separated by about 1/2 their diameter; area between punctures smooth; sides with lateral ridge with small serrations separated by about 1.5 times their length; antebasal impression present; basal margin of pronotum arcuate with a single large sinuation between center and edge; greatest length at center; margins with fringes of long narrowly separated setae separated by about length of serrations; anterior angles obliquely truncated; prosternal process with large scattered punctures and dense long setae.

Elytra with 11 distinct striae; 1 ending at basal 1/2; 8-10 interrupted by humeral callosities; punctures contiguous; two rows of setae between striae; setae separated by approximately 3/4 their length; lateral margins very slowly curved over basal 2/3, narrowing to rounded apex on apical 1/3. Venter with scattered small punctures; short setae separated by 1.5 times length; last ventrite impressed in center.

Aedeagus laterally curved on basal 1/2; straight on apical 1/2; narrowed on apical 1/2; apex directed slightly dorsally; ventrally basal opening subequal in width; sides subparallel; apically gradually narrowed to small apical truncated projection.

Spermathecal pump attached to side of receptacle apex; pump approximately 1/2 length of receptacle; angled 90° slightly prior to center; slight constriction prior to apex. Receptacle slightly elongate over basal 1/2; apical 1/2 slightly expanded and rounded. Spermathecal spout moderate; attached to side of receptacle base; extending across 1/2 of receptacle; forming a moderate loop from the receptacle; gland attachment not produced.

**Distribution:** AZ, TX.

**Host Plants:** None recorded.

**Etymology:** Named after L. G. Gentner, the author of *Epitrix tuberis* and *similaris*. In his 1944 description of these two species he noted specimens of this species from Arizona but never named it.

**Notes:**

*Epitrix gentneri* can be recognized by its impression on the apical ventrite. It can further be separated from *Epitrix tuberis* by its slightly less dense pronotal punctures. It can be separated from *Epitrix cucumeris*, *similaris* and *capsica* by its denser pronotal punctures.

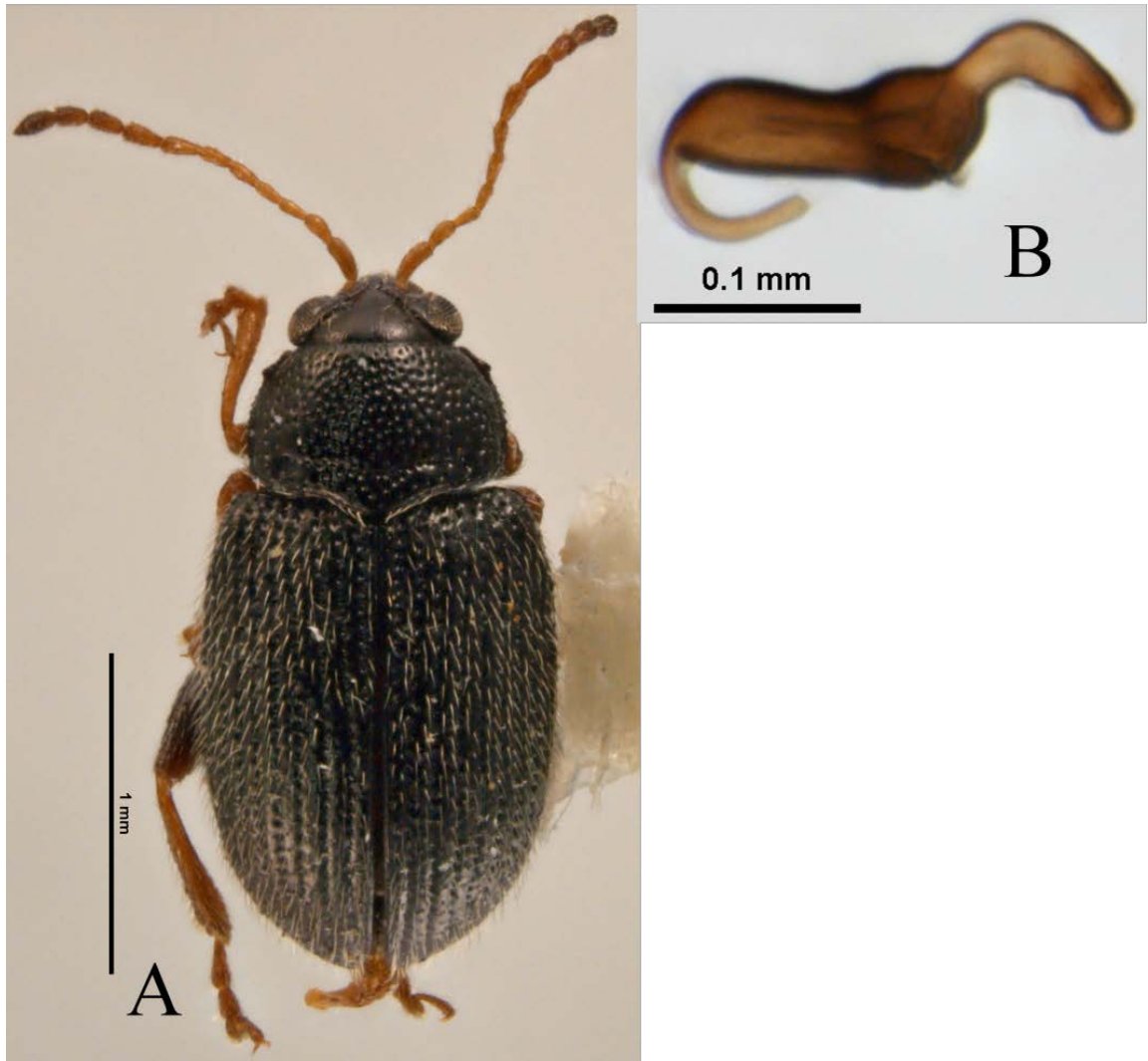


Figure 6 *Epitrix gentneri* sp. nov.; A, habitus, dorsal; B, spermatheca.

*Epitrix tuberis* Gentner

*Epitrix tuberis* Gentner, 1944:137.

**Type Locality:** Scappoose, Oregon, USA.

**Diagnosis:** Body completely piceous; total body length 1.83-1.89mm; antebasal impression of pronotum present; pronotal punctures separated by 1/3 diameter, large; two rows of setae between elytral striae; 11 striae on elytra; last ventrite unmodified.

**Description:**

Total body length, mean=1.86mm (1.83-1.89, n=3); width of elytra, mean=1.03mm (1.00-1.08, n=3); ratio of width to length of pronotum, mean=1.44 (1.39-1.51, n=3); ratio of greatest width of elytra to greatest width of pronotum, mean=1.41 (1.35-1.48, n=3).

Body completely piceous; femora mostly piceous, often becoming testaceous towards apex; tibia and tarsi completely testaceous; antennae testaceous with apical antennomeres sometimes darker.

Head hypo-opisthognathous; mouthparts moderately broad; eyes slightly produced and moderate in size; frontal ridge narrow and produced, extending between antennae in broad rounded angle; vertex with few large punctures near eyes.

Pronotum transverse; evenly convex; densely covered with large distinct punctures separated by about 1/3 their diameter; area between punctures smooth; sides with lateral ridge with small serrations separated by about 1.5 times their length; antebasal impression present; basal margin of pronotum arcuate with a single large sinuation between center and edge; greatest length at center; margins with fringes of long narrowly separated setae separated by about length of serrations; anterior angles obliquely truncated; prosternal process with large scattered punctures and dense long setae.



Elytra with 11 distinct striae; 1 ending at basal 1/3; 8-10 interrupted by humeral callosities; punctures separated by ¼ diameter; two rows of setae between striae; setae separated by approximately 3/4 their length; lateral margins very slowly curved over basal 2/3, narrowing to rounded apex on apical 1/3. Venter with scattered small punctures; short setae separated by approximately their length; last ventrite unmodified.

Aedeagus laterally curved over entire length; narrowed on apical 1/2; apex directed dorsally; ventrally basal opening subequal in width; sides convergent towards apex; apically narrowed to small apical truncated projection.

Spermathecal pump attached slightly to side of center of receptacle apex; pump approximately as long as receptacle; angled 90° approximately 1/3 from base; apex slightly expanded. Receptacle rounded with slight sinuation just basal of center. Spermathecal moderately wide; attached to center of receptacle base; extending across 1/2 of receptacle; slightly curved and divergent from receptacle; gland attachment weakly produced.

**Distribution:** AZ, CA, CO, MT, WA.

Also reported from AB, BC, SK; ID, NE, NM, OR, SD, WY (Riley et al. 2003).

**Host Plants:** Recorded from *Capsicum frutescens* L., *Datura meteloides* Dunal, *D. stramonium* L., *Lycium* sp., *Nicandra physalodes* (L.) P. Gaertn., *Nicotiana alata* Link & Otto, *N. tabacum* L., *Petunia* sp., *Physalis francheti* Masters, *Physalis ixocarpa* Hornem, *P. lanceolata* Michx., *P. lobata* J. Torr., *P. longifolia* Nutt., *P. pruniosa* L., *P. pubescens* L., *Solanum carolinense* L., *S. dulcamara* L., *S. lycopersicum* L., *S.*

*melongena* L., *S. nigrum* L., *S. rostratum* Dunal, *S. triflorum* Nutt., *S. tuberosum* L., and *S. villosum* Mill. (Clark et al. 2004).

**Notes:**

*Epitrix tuberis* can be separated from *similaris*, *cucumeris* and *capsica* by its more dense pronotal punctures. It can be separated from *Epitrix gentneri* by its pronotal punctures being slightly denser and the lack of an impression on the apical ventrite.

