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Trichonotuloides aphoderrans, n.sp. (Coleoptera:
Scarabaeidae: Aphodiinae), a new genus and
species for the United States

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Abstract. *Trichonotuloides aphoderrans*, **new species** (Coleoptera: Scarabaeidae), is described from Arizona, USA. This represents the first member of the genus reported north of Mexico. A brief discussion on its biology is presented.

Introduction

Trichonotuloides Balthasar (Coleoptera: Scarabaeidae: Aphodiinae: Aphodiini) is a genus previously known from four species occurring from central Mexico to Guatemala (Dellacasa et al. 2014). This new species was known to Gordon and Skelley (2007) while preparing their monograph. Unfortunately, the only specimen available at the time was seriously damaged, making generic placement and description impossible. Soon after publication of the generic revision by Dellacasa et al. (2014), we found specimens of an unrecognized species from Arizona. These were the same species as the damaged specimen, which now allows us to fully describe the species and add the genus to the US fauna.

Materials and Methods

Terminology and description follows that presented by Dellacasa et al. (2014). Label data presented verbatim, with text in brackets ‘[]’ added here for clarity. Materials discussed here are deposited in the following collections:

ASUT — Arizona State University, Tempe, AZ, USA

CMNC — Canadian Museum of Nature, Ottawa, Ontario, Canada

CSCA — California State Collection of Arthropods, (California Department of Food & Agriculture),
Sacramento, CA, USA

DCGI — Dellacasa Collection, Genoa, Italy

FSCA — Florida State Collection of Arthropods, Gainesville, FL, USA

NAUF — Northern Arizona University, Flagstaff, AZ, USA

RACC — Rich A. Cunningham collection, Chino, CA, USA

RHMC — Ron H. McPeak collection, Vancouver, WA, USA

SEMC — Snow Entomological Museum, University of Kansas, Lawrence, KS, USA

UAIC — University of Arizona, Tucson, AZ, USA

UNSM — University of Nebraska State Museum, Lincoln, NE, USA

WBWC — William B. Warner Collection, Chandler, AZ, USA

***Trichonotuloides* Balthasar**

Trichonotuloides Balthasar 1945 ~ Dellacasa et al. 2014 (revision).

Diagnosis. Body elongate, almost parallel-sided, uniformly colored body and elytra. Clypeal apical margin sinuate/emarginate, laterally rounded to subangulate, not dentate; surface not tuberculate, coarsely punctate. Pronotum somewhat flattened, anterior angles of some species weakly explanate. Apical fringe of middle and hind tibia short and nearly equal in length. Elytra coarsely punctate and setose; humeral angles not or weakly dentate.

Remarks. *Trichonotuloides* will key to couplet 34 in the generic key of Gordon and Skelley (2007) with *Irrasinus* Gordon and Skelley which occurs in the southeastern US and *Trichonotulus* Bedel (a European immigrant species) which occurs in northeastern North America. Besides having different distributions, these two are readily distinguished by their more convex pronota and smaller body size.

Trichonotuloides is most similar in appearance and distribution to *Neotrichonotuloides* Dellacasa, Gordon and Dellacasa. *Neotrichonotuloides* is readily distinguished from *Trichonotuloides* by having a much more convex pronotum, a more distinct elytral humeral tooth, and having more rounded genae which do not protrude.

In addition, members of *Neotrichonotuloides* are known to be rodent burrow specialists, while label data from specimens of *Trichonotuloides* (see data in Dellacasa et al. 2014) indicate members are high elevation surface dung generalists. The fact the new species has evaded capture for so long may result from its inhabiting high elevations and having a potentially narrow period of activity in the late summer.

Trichonotuloides was recently revised by Dellacasa et al. (2014), who treated the Mexican and Guatemalan species. This new species represents the first record of the genus in the United States.

