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Contribution to the knowledge of the genus *Trogoderma* (Coleoptera: Dermestidae: Magatominae) from Chile

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Taxonomy, new species, Coleoptera, Dermestidae, *Trogoderma*, Chile

Abstract. Four new species *Trogoderma chileanum* sp. n., *T. nubleana* sp. n., *T. santiagoi* sp. n. and *T. constantini* sp. n. - all from Chile are described and illustrated; diagnoses with key to the determination are provided.

INTRODUCTION

The genus *Trogoderma* Dejean, 1821 contains over 130 species and subspecies (Háva 2003, 2009) defined by the following features: setae on dorsal surface not strongly scale-like, although light-colored hairs may be flattened and ensiform, smooth and straight; head with median ocellus; antennae usually 9-11 segmented; club of antenna composed of at least three segments, terminal segment never greatly enlarged, subequal in length to the preceding two or three segments; posterior oblique margin of antennal cavity elevated and more or less carinate, at least as far as the middle of the cavity; hence, antennal cavity at least partly enclosed behind; posterior margin of 5th abdominal tergite straight on both sides; 9th abdominal segment without any processes; body flattened and bullet-shaped.
The genus *Trogoderma* is known worldwide, but only 9 species (including 2 introduced, synanthropic species) are known from Chile (EPPO 2007, Moroni 1975; Háva 2007). Other authors mentioned some species from Chile but identified them only as *Trogoderma* sp. (Solervicens & Gonzales 1993; Solervicens & Estrada 1996). In the present article authors are provided four new species from the following collections.

MATERIAL AND METHODS

Moreover, following abbreviations refer to the collections, in which the examined material is deposited:
AHEC private coll. Andreas Herrmann, Stade, Germany;

CMNH Carnegie Museum of Natural History, Pittsburg, USA;
FMHD Field Museum Natural History, Chicago, USA;
HNHM Hungarian Natural History Museum, Budapest, Hungary;
JHAC Private Entomological Laboratory and Collection, Jiří Háva, Prague, Czech Republic;
MK Marcin Kadej, Institute of Zoology, Department of Biodiversity and Evolutionary Taxonomy collection,
Wrocław, Poland.
BL body length (measured from the head anterior margin to the apex of the elytra).
BW body width (measured between two anterolateral humeral calli).
PL pronotum length (measured from the top of the anterior margin to scutellum).
PW pronotum width (measured between the two posterior angles of pronotum).
SL sternites length (measured from the anterior margin to the apex of posterior margin).
SW sternites width (measured between two lateral margins in the anterior part of sternites).
(in.) infrasubspecific name.
(un) unpublished name.

All measurements are given in millimeters. The morphological structures were observed under phase contrast microscope Nikon Eclipse E 600 with a drawing attachment in transparenting light in glycerin. All morphological structures were put into plastic micro vials with glycerin under proper specimens. Photos were taken with the camera Nikon Coolpix 4500.

The distribution and classification of Dermestidae is after Háva (2009).

RESULTS

Trogoderma Dejean, 1821

Eurhopalus Solier in Gay, 1849: 372.
Ocelliger Philippi et Philippi, 1864: 283.

Trogoderma angustum (Solier in Gay, 1849)

Eurhopalus angustus Solier in Gay, 1849: 374.
Eurhopalus angustus var. α : Solier in Gay, 1849: 374 (in).
Trogoderma bifasciata Redtenbacher, 1867: 44.
Pseudomegatoma boliviensis Pic, 1915: 4.
Trogoderma angustum var. *alfa* Solier: Díaz et al., 2008: 18 (in).