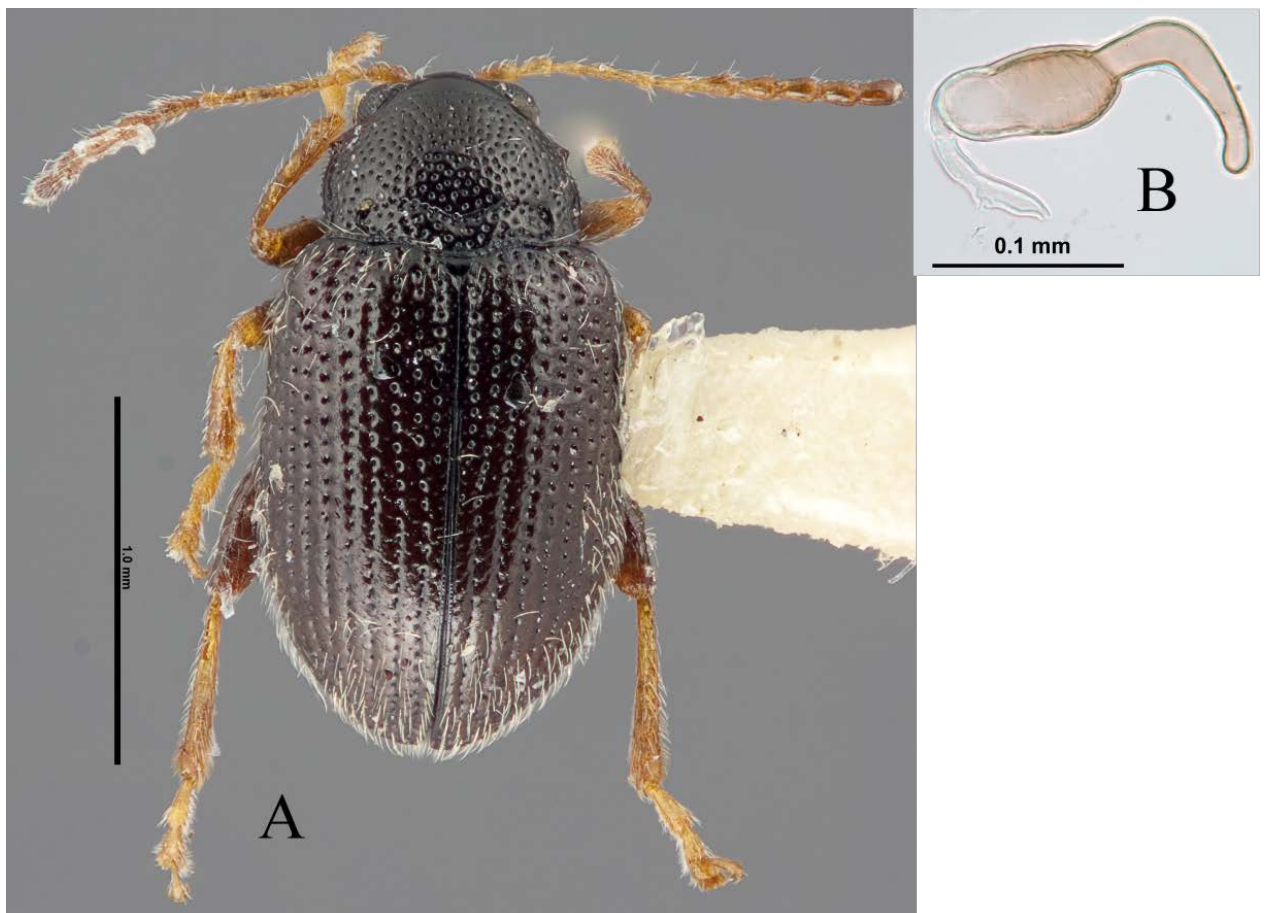


Figure 7 *Epitrix tuberis* Gentner; A, habitus, dorsal; B, spermatheca.

*Epitrix capsica* sp. nov.

**Diagnosis:**

Body completely piceous; total body length 1.46-1.82mm; antebasal impression of pronotum distinct; pronotal punctures separated by twice diameter, small; one row of setae between elytral striae; 10 striae on elytra.

**Description:**

Total body length, mean=1.69mm (1.46-1.82, n=8); width of elytra, mean=0.93mm (1.82-1.04, n=8); ratio of width to length of pronotum, mean=1.58 (1.44-1.71, n=8); ratio of greatest width of elytra to greatest width of pronotum, mean=1.39 (1.32-1.45, n=8).

Body completely piceous; legs and antennae pale testaceous with only hind femora sometimes darker.

Head hypo-prognathous; mouthparts slightly elongate; eyes slightly produced and moderate in size; frontal ridge triangular and produced, extending into rounded angle between antennae; vertex with very few small punctures near eyes.

Pronotum transverse; evenly convex; evenly covered with small distinct punctures separated by approximately twice their diameter; area between punctures smooth; lateral ridges with small serrations separated by approximately their length; antebasal impression well developed; basal margin of pronotum arcuate with a single sinuation between center and edge; greatest length at center; lateral margins with fringes of long setae separated by nearly same distance as serrations, posterior margin with setae present mostly towards lateral sides; anterior angles obliquely truncated; prosternal process with scattered moderate punctures and long setae.

Elytra with 10 distinct striae; 1 ending at basal 2/3; 8-10 interrupted by humeral callosities; punctures separated by less than 1/2 diameter; single row of setae

between striae; setae separated by approximately  $\frac{3}{4}$  their length; lateral margins sub-parallel over basal  $\frac{3}{4}$ , narrowing to rounded apex on apical  $\frac{1}{4}$ . Venter with scattered small punctures mostly towards sides; setae moderately dense; last ventrite unmodified.

Aedeagus laterally curved on basal  $\frac{1}{3}$ ; straight for apical  $\frac{2}{3}$ ; narrowed on apical  $\frac{1}{3}$ ; apex directed slightly dorsally; ventrally basal opening slightly wider; sides slightly convergent towards apex; apically gradually narrowed to small apical truncated projection.

Spermathecal pump attached slightly to side of center of receptacle apex; pump approximately  $\frac{1}{3}$  length of receptacle; angled  $90^\circ$  slightly prior to center; constricted prior to expanded apex. Receptacle arcuate towards exterior over basal  $\frac{1}{2}$ ; apical  $\frac{1}{2}$  distinctly expanded and rounded. Spermathecal spout moderate; attached to side of receptacle base; extending across  $\frac{1}{3}$  of receptacle; parallel with receptacle; gland attachment not produced.

**Distribution:** TX.

**Host Plants:** *Capsicum annuum* L.

**Etymology:** Derived from the plant genus “*Capsicum*”, the only known host plant for the species.

**Notes:**

*Epitrix capsica* is only known from Sabal Palm Grove Sanctuary in Cameron County, TX on *Capsicum annum*. It can be separated from *Epitrix cucumeris* by its more parallel sides and the apex of the receptacle being expanded. It can be separated from *Epitrix gentneri* by its more parallel sides, less dense pronotal punctures, lack of an impression on the apical ventrite, and the apex of the receptacle being expanded.

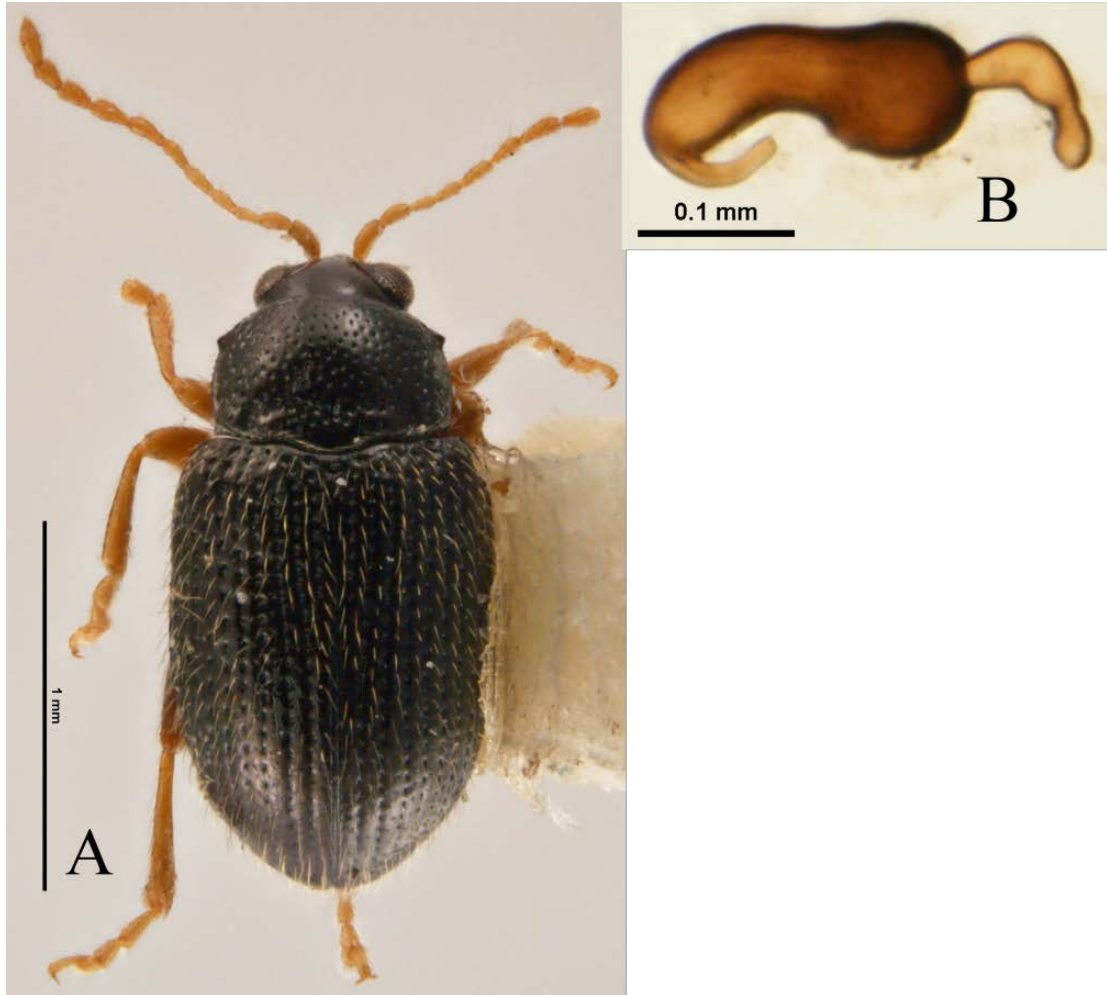


Figure 8 *Epitrix capsica* sp nov.; A, habitus, dorsal; B, spermatheca.

*Epitrix cucumeris* (Harris)

*Haltica cucumeris* Harris, 1851:100.

*Haltica seminulum* LeConte, 1861:358.

**Type Locality:** Massachusetts, USA.

**Diagnosis:**

Body completely piceous; total body length 1.69-2.01mm; antebasal impression of pronotum distinct; pronotal punctures separated by twice diameter, small; one row of setae between elytral striae; 11 striae on elytra. Receptacle with transverse constriction just distad of center, "duct" weakly sclerotized.

**Description:**

Total body length, mean=1.86mm (1.69-2.01, n=6); width of elytra, mean=1.06mm (0.98-1.16, n=6); ratio of width to length of pronotum, mean=1.56 (1.43-1.67, n=6); ratio of greatest width of elytra to greatest width of pronotum, mean=1.42 (1.31-1.51, n=6).

Body completely piceous; femora dark testaceous, often becoming lighter towards apex; tibia, tarsi and antennae pale testaceous.

Head hypo-prognathous; mouthparts slightly elongate; eyes produced and moderate in size; frontal ridge triangular and produced, extending into rounded angle between antennae; vertex with large punctures near eyes.

Pronotum transverse; evenly convex; evenly covered with small distinct punctures separated by approximately twice their diameter; area between punctures smooth; lateral ridges with small serrations separated by approximately their length; antebasal impression well developed; basal margin of pronotum arcuate with a single sinuation between center and edge; greatest length at center; lateral margins with fringes of long setae separated by nearly same distance as serrations, posterior margin

with fewer setae present mostly towards lateral sides; anterior angles obliquely truncated; prosternal process with large dense punctures and scattered long setae.

Elytra with 11 distinct striae; 1 ending at basal  $\frac{1}{2}$ ; 7-9 interrupted by weak humeral callosities; punctures separated by  $\frac{1}{2}$  diameter or less; single row of setae between striae; setae separated by approximately  $\frac{3}{4}$  their length; lateral margins very slowly curved over basal  $\frac{2}{3}$ , narrowing to rounded apex on apical  $\frac{1}{3}$ . Venter with scattered small punctures mostly towards sides; scattered short setae; last ventrite unmodified.

Aedeagus laterally weakly curved over basal  $\frac{3}{4}$ ; straight on apical  $\frac{1}{4}$ ; narrowed on apical  $\frac{1}{2}$ ; apex straight; ventrally basal opening subequal in width; sides subparallel; apically narrowed to apical rounded projection.