***Trichonotuloides aphoderrans*, n. sp.**

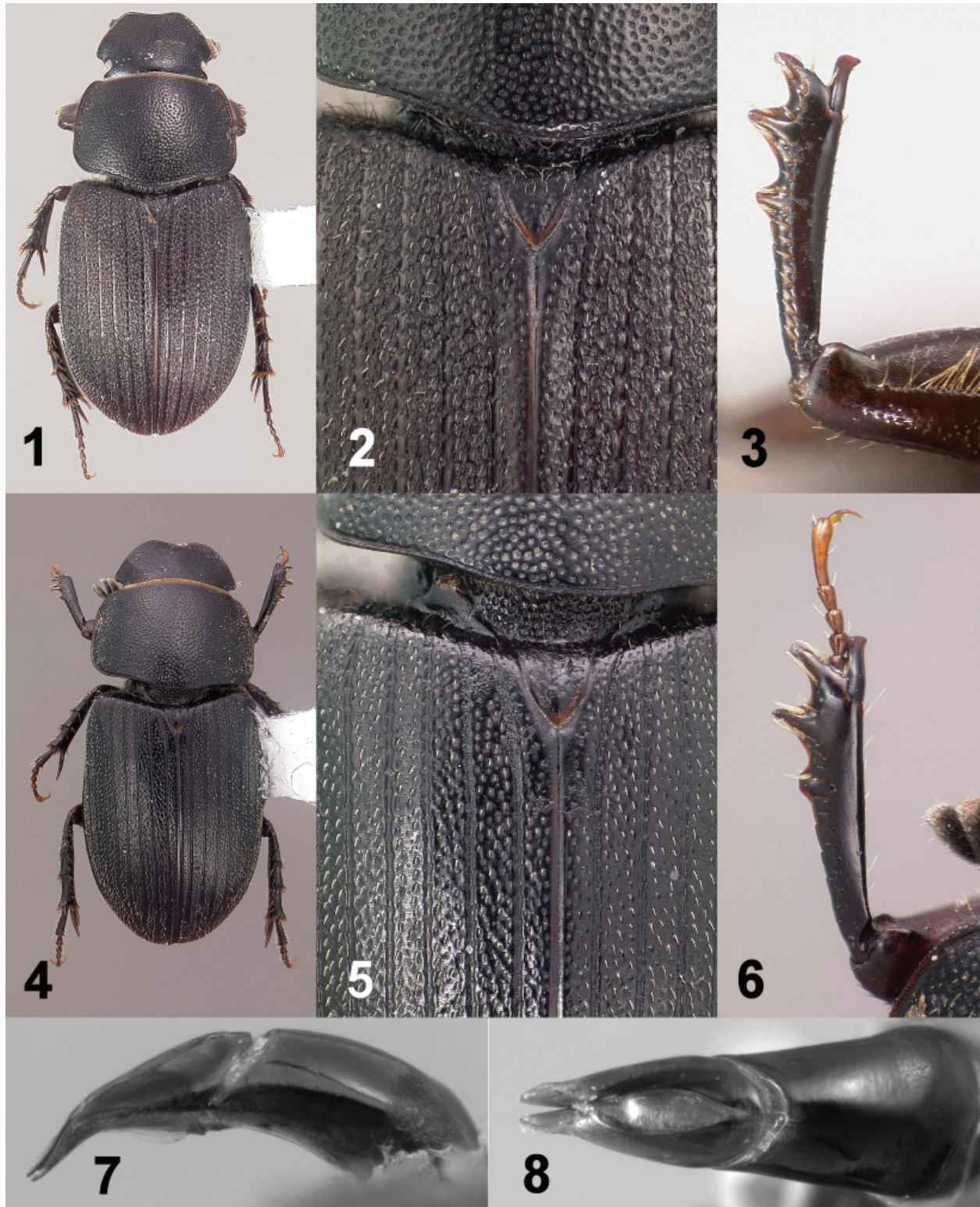
Figures 4–14

Type material. **Holotype** male and **allotype** female appropriately labeled as such, deposited in FSCA, with the following collection label: “USA: AZ: Coconino Co., 0.6km E jct FS300 & 34, 32°24’41”N, 119°58’44”W, AUG 13, 2014; clinging to bottom of fresh elk dung; 7730’; WBWarner”.