Material examined. Chile, reg.IV, pr. Elqui, Vicuna 10 km Totolo, 30°02´S 70°49´W, 565 m, 3.xi.2004, R. Constantin lgt., 1 ex., (AHEC); Chile, reg.IV, Limari Ovalle 30 km NW 2 km NW Samo Alto, 30°25´S 70°55´W, 618 m, 5.xi.2004, R. Constantin lgt., 5 exx., (4 AHEC, 1 JHAC); Chile, VI region, Buculemu, Enero 1998, Alfredo Ugarte-Pena leg., 1 ex., (AHEC). [all mentioned specimens represents colour variability "var. α"]

Other material studied. Total number of examined specimens from Chile and Europe: 150.

Distribution. The species was described from Chile, but is also known from Europe, Argentina, Chile, Peru, USA, India, Pakistan and Thailand.

Remarks. According to the Solier´s „description" the mentioned specimens belong to the variety "α". Díaz et al. (2008) also mentioned this variety as „alfa". The variety is infrasubspecific and differs from the typical specimens only by the colour of elytra.

Trogoderma atrum (Philippi et Philippi, 1864)

Ocelliger atrum Philippi et Philippi, 1864: 238.
Trogoderma atrum: Germain, 1911: 66.
Trogoderma atrum: Mroczkowski, 1968: 100.

Remarks. The species *Trogoderma atrum* (Philippi et Philippi, 1864) is not included in the following key, because for the study, the type material is necessary. According to the original description (*Ocelliger ater* Philippi et Philippi, 1864: 283) the type specimens have antennae with 10 segments; the species is very similar to the *T. vicinum* (Solier in Gay, 1849) but *vicinum* have antennae with 11 segments. Mroczkowski (1968 :100), newly transferred the species to the genus *Trogoderma*, but status of *atrum* should be studied in the following part.

Trogoderma obscurum Pic, 1936

Trogoderma thoracicum var. *obscurum* Pic, 1936: 1.
Trogoderma elcanelo Háva (un): 2007: 72.
Trogoderma obscurum: Háva, 2007: 72.

Material examined. Total number of examined specimens from Chile: 15.

Distribution. Species described by Pic (1936) from Brazil, from Chile recorded by Háva (2007).

Trogoderma rubiginosum (Solier in Gay, 1849)

Eurhopalus rubiginosus Solier in Gay, 1849: 373.
Trogoderma rubiginosum: Lacordaire, 1854: 468.

Material examined. Total number of examined specimens from Chile: 30.

Distribution. Species known only from Chile.

Trogoderma subtile Reitter, 1881

Trogoderma subtile Reitter, 1881: 39.

Material examined. Chile, region VIII, Los Angeles, 18.xi.2004, K. Renner lgt., (1 ♀), J. Háva det., (AHEC); Chile, region VII, Talca, 15 km S Curico, La Molina 15 km S, 35°03´S 71°17´W, 230 m, 14.xi.2004, R. Constantin lgt., (4 ♀♀), J. Háva det., (3 AHEC, 1 JHAC).

Distribution. Species known only from Chile.

Trogoderma variegatum (Solier in Gay, 1849)

Eurhopalus variegatus Solier in Gay, 1849: 373.
Trogoderma variegatum: Lacordaire, 1854: 468.

Material examined. Total number of examined specimens from Chile: 25.

Distribution. Species known only from Chile.

Trogoderma vicinum (Solier in Gay, 1849)

Eurhopalus vicinus Solier in Gay, 1849: 374.
Trogoderma vicinum: Lacordaire, 1854: 468.

Material examined. Total number of examined specimens from Chile: 85.