Spermathecal pump attached to center of receptacle apex; pump approximately  $\frac{1}{3}$  length of receptacle; angled  $90^\circ$  prior to center; produced directly apical to angle and on apex. Receptacle elongate with distinct sinuation directly apical to center. Spermathecal spout thin; attached to side of receptacle base; extending across  $\frac{1}{2}$  of receptacle; forming a large loop diverging far from receptacle before returning; apically becoming parallel with receptacle; gland attachment weakly produced.

**Distribution:** CT, DC, DE, IA, IN, KS, NE, NC, NJ, NY, OH, PA, WV.

Also reported from MB, NB, NF, NS, ON, PE, PQ, SK; AL, AR, CO, FL, GA, IL, KY, MA, MD, ME, MI, MN, MO, MS, MT, ND, NH, RI, SC, SD, VA, VT, WI, WY (Riley et al. 2003).

**Host Plants:** *Datura stramonium* L., *Solanum dulcamara* L., *S. nigrum* L., *S. physalifolium* Rusby, and *S. tuberosum* L.

Also reported from *Atropa belladonna* L., *Capsicum annuum* L., *Nicotiana tabacum* L., *Petunia x hybrid* (Hook.) Vilm., *P. nyctaginiflora* Jussieu, *Physalis alkekengi* L., *P. angulata* L., *P. peruviana* L., *P. pubescens* L., *P. virginiana* P. Mill., *Solanum americanum* P. Mill., *S. burbankii* Bitter, *S. carolinense* L., *S. lycopersicum* L., *S. melongena* L., *S. pseudocapsicum* L., *S. purpureum* Dunal, *S. rostratum* Dunal, and *S. torvum* Sw. (Clark et al. 2004).

**Notes:**

*Epitrix cucumeris* can usually be separated from *tuberis*, *similaris*, *gentneri*, and *capsica* by its eastern range. Morphologically it can be separated from *Epitrix tuberis* by its pronotal punctures being less dense. It can be separated from *Epitrix similaris* by its smaller pronotal punctures and the apex of the receptacle not being enlarged. It can be separated from *Epitrix gentneri* by its less dense pronotal punctures and the lack of an impression on the apical ventrite. It can be separated from *Epitrix capsica* by its more convex lateral sides and the apex of the receptacle not being enlarged.





Figure 9 *Epitrix cucumeris* (Harris); A, habitus, dorsal; B, spermatheca; C, aedeagus, ventral; D, aedeagus, lateral.

***Epitrix similaris* Gentner**

*Epitrix similaris* Gentner, 1944:142.

**Type Locality:** Santa Barbara, California, USA.

**Distribution:** Reported from CA (Riley et al. 2003).

**Host Plants:** Recorded from *Nicotiana* sp., *Solanum douglasii* Dun., *S. lycopersicum* L., *S. melongena* L., *S. nigrum* L., and *S. tuberosum* L. (Clark et al. 2004).

**Notes:**

*Epitrix similaris* was not observed during this study. One specimen from Arizona labelled as “*Epitrix similaris*?” was obtained from the BYU, but upon dissection it was found to be *gentneri*. It is known from central and southern California, primarily near the coast (Seeno and Andrews 1972). Morphological information here is based on Gentner (1944), Seeo and Andrews (1972) and OEPP/EPPO (2011). It can be separated from *Epitrix tuberis* by its less dense pronotal punctures. It can be separated from *Epitrix gentneri* by its lack of an impression on the apical ventrite.

*Epitrix pubescens* (Koch)

*Altica pubescens* Koch, 1803:37.

**Type Locality:** Germany.

**Diagnosis:**

Body completely piceous, alutaceous; total body length 1.81-2.04mm; antebasal impression of pronotum well developed; pronotal punctures separated by 1/2 diameter, large; mouthparts broad; one row of setae between elytral striae; 11 striae on elytra.

**Description:**

Total body length, mean=1.88mm (1.81-2.04, n=6); width of elytra, mean=1.07mm (0.96-1.18, n=6); ratio of width to length of pronotum, mean=1.78 (1.70-1.83, n=6); ratio of greatest width of elytra to greatest width of pronotum, mean=1.37 (1.28-1.46, n=6).

Body completely piceous; hind femora dark testaceous, becoming lighter towards apex; front and middle femora testaceous; tibia and tarsi testaceous; antennae testaceous becoming darker towards apex; body alutaceous.

Head hypognathous; mouthparts broad; eyes slightly produced and moderate in size; frontal ridge weakly produced, extending into poorly defined angle between antennae; vertex alutaceous with scattered punctures near eyes.

Pronotum transverse; evenly convex; evenly covered with large distinct punctures separated by approximately 1/2 their diameter; lateral ridges with minute serrations separated by approximately their length; antebasal impression well

developed; basal margin of pronotum arcuate with a single sinuation between center and edge; greatest length at center; lateral margins with fringes of long setae separated by approximately same distance as serrations, posterior margin with setae present mostly towards lateral sides; anterior angles mostly rounded; prosternal process with large dense punctures and scattered long setae.

Elytra with 11 distinct striae; 1 ending at basal 2/3; 8-9 interrupted by minute humeral callosities; punctures poorly defined, separated by approximately their diameter; single row of setae between striae; setae separated by approximately their length; lateral margins arcuate over entire length. Venter evenly covered in small punctures and short setae.

Aedeagus laterally curved over entire length; narrowed on apical 1/2; apex directed dorsally; ventrally basal opening subequal in width; sides convergent apically; abruptly rounded apically to small rounded projection.

Spermathecal pump attached to side of receptacle apex; pump approximately 1/2 length of receptacle; angled 90° at basal 1/3; slight constriction prior to expanded apex. Receptacle arcuate towards interior. Spermathecal spout moderate; attached to side of receptacle base; extending across 3/4 of receptacle; forming a moderate loop from the receptacle; gland attachment slightly produced.

**Distribution:** MA, NH.

**Host Plants:** None recorded from the New World.

**Notes:**

*Epitrix pubescens* is a European immigrant which has been introduced into the northeast. It is the only black species in the area which is minutely alutaceous.

*Epitrix pubescens* can be separated from *cucumeris* by its wider dorsal profile. *Epitrix pubescens* can be separated from *fuscula* by its less dense pronotal punctures.



Figure 10 *Epitrix pubescens* (Koch); A, habitus, dorsal; B, spermatheca.

***Epitrix fuscula* Crotch**

*Epitrix fuscula* Crotch, 1873:72.

**Type Locality:** USA.

**Diagnosis:**

Body completely piceous; total body length 1.87-2.43mm; antebasal impression of pronotum present but often obscured by punctures; pronotal punctures dense, large; two rows of setae between elytral striae; 12 striae on elytra. Receptacle with slight constriction prior to pump attachment, spout distinctly sclerotized.

**Description:**

Total body length, mean=2.13mm (1.87-2.43, n=6); width of elytra, mean=1.16mm (1.04-1.22, n=6); ratio of width to length of pronotum, mean=1.59 (1.53-1.67, n=6); ratio of greatest width of elytra to greatest width of pronotum, mean=1.37 (1.32-1.42, n=6).

Body completely piceous; femora mostly piceous, often becoming testaceous towards apex; tibia testaceous becoming darker prior to pale apex; tarsi completely testaceous; antennae mostly pale testaceous with scape and apical antennomeres sometimes darker.

Head hypo-prognathous, elongate; mouthparts elongate; eyes slightly produced and moderate in size; frontal ridge narrow and distinctly produced, extending partially between antennae in broad rounded angle; vertex with large dense punctures surrounding eyes.

Pronotum transverse; evenly convex; densely covered with large distinct punctures separated by about 1/3 their diameter; area between punctures smooth; sides with lateral ridge minutely serrate; antebasal impression present but often obscured by punctures; basal margin of pronotum arcuate with a single sinuation between center and edge; greatest length at center; margins with fringes of long narrowly separated setae; anterior angles obliquely truncated; prosternal process with large dense punctures and scattered long setae.

Elytra with 12 distinct striae; 1 ending at basal 1/2; 8-10 interrupted by weak humeral callosities; punctures narrowly separated; two rows of setae between striae; setae separated by approximately 2/3 their length; lateral margins very slowly curved over basal 2/3, narrowing to rounded apex on apical 1/3. Venter with scattered small punctures; scattered short setae; last ventrite unmodified.

Aedeagus laterally weakly curved; narrowed on apical 1/2; apex directed ventrally; ventrally basal opening wider; sides arcuate over entire length with widest point at center; apex pointed.

Spermathecal pump attached to center of receptacle apex; pump approximately 1/2 length of receptacle; angled 90° at basal 1/3; apex curved inwards. Receptacle widened on basal 1/4; subparallel in center; convergent on apical 1/4. Spermathecal spout moderate; attached to center of receptacle base; extending across 1/4 of receptacle; forming a small loop returning to the receptacle; gland attachment not produced.

**Distribution:** AL, DC, DE, FL, IA, IL, IN, KS, KY, MD, MO, NC, NJ, OH, PA, SC, TN, VA, WV.

Also reported from AR, CT, GA, LA, MS, NE, NY, OK, TX, WI (Riley et al. 2003).

**Host Plants:** *Solanum aethiopicum* L., *S. carolinense* L., *S. melongena* L., and *S. tuberosum* L.

Also recorded from *Datura stramonium* L., *Nicotiana tabacum* L., *Physalis pubescens* L., *S. dulcamara* L., *S. elaeagnifolium* Cav., *S. lycopersicum* L. and *S. rostratum* Dunal.

**Notes:**

*Epitrix fuscula* can be separated from *floridana* by its larger range and more elongate body. It can be separated from all other *Epitrix* by its dense pronotal punctures.





Figure 11 *Epitrix fuscula* Crotch; A, habitus, dorsal; B, spermatheca; C, aedeagus, ventral; D, aedeagus, lateral.

***Epitrix floridana* sp. nov.**

**Diagnosis:**

Body completely piceous; total body length 1.81-1.92mm; antebasal impression of pronotum faint, obscured by punctures; pronotal punctures dense, large; two rows of setae between elytral striae; 11 striae on elytra.

**Description:**

Total body length, mean=1.86mm (1.81-1.92, n=4); width of elytra, mean=1.12mm (1.09-1.13, n=4); ratio of width to length of pronotum, mean=1.60

(1.54-1.74, n=4); ratio of greatest width of elytra to greatest width of pronotum, mean=1.30 (1.23-1.35, n=4).

Body completely piceous; femora mostly piceous, often becoming testaceous towards apex; tibia, tarsi, and antennae testaceous.

Head prognathous; mouthparts broad; eyes slightly produced and moderate in size; frontal ridge narrow and produced, extending partially between antennae in broad rounded angle; vertex densely covered in punctures.

Pronotum transverse; evenly convex; densely covered with large distinct punctures separated by about 1/3 their diameter; area between punctures smooth; sides with lateral ridge minutely serrate; antebasal impression faint and obscured by punctures; basal margin of pronotum arcuate with a single sinuation between center and edge; greatest length at center; margins with fringes of long setae separated by approximately 1/2 length; anterior angles obliquely truncated; prosternal process with large dense punctures and dense long setae.

Elytra with 11 distinct striae; 1 ending at basal 1/3; 7-9 interrupted by humeral callosities; punctures narrowly separated; two rows of setae between striae; setae separated by approximately 2/3 their length; lateral margins highly curved over entire length. Venter with scattered small punctures; scattered short setae; last ventrite unmodified.

Aedeagus laterally weakly curved over entire length; narrowed on apical 1/2; apex directed ventrally; ventrally basal opening wider; sides convergent towards apex; apically abruptly rounded to weak angle.