Paratypes (54 exx.): Same data as holotype (25 exx.); “USA: AZ: Coconino Co., 0.6km E jct FS300 & 34, 32°24’41”N, 119°58’44”W, AUG 24, 2014; clinging to bottom of moist elk dung; 7730’; WBWarner” (28 exx.); [AZ: Apache Co., hand written] “White Mtn., Ariz., VIII-28-32” (1 damaged male). Paratypes deposited in ASUT, CMNC, CSCA, DCGI, FSCA, NAUF, RACC, RHMC, SEMC, UAIC, UNSM, WBWC.

Diagnosis. Besides being the only species of the genus known from the United States, *T. aphoderrans* is readily distinguished from other species in the genus by the following combination of characters: head with genae angulate, angle approximately 90°, pronotal punctures uniformly coarse, elytral punctures distinct, elytral surface between punctures flattened and almost glossy (at most only vaguely verruculose), male protibial spur weakly hooked inward at apex, and mesotarsomere I shorter than upper spur.

Description. Length 3.7–5.0 mm; oval-elongate, convex, almost glossy beneath punctation and pubescence; each elytral puncture with short, erect silver-grey seta. Blackish or piceous black; head, pronotum and elytra with margins dark reddish. Head with epistome convex at center, coarsely and densely punctured, punctures sparser on disc, denser on sides; clypeus feebly sinuate at middle, rounded or obtusely angulate at each side, bordered, edge imperceptibly bristled laterally; genae angulate, ~90°, rather shortly ciliate, distinctly protruding from the eyes; frontal suture nearly obsolete at middle, moderately raised laterally; front coarsely and rather densely punctured. Epipharynx transverse (Fig. 14). Pronotum transverse, moderately convex medially, narrowly flattened on sides, strongly and densely punctured with nearly uniformly sized punctures; sides of disc shortly pubescent; lateral margins with border minutely bristled, slightly inwardly sinuate before hind angles; hind angle obtusely rounded;



Figures 1–8. *Trichonotuloides* spp. 1–3) *T. glyptus* (Bates) male. 1) Dorsal habitus. 2) Elytra and pronotal base. 3) Protibia, dorsal view. 4–6) *T. aphoderrans* n. sp., holotype male. 4) Dorsal habitus. 5) Elytra and pronotal base. 6) Protibia, dorsal view. 7–8) *T. aphoderrans* male genitalia, paratype male.

base slightly bisinuate and distinctly bordered. Scutellum with curved sides, coarsely and confusedly punctured. Elytra elongate-oval, moderately convex, not denticulate at shoulder; epipleural carina very distinct at humeral callus and minutely bristled; striae wide, glossy, superficially punctured and subcrenulate discally, indistinctly punctured and canaliculate toward apex; intervals flat with coarse punctation distinct, separated by almost glossy surface between punctures [surface best studied under diffused light]. Upper spur of mesotibia longer than first tarsal segment. Upper spur of hind tibiae shorter than first tarsal segment; latter as long as or slightly longer than the following three segments combined.

Male. Clypeal angles rounded; pronotum relatively more transverse; fore tibial spur stout, spatulate, and weakly hooked inwardly at apex; fore tibia more elongate, narrowed, apical half ventrally curved; metasternal plate spoon-shaped, punctured and shortly pubescent distally; setae on basal half of hind femur dense and long; aedeagus (Fig. 7–8) with parameres gradually narrowing to dorsoventrally flattened apex, paramere apices not contiguous at apex, parameres bent ventrally at apical third in lateral view.

Female. Clypeal angles often angulate; pronotum relatively narrower toward front; fore tibial spur slender and regularly acuminate apically; fore tibia normal, flattened, lacking ventral curvature on apical half; metasternal plate nearly flat, glabrous; setae on basal half of hind femur sparse and short.

Biological observations. Nearly all specimens of the type series were collected from beneath aggregated pellets or piles of fresh elk dung to which they mostly clung upside-down to the bottom surface. Some specimens were also found in cracks and surfaces between the coagulated pellets. No specimens were found burrowing into the interior of the dung, but many had excavated shallow channels in the surface as much as half the body depth, and appeared to be “grazing” on the surface of the dung. This is in sharp contrast to the many specimens of *Agoliinus plutonicus* (Fall) and few specimens of *Pseudogolius coloradensis* (Horn) found burrowing completely into the same dung (some on the bottom surface as well). Specimens of *T. aphoderrans* were densely packed beneath the freshest dung piles in an open, narrow, grassy canyon bottom in ponderosa pine/Douglas fir/aspen woods (Fig. 15); but very few specimens were found beneath dung that had dried to a hard crust on its exposed surfaces. No specimens were found beneath logs or rocks in the area, nor under older dung piles even though the ground beneath was damp. Based on these observations, the species appears to be a true dung feeder and not a detritivore.