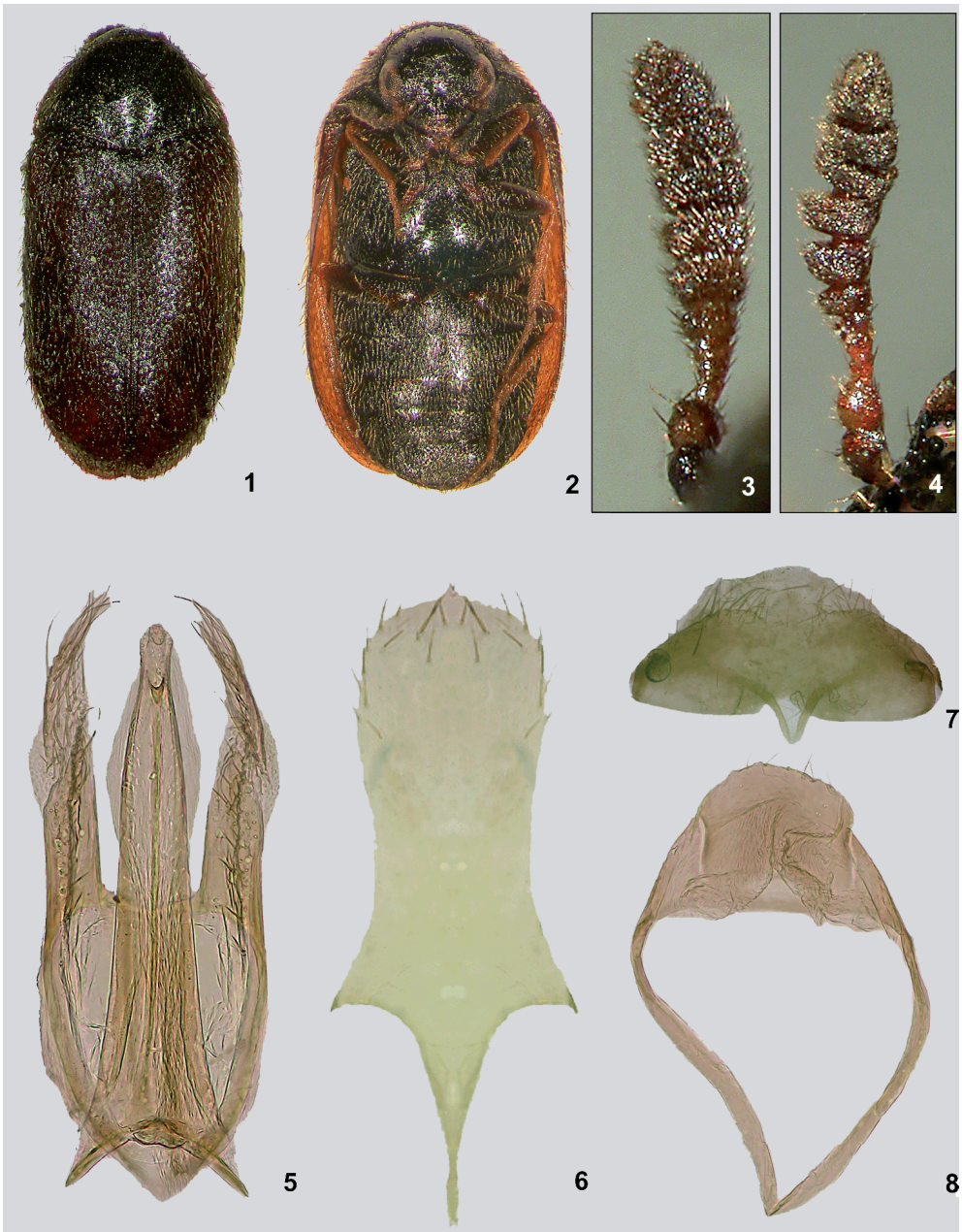
Distribution. Species known only from Chile.

DESCRIPTIONS

Trogoderma chileanum sp. n.
(Figs 1-8)

Type material. Holotype (♂): „Chile“ / „Malcho Linares, xii.1957, coll. L. E. Pena“ / „CMNH Acc. No.31811“, (CMNH). Paratypes (4 ♂♂, 4 ♀♀): the same data as holotype, (7 CMNH, 1 JHAC). Remarks: one specimen without head and pronotum. Type specimens were labelled with red, printed labels bearing the text as follows: “HOLOTYPE [or PARATYPE, respectively] *Trogoderma chileanum* sp. n. J. Háva & M. Kadej det. 2008“.