Spermathecal pump attached to center of receptacle apex; pump approximately 1/3 length of receptacle; rounded 90°; apex not expanded. Receptacle with slight

constriction at apical 1/3. Spermathecal spout thin; attached to side of receptacle base; extending across 1/3 of receptacle; forming a moderate loop from the receptacle; gland attachment not produced.

**Distribution:** FL.

**Host Plants:** Unknown.

**Etymology:** Derived from “Florida”, the only state where it is known to occur.

**Notes:**

*Epitrix floridana* is known from a single series of four specimens from North Port in Sarasota County, FL. It can be separated from *Epitrix fuscula* by its range in southern Florida and its shorter body. *Epitrix floridana* can be separated from all other *Epitrix* by its dense pronotal punctures.

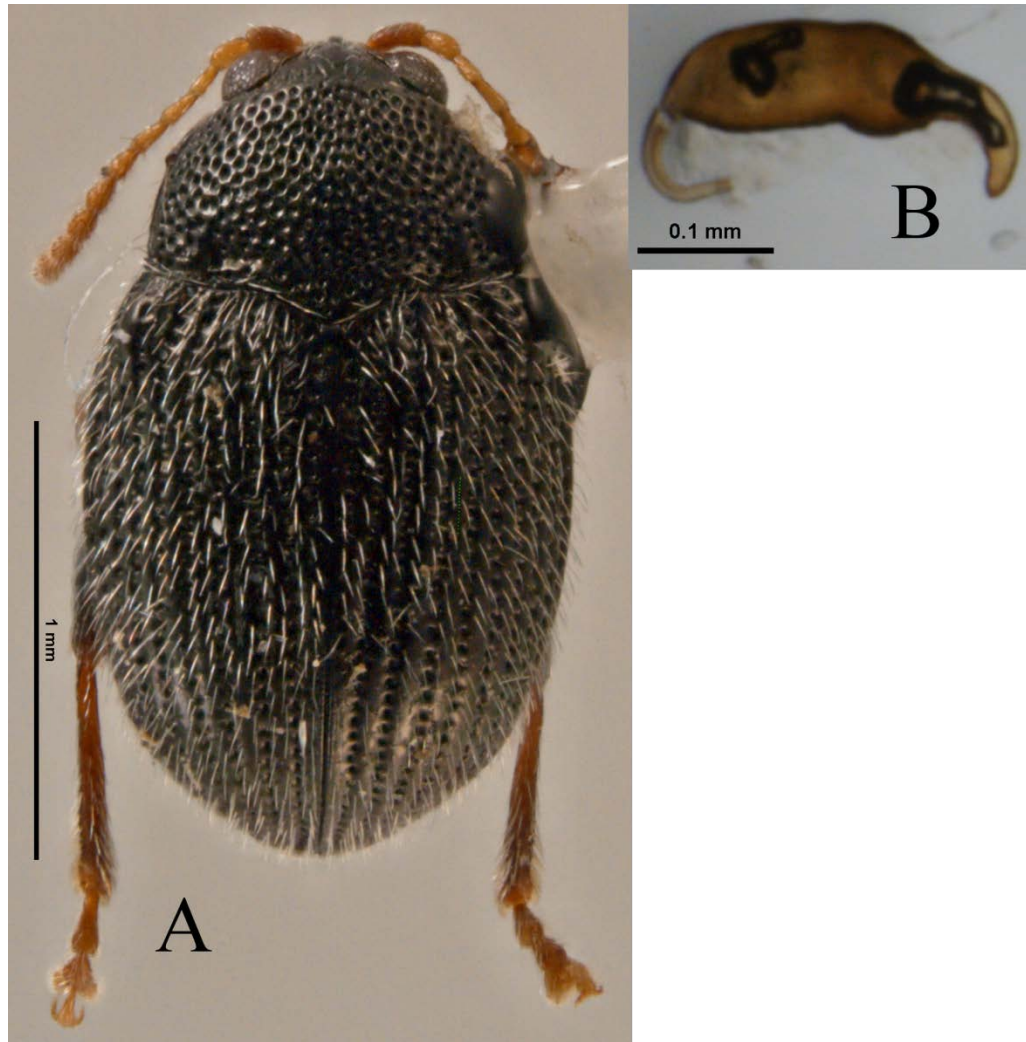


Figure 12 *Epitrix floridana* sp nov.; A, habitus, dorsal; B, spermatheca.

*Epitrix solani* (Blatchley)

*Crepidodera solani* Blatchley, 1925:167.

**Type Locality:** Florida, USA.

**Diagnosis:**

Body uniform pale testaceous; total body length 1.31-1.45mm; antebasal impression of pronotum absent; pronotal punctures separated by their diameter, small; one row of setae between elytral striae, setae sparse; 10 striae on elytra.

**Description:**

Total body length, mean=1.37mm (1.31-1.45, n=3); width of elytra, mean=0.75mm (0.72-0.80, n=3); ratio of width to length of pronotum, mean=1.47 (1.32-1.61, n=3); ratio of greatest width of elytra to greatest width of pronotum, mean=1.37 (1.26-1.48, n=3).

Body, legs and antennae entirely uniform pale testaceous.

Head hypo-prognathous; mouthparts broad; eyes small, not distinctly produced; frontal ridge triangular, broad, and flat, extending into wide acute angle between antennae; vertex with few punctures near eyes.

Pronotum slightly transverse; evenly covered with small punctures separated by approximately their diameter; area between punctures smooth; lateral ridges without serrations; antebasal impression absent; basal margin of pronotum evenly arcuate with greatest length at center; lateral margins with few long setae; anterior angles indistinctly truncated; prosternal process without punctures, few scattered setae present.

Elytra with 10 distinct striae, 1 ending at basal ½, 6-8 interrupted by weak humeral callosities; punctures separated by their diameter; single row of setae between striae; setae very sparse; lateral margins slowly curved over basal 2/3, narrowing to

rounded apex on apical 1/3. Venter with few scattered small punctures; scattered short setae; last ventrite unmodified.

Aedeagus laterally weakly curved over entire length; narrowed on apical 1/3; apex directed slightly ventrally; ventrally basal opening subequal in width; sides subparallel; apically narrowed to a point.

Spermathecal pump attached to center of receptacle apex; pump approximately 1/3 length of receptacle; angled 90° at basal 1/3; apex not expanded. Receptacle tapered with widest point at basal 1/4. Spermathecal spout moderate; attached to center of receptacle base; extending across 1/4 of receptacle; curved along with receptacle; gland attachment not produced.

**Distribution:** FL.

**Host Plants:** Recorded from *Solanum verbascifolium* Kunth (Clark et al. 2004).

**Notes:**

*Epitrix solani* can be separated from *Epitrix fasciata* by its smaller range in southern Florida, its typically smaller size, less dense elytral pubescence, and its constant lack of a dark transverse band. It can be separated from *Epitrix variabilis* by its range, smaller size, and larger pronotum.

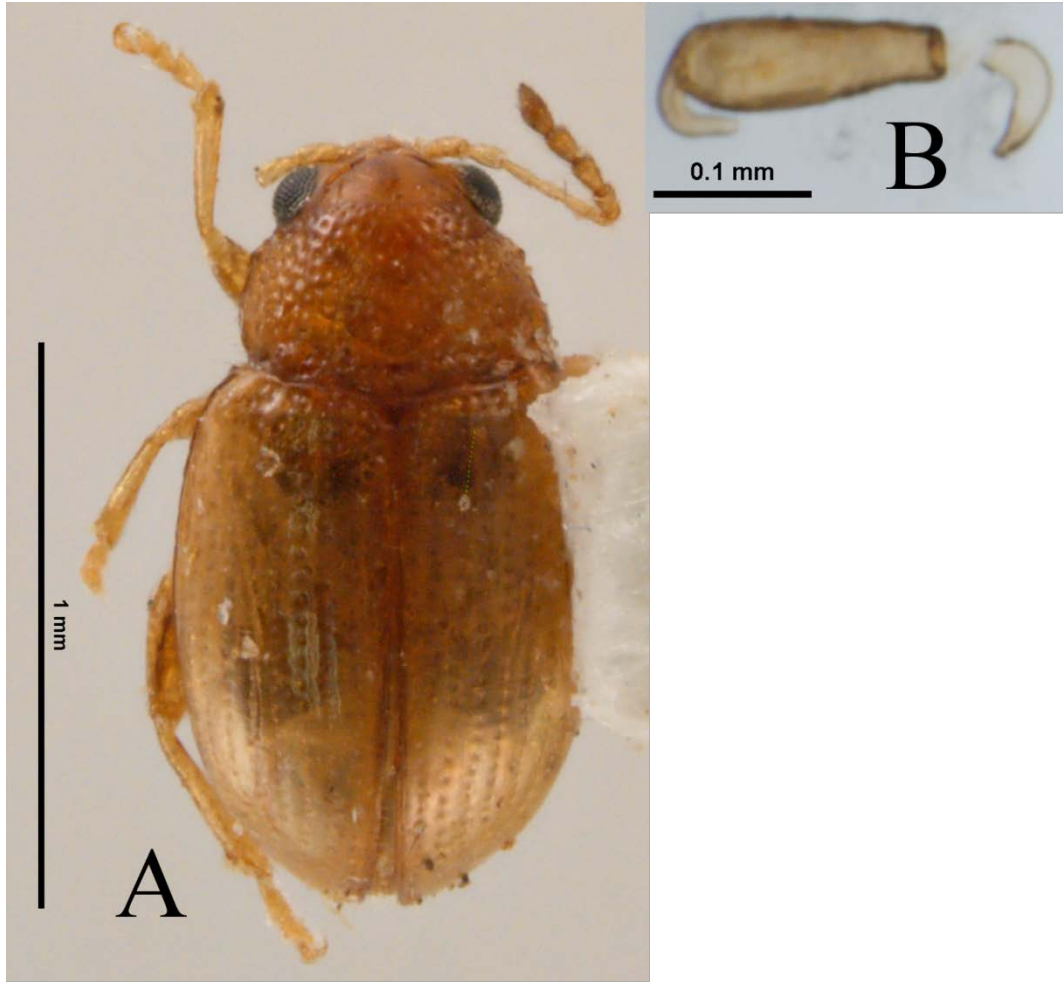


Figure 13 *Epitrix solani* (Blatchley); A, habitus, dorsal; B, spermatheca.

*Epitrix humeralis* Dury

*Epitrix humeralis* Dury, 1906:253.

**Type Locality:** USA.

**Diagnosis:**

Body testaceous to nearly piceous, often rufous; total body length 1.72-2.42mm; antebasal impression of pronotum weak; pronotal punctures separated by diameter, large; two rows of setae between elytral striae; 11 striae on elytra.

**Description:**

Total body length, mean=2.04mm (1.72-2.42, n=6); width of elytra, mean=1.17mm (0.98-1.28, n=6); ratio of width to length of pronotum, mean=1.56 (1.48-1.65, n=6); ratio of greatest width of elytra to greatest width of pronotum, mean=1.34 (1.26-1.42, n=6).

Body testaceous to nearly piceous, often rufous, sometimes with elytral humeri paler than rest of elytra; legs and antennae same color as body.

Head hypo-prognathous; mouthparts broad; eyes produced and moderate in size; frontal ridge triangular and distinctly produced, extending partially between antennae in broad rounded angle; vertex with large punctures near eyes.