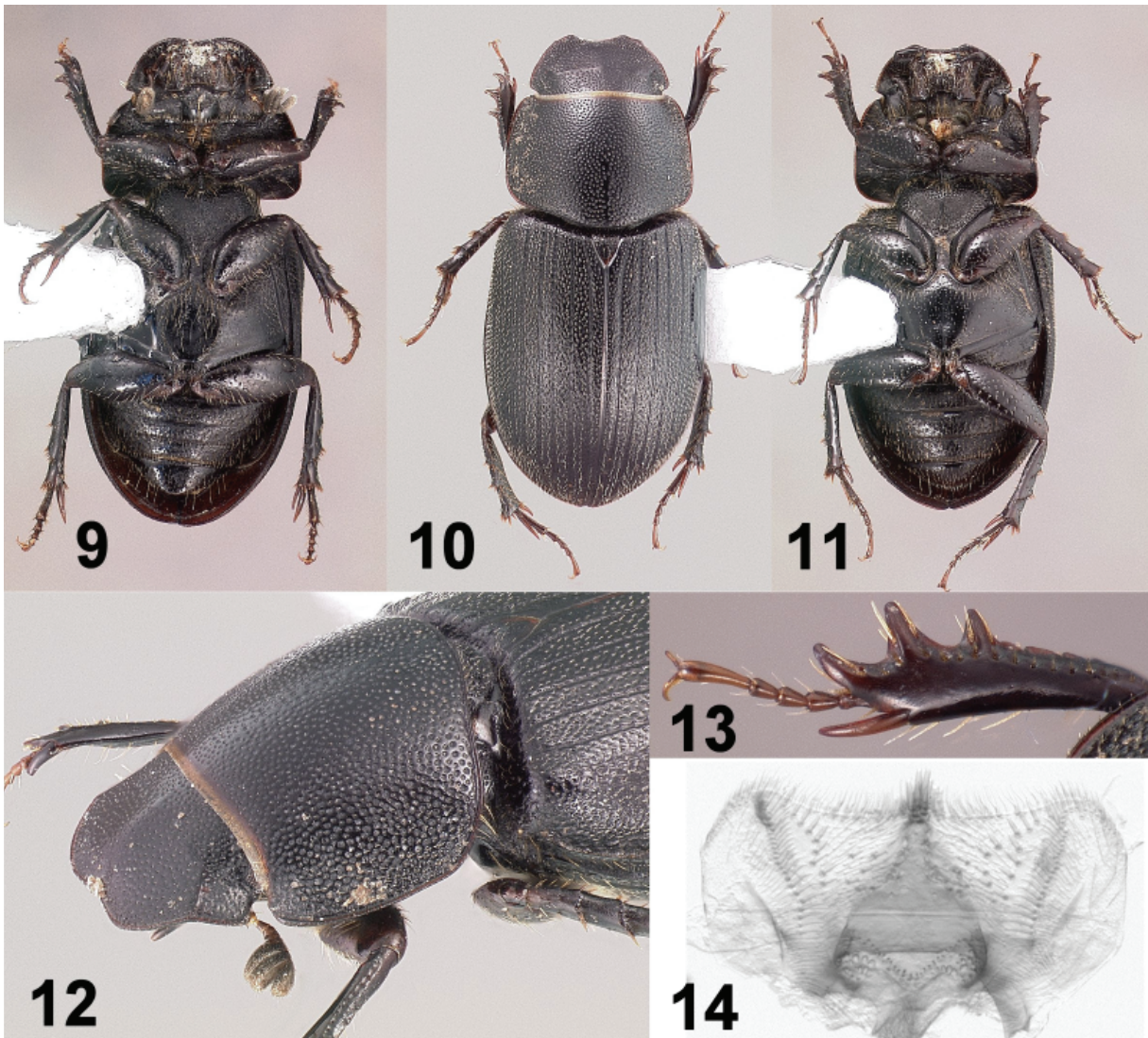
Remarks. In general, *T. aphoderrans* is most similar in general morphological characters, genitalia and sexual dimorphisms to *T. glyptus*, the most commonly collected and widespread species in the genus. *Trichonotuloides glyptus* can be distinguished by having the genae obtusely rounded, pronotal punctures coarse and moderate in size (Fig. 1–2), elytral punctures nearly coalescing making surface distinctly rugose-vermiculose (Fig. 2), male fore tibial spur distinctly hooked inward at apex (Fig. 3), and middle tarsomere I a bit longer than upper spur.