Description. Habitus (Fig. 1) (BL: 2.1-2.55; BW: 1.0-1.3). Dorsal and ventral integument with head, pronotum, thorax, femurs and abdomen (SL: 1.0-1.05; SW: 0.95-1.05) dark brown, antennae, tibia and legs brown. Pubescence of dorsal surfaces brown (might seem to be golden or grey in transparent light), pubescence of undersurfaces light golden, grey (Fig. 2). Head with pubescence consisting entirely of brown hairs and median ocellus distinct. Antenna



Figs 1-8. *Trogoderma chileanum* sp. n.: 1- habitus (dorsal aspect); 2- habitus (ventral aspect); 3- male antenna; 4- female antenna; 5- 8th abdominal segment; 6- male genitalia; 7- 9th abdominal sternite; 8- 10th abdominal tergite.

11-segmented, covered with brown and light brown pubescence (Figs 3-4); configuration in male as in (Fig. 3), in female as in (Fig. 4). Disc of pronotum subhemispherical (PL: 0.5-0.55; PW: 0.95-1.1), lateral margins not broadly explanate. Scutellum visible. Elytra with punctures of disc subequal in size to those of pronotum; punctures dense but small and shallow. Pubescence of elytra uniform; dorsal patterns absent. Prosternum punctate, prosternal process moderately long, without median carina. Antennal fossa occupying all of hypomeron except for small projecting triangular area at antero-medial angle; floor of fossa microscopically punctate. Mesosternal disc with punctures of disc subequal in size to those of pronotum nd prosternum, metasternum without discal striae. First visible abdominal sternite without distinct oblique discal striae. Morphological abdominal segment VIII as in (Fig. 7); abdominal sternite IX as in (Fig. 6), abdominal tergite X as in (Fig. 8). Male genitalia as in (Fig. 5).

Female similar to the male, but differs by the form of antennae (Figs 3-4).