Pronotum transverse; evenly convex; densely covered with large distinct punctures separated by approximately their diameter; area between punctures smooth; sides with lateral ridge serrate, separated by approximately their length; antebasal impression weakly present; basal margin of pronotum arcuate with a single sinuation between center and edge, greatest length at center; margins with fringes of long setae separated by approximately length of serrations; anterior angles obliquely truncated; prosternal process with small dense punctures and long setae.



Elytra with 11 distinct striae; 1 ending at basal 1/2; 7-10 interrupted by weak humeral callosities; punctures narrowly separated; two rows of setae between striae; setae separated by approximately 3/4 their length; lateral margins very slowly curved over basal 2/3, narrowing to rounded apex on apical 1/3. Venter with few small punctures; dense short setae; last ventrite unmodified.

Aedeagus laterally curved on basal 1/3; straight on apical 2/3; narrowed on apical 1/2; apex straight; ventrally basal opening slightly wider; sides subparallel; apically gradually rounded to apex with a small produced rounded apex.

Spermathecal pump attached to side of receptacle apex; pump approximately 1/3 length of receptacle; angled 90° at basal 1/4; constriction prior to apex. Receptacle elongate with sinuation at center. Spermathecal spout moderately narrow; attached to side of receptacle base; extending across 1/2 of receptacle; forming a moderately large loop from the receptacle; gland attachment not produced.

**Distribution:** ON; DE, IA, IL, IN, KS, MD, NC, NY, OH, TN, VA, WV.

Also reported from AL, FL, MI, MO, OK, SD, WI (Riley et al. 2003).

**Host Plants:** *Physalis* sp. and *Solanum carolinense* L.

Also recorded from *Physalis heterophylla* Nees, *P. longifolia* Nutt., *P. pubescens* L., *P. virginiana* P. Mill., and *Solanum nigrum* L. (Clark et al. 2004).

**Notes:**

*Epitrix humeralis* can be separated from *fuscula* by the less dense punctures on the pronotum and paler color. It can be separated from *Epitrix rufa* by its range, denser pubescence, and often being a paler color. It can be separated from *Epitrix ovalis* by its larger size, two rows of setae per striae, and less rounded elytra.



Figure 14 *Epitrix humeralis* Dury; A, habitus, dorsal; B, spermatheca.

***Epitrix flavotestacea* Horn**

*Epitrix flavotestacea* Horn, 1894:407.

**Type Locality:** Baja California, Mexico.

**Diagnosis:**

Body testaceous; total body length 1.99-2.45mm; antebasal impression of pronotum very weak; pronotal punctures separated by 1/2 diameter, large; two rows of setae between elytral striae; 10 striae on elytra.

**Description:**

Total body length, mean=2.21mm (1.99-2.45, n=6); width of elytra, mean=1.17mm (1.06-1.30, n=6); ratio of width to length of pronotum, mean=1.52 (1.46-1.55, n=6); ratio of greatest width of elytra to greatest width of pronotum, mean=1.46 (1.39-1.51, n=6).

Body and legs testaceous, dull; antennae testaceous becoming darker towards apex.

Head hypognathous, elongate; mouthparts elongate; eyes large and elongate, only slightly produced; frontal ridge triangular and distinctly produced, extending partially between antennae in broad rounded angle; vertex with large punctures near eyes.

Pronotum slightly transverse; evenly weakly convex; densely covered with large distinct punctures separated by approximately 1/2 their diameter; area between punctures smooth; sides with lateral ridge minutely serrate, separated by approximately 1/2 their length; antebasal impression very weakly present; basal margin of pronotum arcuate with a single sinuation between center and edge, greatest length at center; lateral margins with fringes of long setae separated by approximately length of serrations, basal margin with fewer setae present mostly towards center;

anterior angles obliquely truncated; prosternal process with small dense punctures and few long setae.

Elytra with 10 distinct striae; 1 ending at basal  $\frac{1}{2}$ ; 7-9 interrupted by weak humeral callosities; punctures separated by approximately  $\frac{1}{3}$  diameter; two rows of setae between striae; setae separated by approximately  $\frac{2}{3}$  their length; lateral margins very slowly curved over basal  $\frac{3}{4}$ , narrowing to rounded apex on apical  $\frac{1}{4}$ . Venter with scattered small punctures; dense short setae; last ventrite unmodified.

Aedeagus laterally slightly curved over entire length; narrowed on apical  $\frac{1}{2}$ ; apex straight; ventrally basal opening width greater; sides subparallel; abruptly narrowed to rounded apex.

Spermathecal pump attached to side of receptacle apex; pump approximately  $\frac{1}{3}$  length of receptacle; angled  $90^\circ$  at basal  $\frac{1}{3}$ ; apex slightly expanded. Receptacle constricted in center; apical  $\frac{1}{2}$  produced and rounded. Spermathecal spout moderate; attached to side of receptacle base; extending across  $\frac{3}{4}$  of receptacle; forming a moderate loop from the receptacle; gland attachment not produced.

**Distribution:** AZ; Mexico.

**Host Plants:** *Datura meteloides* Dunal and *D. stramonium* L.

**Notes:**

*Epitrix flavotestacea* can be separated from *rufa* by its paler color, dull luster, and less convex body. It can be separated from *Epitrix hirtipennis* by its lack of a dark transverse band, larger pronotum, and range.

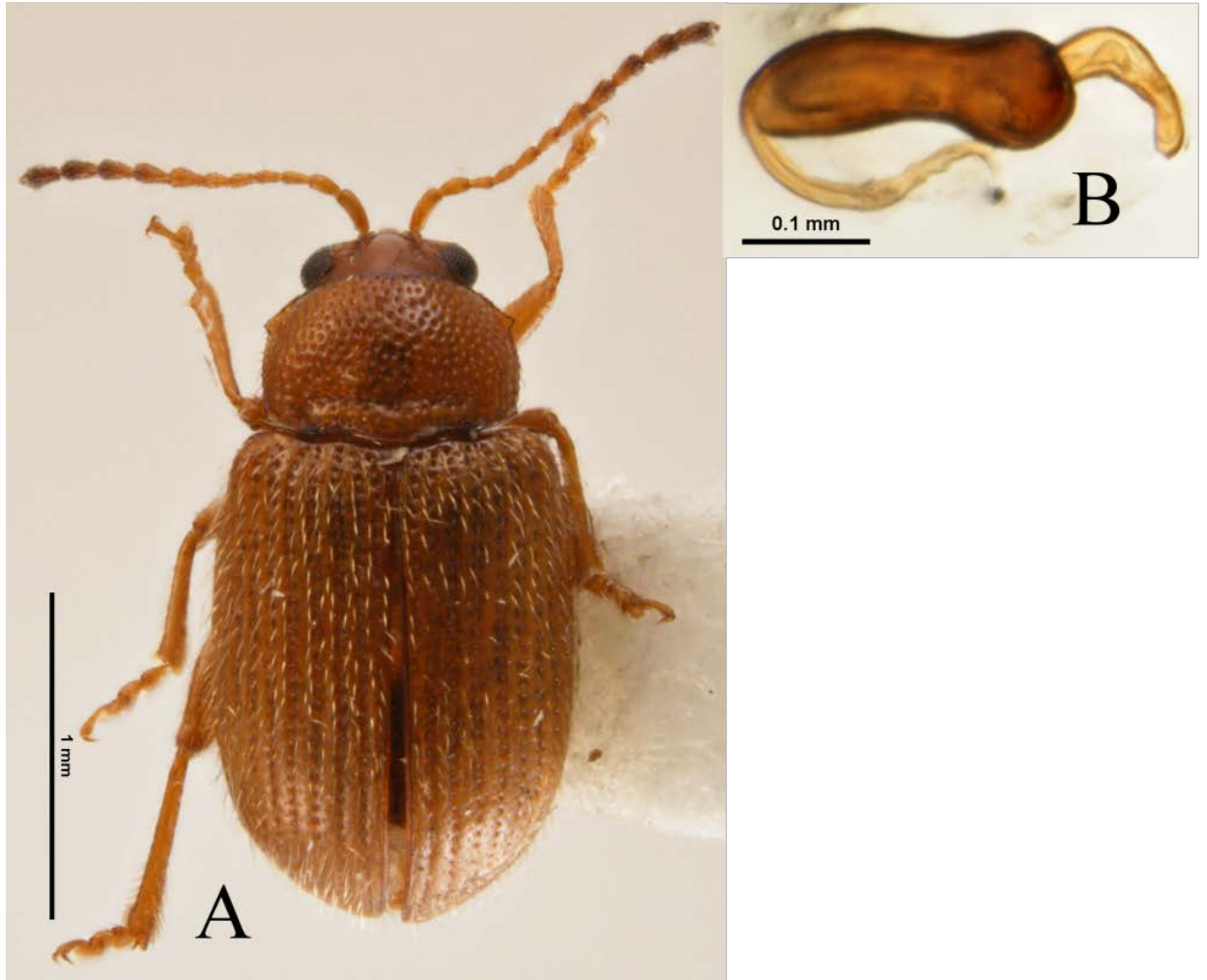


Figure 15 *Epitrix flavotestacea* Horn; A, habitus, dorsal; B, spermatheca.

*Epitrix rufa* sp. nov.

**Diagnosis:**

Body dark rufous, glossy; total body length 1.80-2.15mm; antebasal impression of pronotum very weak; pronotal punctures separated by their diameter, moderate; two rows of setae between elytral striae; 10 striae on elytra.

**Description:**

Total body length, mean=1.99mm (1.80-2.15, n=6); width of elytra, mean=1.10mm (0.98-1.16, n=6); ratio of width to length of pronotum, mean=1.51 (1.39-1.63, n=6); ratio of greatest width of elytra to greatest width of pronotum, mean=1.37 (1.31-1.43, n=6).

Body, legs and antennae dark rufous, glossy.

Head hypognathous, elongate; mouthparts elongate; eyes large and elongate, only slightly produced; frontal ridge triangular and distinctly produced, extending partially between antennae in large broad rounded angle; vertex with few large punctures near eyes.

Pronotum transverse; evenly convex; densely covered with moderate distinct punctures separated by approximately their diameter; area between punctures smooth; sides without serrations; antebasal impression very weakly present; basal margin of pronotum arcuate with a single sinuation between center and edge, greatest length at center; lateral margins with fringes of long setae separated by approximately their length, basal margin with fewer setae present mostly towards sides; anterior angles obliquely truncated; prosternal process with small punctures and few long setae.

Elytra with 10 distinct striae; 1 ending at basal  $\frac{1}{2}$ ; 7-10 interrupted by weak humeral callosities; punctures separated by approximately  $\frac{1}{3}$  diameter; two rows of setae between striae; setae separated by approximately  $\frac{2}{3}$  their length; lateral margins

very slowly curved over basal 2/3, narrowing to rounded apex on apical 1/3. Venter with scattered small punctures; dense short setae; last ventrite unmodified.

Aedeagus laterally curved over entire length; narrowed on apical 1/2; apex directed ventrally; ventrally basal opening subequal in width; sides convergent towards apex; apically rounded to small produced rounded apex.

Spermathecal pump attached to side of receptacle apex; pump approximately 1/3 length of receptacle; angled greater than 90° on apical 1/4; apex slightly expanded. Receptacle arcuate towards exterior on basal 2/3; produced and rounded on apical 1/3. Spermathecal spout moderately thin; attached to side of receptacle base; extending across 1/2 of receptacle; forming a moderate loop from the receptacle; gland attachment not produced.