Etymology. The specific epithet “*aphoderrans*” was chosen for the fact that the type series was found walking on the dung, not burrowing into it. It is derived from ‘*aphodos*’ which is Greek meaning dung and ‘*errans*’ which is Latin meaning wanderer, and is an intentional combination of the Greek and Latin roots.

Key Placement. *Trichonotuloides aphoderrans*, is most similar to *T. glyptus* (Bates). However, *T. aphoderrans* does not easily fall to that species in the key of Dellacasa et al. (2014). To help resolve this problem, we here reproduce and modify their key to include the new species.

1. Elytra strongly denticulate at shoulder; striae almost as broad as intervals; latter coarsely, densely, evenly punctured; pronotum dually punctured with hind angles truncate. Dark brownish. Length 4.0–4.5 mm. Guatemala, Mexico (Chiapas). ***T. latecrenatus* (Bates)**
- Elytra not denticulate at shoulder, at most with distinct epipleural carina; striae not so broad; pronotum irregularly punctured, with hind angles obtusely rounded. **2**

- 2(1). Clypeus widely rounded at sides of median sinuosity; genae rounded, feebly protruding from the eyes; fore tibiae spur almost straight and acuminate in both sexes. Blackish. Length 4.5–6.0 mm. Mexico (Veracruz).....***T. hansferyi* Dellacasa, Dellacasa and Gordon**
- Clypeus subangulate at sides of median sinuosity; genae obtusely to angularly rounded, strongly protruding from the eyes; fore tibiae spur in males strongly curved or hooked inwardly at apex.....**3**
- 3(2). Elytral intervals densely, coarsely, evenly punctured, surface smooth between punctures (Fig. 5); genae angularly rounded (Fig. 4); upper mesotibial spur longer than first tarsomere. Length 3.7–5.0 mm. USA (Arizona).....***T. aphoderrans* n. sp.**
- Elytral intervals with coarse punctation irregularly vermiculose (Fig. 2); genae obtusely rounded (Fig. 1); upper mesotibial spur shorter than first tarsomere. Mexico.....**4**
- 4(3). Epistome subshiny, coarsely, distinctly almost evenly punctured; clypeus relatively more feebly sinuate at middle; spur of fore tibiae, in males, spatulate and apically hooked. Blackish or piceous black, margins of head and pronotum reddish. Species relatively larger: length 4.5–5.0 mm. Mexico (Colima, Durango, Hidalgo, Mexico, Oaxaca, Puebla, Veracruz).....***T. glyptus* (Bates)**



Figures 9–14. *Trichonotuloides aphoderrans* n. sp. **9)** Male holotype, ventral view. **10–11)** Female allotype, dorsal and ventral view. **12)** Male holotype head and pronotum dorso-lateral view. **13)** Female allotype protibia. **14)** Epipharynx, paratype male.

- Epistome dull, confusedly subrugosely punctured; clypeus relatively more deeply sinuate at middle, fore tibiae spur in males stout, subcylindrical, acuminate and strongly curved inwardly apically. Blackish. Species relatively smaller: length 3.5–4.0 mm. Mexico (Veracruz).....
..... *T. alfonsinae* Dellacasa, Dellacasa and Gordon

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Figure 15. Type locality for *Trichonotuloides aphoderrans* n. sp.