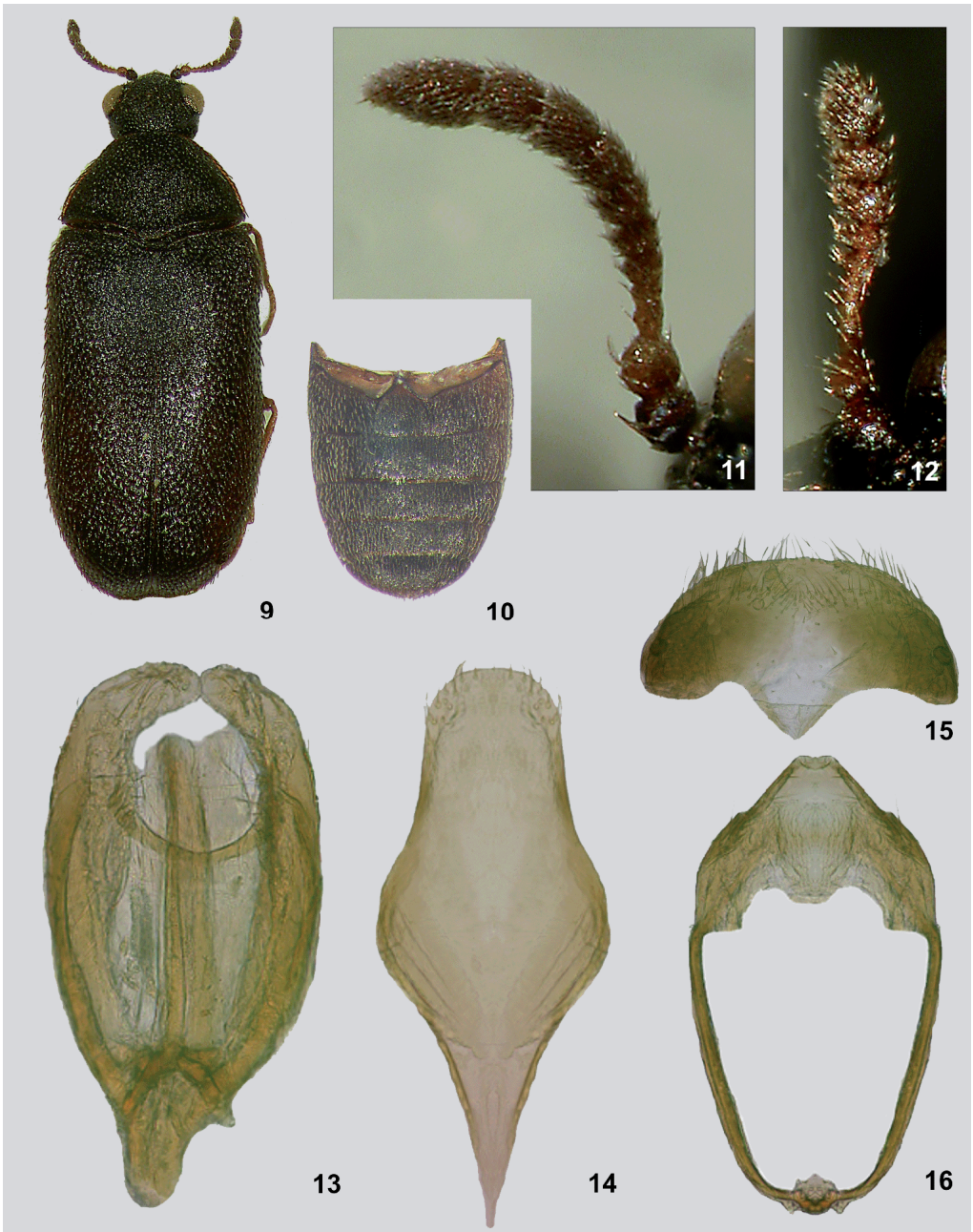
Differential diagnosis. The new species differs by the characters mentioned in the following key.

Etymology. Named according to the type locality, the state of Chile.

***Trogoderma nubleana* sp. n.**
(Figs 9-16)

Type material. Holotype (♂): CHILE, Nuble prov., 72 km SE Chillan, Trancas nr Termas, 1700 m, 6.xii.1984-19.ii.1985, S. Peck lgt. (FMHD). Paratypes (13 exx.): the same data as holotype, (8 FMHD, 5 JHAC). Type specimens were labelled with red, handwritten labels bearing the text as follows: "HOLOTYPE [or PARATYPE, respectively] *Trogoderma nubleana* Jiří Háva det. 2002"

Description. Habitus (Fig. 9) (BL: 2.4; BW: 1.1). Dorsal integument with head and pronotum dark brown, almost black. Ventral integument with thorax, abdomen (SL: 1.1; SW: 0.95; Fig. 10), antennae and legs brown. Pubescence of dorsal surfaces dark brown, pubescence of undersurfaces light golden (Fig. 9). Head with pubescence consisting entirely of brown hairs and median ocellus distinct. Antenna 11-segmented, covered with brown and gold pubescence (Figs 11-12), configuration in male as in (Fig. 11), in female as in (Fig. 12). Disc of pronotum subhemispherical (PL: 0.5; PW: 0.95), extending in the middle part; lateral margins not broadly explanate, posterior margin quite broadly explanate. Scutellum visible but minute. Pronotum with punctures of disc subequal in size to those of head - dense and broad. Pubescence of elytra consisting of brown hairs - uniform, dorsal patterns absent. Prosternum punctate, prosternal process moderately long without median carina. Antennal fossa occupying all of hypomeron except for small projecting triangular area at antero-medial angle; floor of fossa microscopically punctate. Mesosternal disc with punctures of disc subequal in size to those of pronotum and prosternum, metasternum without discal striae. First visible abdominal sternite with distinct oblique discal striae. Morphological abdominal



Figs 9-16. *Trogoderma nubleana* sp. n.: 9- habitus (dorsal aspect); 10- abdominal sternites I-V; 11- male antenna; 12- female antenna; 13- 8th abdominal segment; 14- male genitalia; 15- 9th abdominal sternite; 16- 10th abdominal tergite.

segment VIII as in (Fig. 15); abdominal sternite IX as in (Fig. 14), abdominal tergite X as in (Fig. 16). Male genitalia as in (Fig. 13).