**Distribution:** AZ, TX.

**Host Plants:** *Solanum elaeagnifolium* Cav.

**Etymology:** Derived from the Latin “*rufus*” meaning red. This refers to the reddish coloration of the species (Brown 1956).

**Notes:**

*Epitrix rufa* can be separated from *flavotestacea* by its darker rufous color, shiny luster, and more convex body. It can be separated from *Epitrix humeralis* by range and by possessing one row of setae between elytral striae.

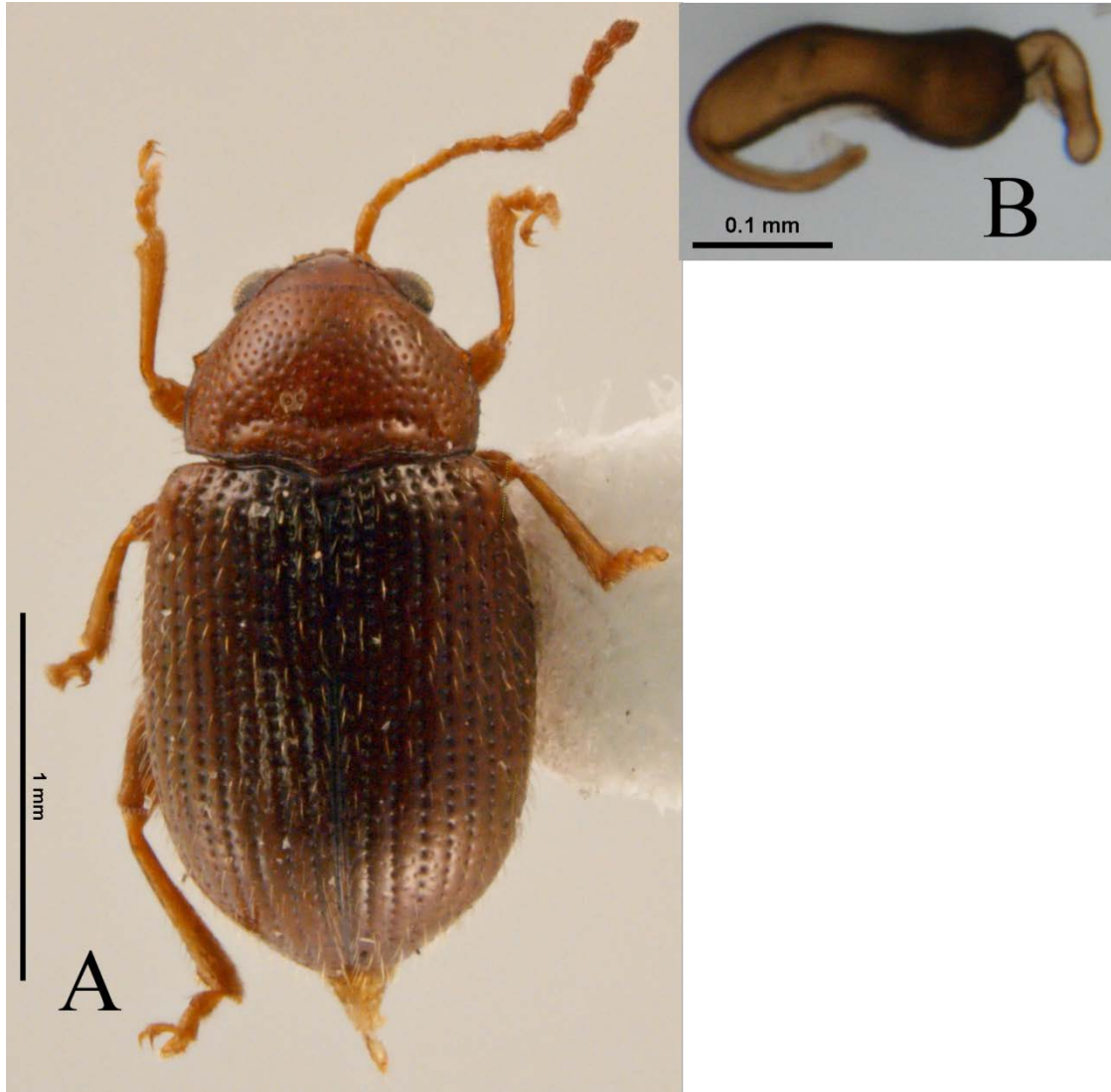


Figure 16 *Epitrix rufa* sp nov.; A, habitus, dorsal; B, spermatheca.



*Epitrix ovalis* sp. nov.

**Diagnosis:**

Body pale testaceous to dark rufous; total body length 1.52-1.83mm; antebasal impression of pronotum very weak; pronotal punctures separated by 1/2 diameter, large; one row of setae between elytral striae; 10 striae on elytra.

**Description:**

Total body length, mean=1.70mm (1.52-1.83, n=5); width of elytra, mean=0.92mm (0.80-1.02, n=5); ratio of width to length of pronotum, mean=1.60 (1.53-1.68, n=5); ratio of greatest width of elytra to greatest width of pronotum, mean=1.32 (1.21-1.40, n=5).

Body pale testaceous to dark rufous; legs and antennae same color as body.

Head hypo-prognathous; mouthparts elongate; eyes slightly produced and moderately small in size; frontal ridge triangular and distinctly produced, extending partially between antennae in broad rounded angle; vertex with few large punctures near eyes.

Pronotum transverse; evenly convex; densely covered with large distinct punctures separated by approximately 1/2 their diameter; area between punctures smooth; sides with lateral ridge serrate, separated by approximately twice their length; antebasal impression very weakly present; basal margin of pronotum arcuate with a single sinuation between center and edge, greatest length at center; margins with fringes of long setae separated by approximately length of serrations; anterior angles obliquely truncated; prosternal process with moderate dense punctures and scattered long setae.

Elytra with 10 distinct striae; 1 ending at basal 1/3; 7-9 interrupted by weak humeral callosities; punctures separated by approximately 1/2 their length; one row of

setae between striae; setae separated by approximately 2/3 their length; lateral margins curved over entire length. Venter with small punctures; scattered short setae; last ventrite unmodified.

Aedeagus laterally curved on basal 1/3; straight on apical 2/3; narrowed on apical 1/2; apex straight; ventrally basal opening subequal in width; sides convergent towards apex; apically gradually rounded to small apical rounded projection.

Spermathecal pump attached to center of receptacle apex; pump approximately 1/3 length of receptacle; angled 90° at basal 1/3; slight constriction prior to apex.

Receptacle constricted at center; basal 1/2 more produced than apical 1/2.

Spermathecal spout moderately thin; attached to side of receptacle base; extending across 1/2 of receptacle; forming a moderately large loop from the receptacle; gland attachment slightly produced.

**Distribution:** TX.

**Host Plants:** *Physalis* sp.

**Etymology:** Derived from the English word “oval” referring to the tapered dorsal profile of most individuals of this species.

**Notes:**

*Epitrix ovalis* can be separated from *humeralis* by its smaller size, one row of setae between elytral striae, and more rounded elytra. It can be separated from *Epitrix humeralis* by its lack of a transverse dark band, sometimes darker color, more rounded profile, and more convex pronotum.

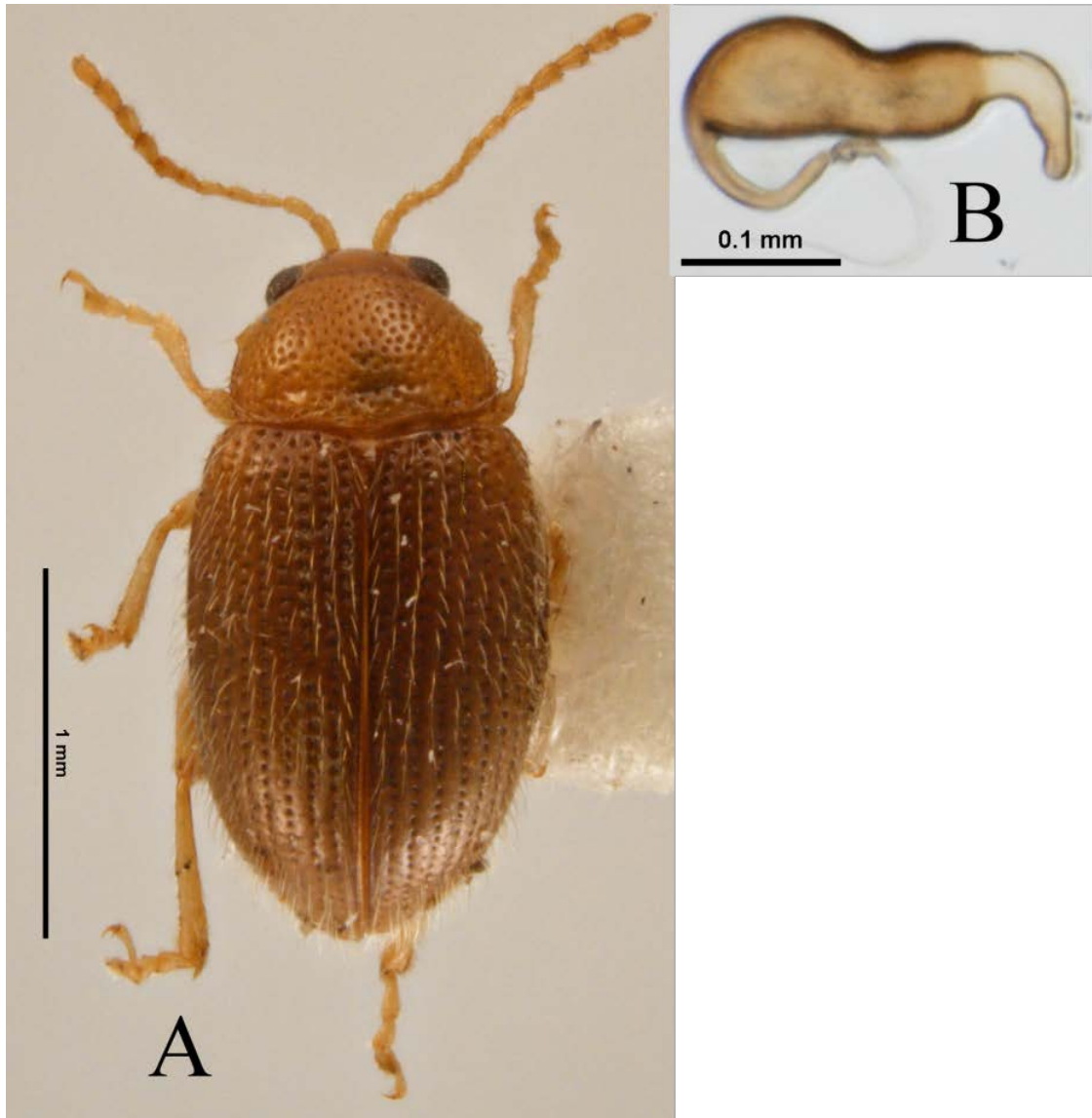


Figure 17 *Epitrix ovalis* sp. nov.; A, habitus, dorsal; B, spermatheca.

*Epitrix hirtipennis* (Melsheimer)

*Crepidodera hirtipennis* Melsheimer, 1847:165.

**Type Locality:** Pennsylvania, USA.

**Diagnosis:**

Body testaceous, usually with dark transverse band near center of elytra; total body length 1.60-2.06mm; antebasal impression of pronotum absent; pronotal punctures separated by their diameter, small; one row of setae between elytral striae; 10 striae on elytra.