Female similar to the male, but differs by the form of antennae.

Differential diagnosis. The new species differs by the characters mentioned in the following key.

Etymology. Named according to the type locality, the province of Nuble.

***Trogoderma santiagoi* sp. n.**
(Figs 17-24)

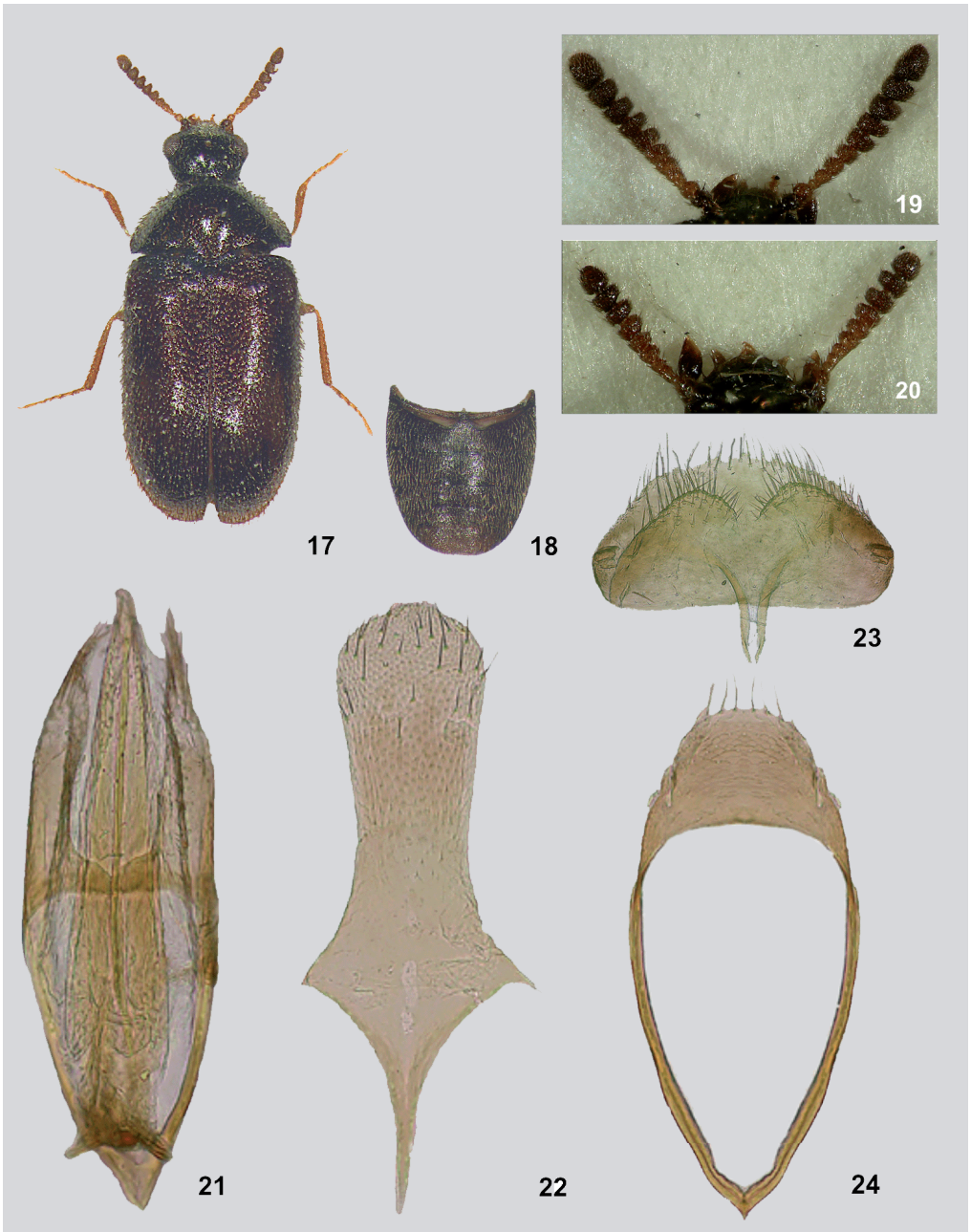
Type material. Holotype (♂): Chile, Santiago, Aculeo-Rangue, 20.x.2000, S. Roitman lgt., (AHEC). Paratypes (4 ♂♂, 3 ♀♀): the same data as holotype, (5 AHEC, 2 JHAC); (1 ♂): Chile, Santiago Prov., Cuesta El Melon, 3.xi.1965, Hungarian Soil-Zool. Exp., Nr. P-B.84, Andrássy, Balogh, Loksa et Mahunka lgt. (HNHM); (1 ♂, 1 ♀): Chile, Santiago Prov., El Manzano, 30.x.1965, Hungarian Soil-Zool. Exp., Nr. P-B.71, Loksa et Mahunka lgt. (1 HNHM, 1 JHAC). Type specimens were labelled with red, printed labels bearing the text as follows: "HOLOTYPE [or PARATYPE, respectively] *Trogoderma santiagoi* sp. n. J. Háva & M. Kadej det. 2008".