**Description:**

Total body length, mean=1.80mm (1.60-2.06, n=6); width of elytra, mean=0.97mm (0.86-1.06, n=6); ratio of width to length of pronotum, mean=1.60 (1.54-1.63, n=6); ratio of greatest width of elytra to greatest width of pronotum, mean=1.60 (1.41-1.58, n=6).

Body testaceous, usually with dark transverse band near center of elytra; legs entirely testaceous; antennae testaceous becoming darker towards apex; body alutaceous.

Head hypo-prognathous; mouthparts broad; eyes moderately large, produced; frontal ridge triangular and distinctly produced, extending partially between antennae in broad rounded angle; vertex with few punctures near eyes.

Pronotum slightly transverse; evenly weakly convex; densely covered with small distinct punctures separated by approximately their diameter; area between punctures alutaceous; sides with lateral ridge minutely serrate, separated by approximately their length; antebasal impression absent; basal margin of pronotum evenly arcuate; greatest length at center; lateral margins with fringes of long setae separated by approximately length of serrations, basal margin with fewer setae present

mostly towards sides; anterior angles obliquely truncated; prosternal process with few minute punctures and dense long setae.

Elytra with 10 distinct striae; 1 ending at basal 1/3; 7-9 interrupted by weak humeral callosities; punctures separated by approximately 1/4 diameter; one row of setae between striae; setae separated by approximately 2/3 their length; lateral margins very slowly curved over basal 2/3, narrowing to rounded apex on apical 1/3. Venter with scattered minute punctures; dense short setae; last ventrite unmodified.

Aedeagus laterally distinctly curved over entire length; narrowed on apical 1/3; apex directed ventrally; ventrally basal opening slightly wider; sides slightly convergent towards apex; apically rounded to rounded apex.

Spermathecal pump attached to center of receptacle apex; pump approximately 1/3 length of receptacle; angled 90° slightly basal to center; apex slightly narrowed. Receptacle rounded with apical 1/4 narrowed to apex. Spermathecal spout thick; attached to center of receptacle base; extending across 1/3 of receptacle; basal 2/3 curved with receptacle; apical 1/3 parallel to receptacle; gland attachment not produced.

**Distribution:** AL, CA, DE, IL, IN, MO, NC, NJ, OR, TX, VA.

Also reported from ON, PQ; AR, AZ, CO, CT, DC, FL, GA, IA, ID, KS, KY, LA, MD, MS, NE, NH, NM, NV, NY, OH, OK, PA, RI, SC, SD, TN, UT, WA, WV, WY; Mexico, Hawaii (Riley et al. 2003).

**Host Plants:** *Datura stramonium* L., and *Solanum melongena* L.

Also reported from *Datura wrightii* Regel, *Capsicum frutescens* L., *Nicotiana attenuata* Torr. ex Watts., *N. tabacum* L., *Petunia* sp., *Physalis ixocarpa* Hornem., *P. peruviana* L., *P. pubescens* L., *Solanum carolinense* L., *S. dulcamara* L., *S.*

*elaeagnifolium* Cav., *S. lycopersicum* L., *S. nigrum* L., *S. rostratum* Dunal, and *S. tuberosum* L. (Clark et al. 2004).

**Etymology:** Derived from the Latin “*variabilis*” meaning “changeable” referring to the variable pronotum to elytra proportions present in this species (Brown 1956).

**Notes:**

*Epitrix hirtipennis* can be separated from *fasciata* by its more elongate body, larger average total body length, and more northern distribution. It can be separated from *Epitrix centralis* by its narrower dorsal profile and less convex body.

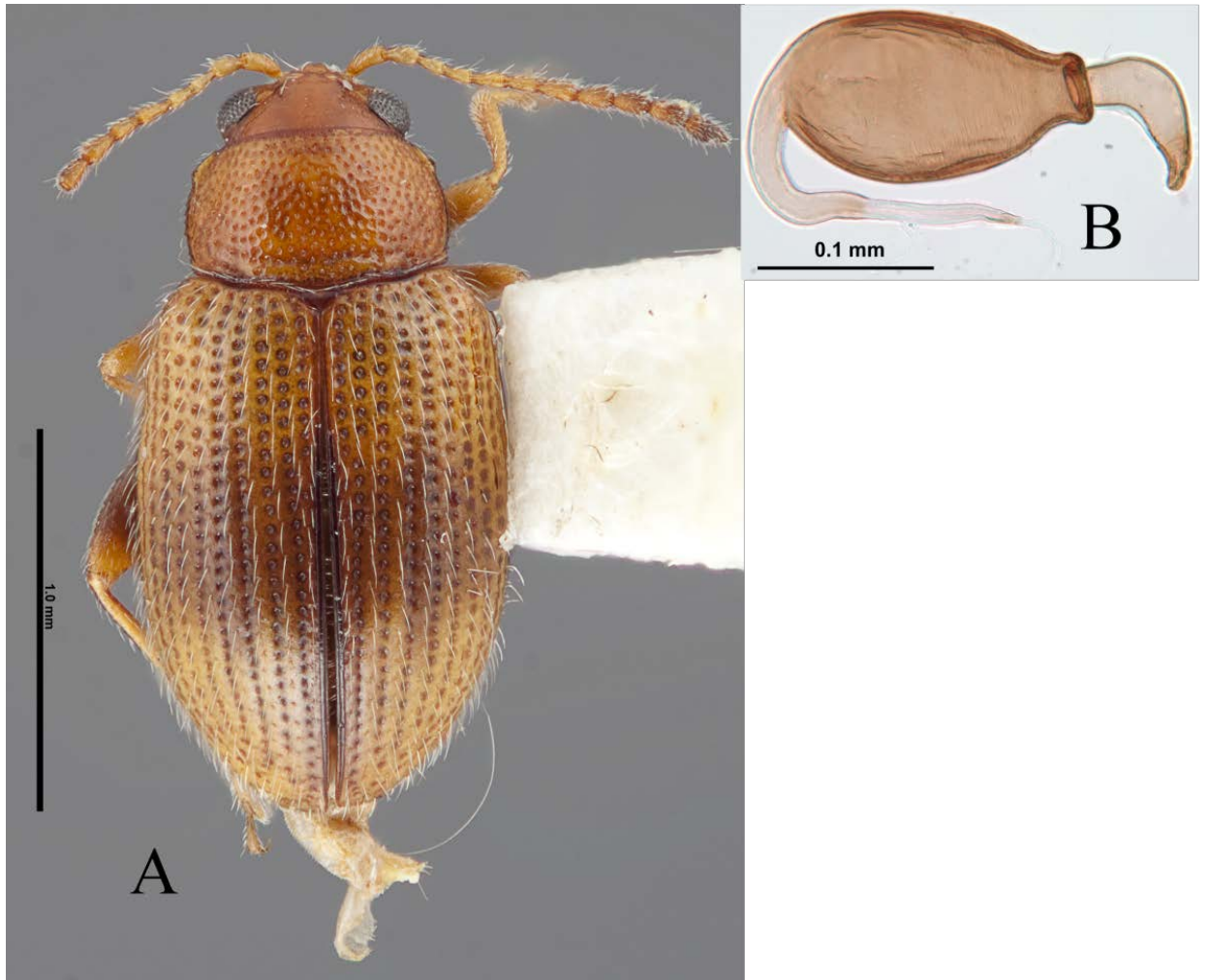


Figure 18 *Epitrix hirtipennis* (Melsheimer); A, habitus, dorsal; B, spermatheca.

*Epitrix fasciata* Blatchley

*Crioceris parvula* Fabricius, 1801:468.

*Epitrix fasciata* Blatchley, 1918:56.

**Type Locality:** Hog Island, Florida, USA.

**Diagnosis:**

Body testaceous, usually with dark transverse band near center of elytra, may not be complete, alutaceous; total body length 1.34-1.79mm; antebasal impression of pronotum absent; pronotal punctures separated by 3/4 their diameter, small; one row of setae between elytral striae; 10 striae on elytra.

**Description:**

Total body length, mean=1.55mm (1.34-1.79, n=6); width of elytra, mean=0.89mm (0.78-1.06, n=6); ratio of width to length of pronotum, mean=1.58 (1.50-1.68, n=6); ratio of greatest width of elytra to greatest width of pronotum, mean=1.43 (1.30-1.56, n=6).

Body testaceous, usually with dark transverse band near center of elytra, may not be complete; legs and antennae entirely testaceous; body alutaceous.

Head hypo-prognathous; mouthparts broad; eyes moderate, slightly produced; frontal ridge triangular and distinctly produced, extending partially between antennae in broad rounded angle; vertex with few punctures near eyes.

Pronotum slightly transverse; evenly weakly convex; densely covered with small distinct punctures separated by approximately 3/4 their diameter; area between punctures alutaceous; sides with lateral ridge minutely serrate; antebasal impression absent; basal margin of pronotum evenly arcuate; greatest length at center; lateral margins with fringes of long setae separated by approximately 1/2 their length, basal



margin with fewer setae present mostly towards sides; anterior angles obliquely truncated; prosternal process with minute punctures and dense long setae.

Elytra with 10 distinct striae; 1 ending at basal 1/3; 8-9 interrupted by weak humeral callosities; punctures separated by approximately 1/3 diameter; one row of setae between striae; setae separated by approximately 1/2 their length; lateral margins distinctly curved over entire length. Venter with scattered minute punctures; dense short setae; last ventrite unmodified.

Aedeagus laterally highly curved over entire length; narrowed on apical 1/3; apex straight; ventrally basal opening wider; sides convergent towards apex; apically narrowed to an acute point.

Spermathecal pump attached to center of receptacle apex; pump approximately 1/3 length of receptacle; angled 90° slightly prior to center; apex narrowed. Receptacle rounded with apical 1/4 narrowed towards apex. Spermathecal spout thick; attached to side of receptacle base; curved and slightly divergent from receptacle; gland attachment not produced.

**Distribution:** DE, FL, TX, VA.

Also reported from GA, LA, MD, MS, SC, TX, WV; Mexico, West Indies, Central and South America, Hawaii (Riley et al. 2003).

**Host Plants:** *Datura stramonium* L., *S. erianthum* D. Don, *S. lycopersicum* L., and *S. melongena* L.

Also reported from *Nicotiana tabacum* L., *Physalis angulata* L., *P. heterophylla* Nees, *Solanum carolinense* L., *S. erianthum* D. Don, *S. indicum* L., *S. nigrum* L., *S. nigrescens* M. Martens & Galeotti, *S. nodiflorum* Jacq., *S. torvum* Sw., *S. triquetrum* Cav. and *S. tuberosum* L. (Clark et al. 2004).

**Notes:**

*Epitrix fasciata* can be separated from *hirtipennis* by its shorter, rounder dorsal profile, smaller average total body length, and more southern distribution. It can be separated from *Epitrix centralis* by its smaller size and less convex body.



Figure 19 *Epitrix fasciata* Blatchley; A, habitus, dorsal.

*Epitrix centralis* sp nov.

**Diagnosis:**

Body testaceous, sometimes with darker transverse band near middle of elytra, alutaceous; total body length 1.64-1.86mm; antebasal impression of pronotum absent; pronotal punctures separated by 1/3 their diameter, large; one row of setae between elytral striae; 10 striae on elytra.

**Description:**

Total body length, mean=1.72mm (1.64-1.86, n=6); width of elytra, mean=1.02mm (0.98-1.04, n=6); ratio of width to length of pronotum, mean=1.57 (1.51-1.71, n=6); ratio of greatest width of elytra to greatest width of pronotum, mean=1.38 (1.32-1.42, n=6).

Body testaceous, sometimes with darker transverse band near middle of elytra, alutaceous; legs and antennae testaceous.

Head hypognathous; mouthparts elongate; eyes small but strongly produced; frontal ridge triangular and distinctly produced, extending partially between antennae in broad rounded angle; vertex with few large punctures near eyes.

Pronotum transverse; evenly convex; densely covered with large distinct punctures separated by approximately 1/3 their diameter; area between punctures smooth; sides with lateral ridge minutely serrate, separated by approximately twice their length; antebasal impression absent; basal margin of pronotum arcuate with a single sinuation between center and edge, greatest length at center; lateral margins with fringes of long setae separated by approximately length of serrations, basal margin with fewer setae present mostly towards sides; anterior angles obliquely truncated; prosternal process with small dense punctures and scattered long setae.

Elytra with 10 distinct striae; 1 ending at basal ½; 7-9 interrupted by weak humeral callosities; punctures separated by approximately 1/3 their diameter; one row of setae between striae; setae separated by approximately 1/2 their length; lateral margins distinctly curved over entire length. Venter with scattered small punctures; dense short setae; last ventrite unmodified.

Aedeagus laterally curved on basal 1/3; straight on apical 2/3; narrowed on apical 1/3; apex directed slightly ventrally; ventrally basal opening slightly wider; sides convergent towards apex; apically narrowed to acute rounded apex.

Spermathecal pump attached to center of receptacle apex; pump approximately 1/2 length of receptacle; angled 90° slightly prior to center; apex weakly narrowed. Receptacle rounded with apical 1/5 narrowed to apex. Spermathecal spout moderately thick; attached to side of receptacle base; extending across 1/4 of receptacle; forming a 90° angle at center with apical 1/2 parallel to receptacle; gland attachment not produced.

**Distribution:** IA, IN, KS, LA, MO, NC, OH, TN.

**Host Plants:** *Physalis pubescens* L.

**Notes:**

*Epitrix centralis* can be separated from *variabilis* by its larger size and always having a wider, more convex profile, and hypognathous head. It can be separated from *Epitrix fasciata* by its larger size and much more convex body.



Figure 20 *Epitrix centralis* sp. nov.; A, habitus, dorsal; B, spermatheca.

*Epitrix variabilis* sp. nov.

**Diagnosis:**

Body testaceous, alutaceous; total body length 1.53-1.65mm; antebasal impression of pronotum absent; pronotal punctures separated by 1/3 their diameter, large; one row of setae between elytral striae; 10 striae on elytra.

**Description:**

Total body length, mean=1.59mm (1.53-1.65, n=5); width of elytra, mean=0.89mm (0.84-0.92, n=5); ratio of width to length of pronotum, mean=1.54 (1.49-1.68, n=5); ratio of greatest width of elytra to greatest width of pronotum, mean=1.35 (1.31-1.39, n=5).

Body testaceous, alutaceous; legs and antennae testaceous.

Head hypo-prognathous; mouthparts broad; eyes small and slightly produced; frontal ridge triangular and distinctly produced, extending between antennae in broad rounded angle; vertex with few large punctures near eyes.

Pronotum moderately transverse; evenly convex; densely covered with moderate distinct punctures separated by approximately 1/2 their diameter; area between punctures alutaceous; sides with lateral ridge serrate, separated by approximately their length; antebasal impression absent; basal margin of pronotum arcuate with a single weak sinuation between center and edge, greatest length at center; lateral margins with fringes of long setae separated by approximately length of serrations, basal margin with fewer setae present mostly towards sides; anterior angles obliquely truncated; prosternal process with small dense punctures and scattered long setae.

Elytra with 10 distinct striae; 1 ending at basal 1/3; 7-9 interrupted by weak humeral callosities; punctures separated by approximately 1/2 their diameter; one row

of setae between striae; setae separated by approximately 1/2 their length; lateral margins curved over entire length, width variable. Venter with small punctures; dense short setae; last ventrite unmodified.

Aedeagus laterally curved over entire length; narrowed on apical 1/3; apex directed ventrally; ventrally basal opening slightly wider; sides subparallel; apically narrowed to acute apex.

Spermathecal pump attached to center of receptacle apex; pump approximately 1/2 length of receptacle; angled greater than 90° slightly at basal 1/3; apex directed inwards. Receptacle rounded with apical 1/5 narrowed to apex. Spermathecal spout moderately thick; attached to side of receptacle base; extending across 1/4 of receptacle; rounded over basal 1/2; parallel with receptacle on apical 1/2; gland attachment not produced.

**Distribution:** AL, IL, MO.

**Host Plants:** *Physalis longifolia* Nutt. and *P. pubescens* L.

**Notes:**

*Epitrix variabilis* can be separated from *centralis* by its smaller size, narrower and less wide profile, and hypo-prognathous head. It can be separated from *Epitrix fasciata* by its lack of a dark transverse band and more convex body.

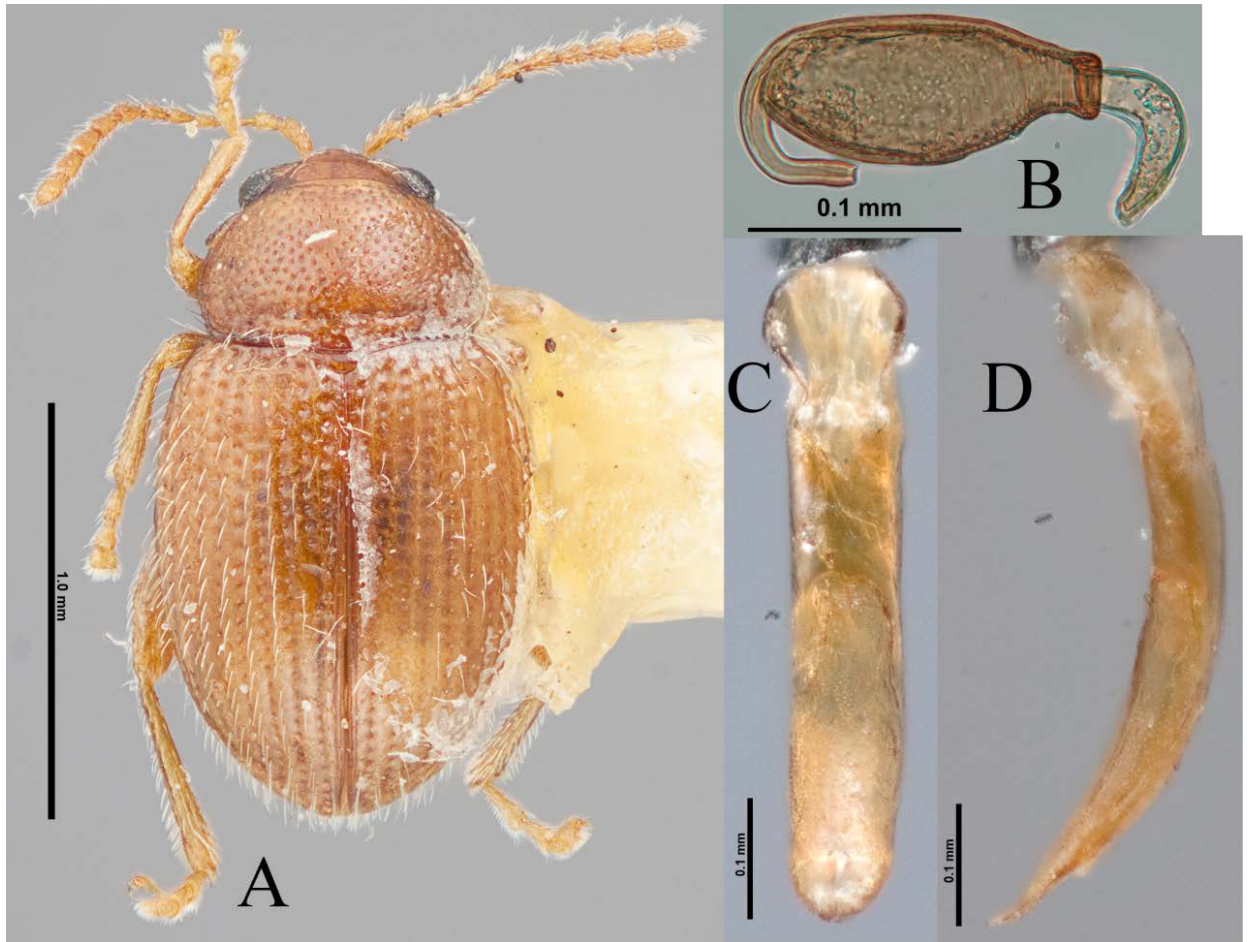


Figure 21 *Epitrix variabilis* sp nov.; A, habitus, dorsal; B, spermatheca; C, aedeagus, ventral; D, aedeagus, lateral.



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## Appendix

### DISTRIBUTION ABBREVIATIONS

#### CANADA:

<b>AB</b>	Alberta	<b>NU</b>	Nunavut
<b>BC</b>	British Columbia	<b>ON</b>	Ontario
<b>MB</b>	Manitoba	<b>PE</b>	Prince Edward Island
<b>NB</b>	New Brunswick	<b>PQ</b>	Quebec
<b>NF</b>	Newfoundland	<b>SK</b>	Saskatchewan
<b>NS</b>	Nova Scotia	<b>YK</b>	Yukon
<b>NT</b>	Northwest Territories		

#### UNITED STATES:

<b>AK</b>	Alaska	<b>MT</b>	Montana
<b>AL</b>	Alabama	<b>NC</b>	North Carolina
<b>AR</b>	Arkansas	<b>ND</b>	North Dakota
<b>AZ</b>	Arizona	<b>NE</b>	Nebraska
<b>CA</b>	California	<b>NH</b>	New Hampshire
<b>CO</b>	California	<b>NJ</b>	New Jersey
<b>CT</b>	Connecticut	<b>NM</b>	New Mexico
<b>DC</b>	District of Columbia	<b>NV</b>	Nevada
<b>DE</b>	Delaware	<b>NY</b>	New York
<b>FL</b>	Florida	<b>OH</b>	Ohio
<b>GA</b>	Georgia	<b>OK</b>	Oklahoma
<b>IA</b>	Iowa	<b>OR</b>	Oregon
<b>ID</b>	Idaho	<b>PA</b>	Pennsylvania
<b>IL</b>	Illinois	<b>RI</b>	Rhode Island
<b>IN</b>	Indiana	<b>SC</b>	South Carolina
<b>KS</b>	Kansas	<b>SD</b>	South Dakota
<b>KY</b>	Kentucky	<b>TN</b>	Tennessee
<b>LA</b>	Louisiana	<b>TX</b>	Texas
<b>MA</b>	Massachusetts	<b>UT</b>	Utah
<b>MD</b>	Maryland	<b>VA</b>	Virginia
<b>ME</b>	Maine	<b>VT</b>	Vermont
<b>MI</b>	Michigan	<b>WA</b>	Washington
<b>MN</b>	Minnesota	<b>WI</b>	Wisconsin
<b>MO</b>	Missouri	<b>WV</b>	West Virginia
<b>MS</b>	Mississippi	<b>WY</b>	Wyoming