Description. Habitus (Figs 17-18) (BL: 2.25; BW: 1.15). Dorsal integument with head and pronotum dark brown, almost black. Ventral integument with thorax, abdomen (SL: 0.95; SW: 1.1) and antennae brown, legs light brown. Head with median ocellus distinct. Pubescence of dorsal surfaces and head brown (might seem to be golden or grey in transparent light) - uniform, dorsal patterns absent; pubescence of undersurfaces light golden. Antenna 11-segmented, covered with gold pubescence (Figs 19-20); configuration in male as illustrated (Fig. 19), in female as in (Fig. 20). Antennal segments I, VI-XI brown, II-V light brown in male; I, VII(VIII)-XI brown, II-VI(VII) light brown in female. Disc of pronotum subhemispherical (PL: 0.6; PW: 1.1), margins not broadly explanate. Scutellum visible but minute. Elytra with punctures of disc subequal in size to those of pronotum. Pubescence of elytra consisting of brown hairs - uniform, dorsal patterns absent. Prosternum finely punctate, prosternal process moderately long without median carina. Antennal fossa occupying all of hypomeron, deeply excavated, floor of fossa microscopically punctate. Mesosternal disc with punctures of disc subequal in size to those of pronotum and prosternum, metasternum without discal striae. First visible abdominal sternite without distinct oblique discal striae. Morphological abdominal segment VIII as in (Fig. 23); abdominal sternite IX as in (Fig. 22), abdominal tergite X as in (Fig. 24). Male genitalia as in (Fig. 21).

Female similar to the male, but differs by the form of antennae.

Differential diagnosis. The new species differs by the characters mentioned in the following key.

Etymology. Named according to the type locality, the province and city of Santiago.



Figs 17-24. *Trogoderma santiagoi* sp. n.: 17- habitus (dorsal aspect); 18- abdominal sternites I-V; 19- male antenna; 20- female antenna; 21- 8th abdominal segment; 22- male genitalia; 23- 9th abdominal sternite; 24- 10th abdominal tergite

Trogoderma constantini sp. n.
(Figs 25-32)

Type material. Holotype (♂): Chile, reg.Iii, Copiapó, 80 km NE Copiapo, Portezuelo del Salto, 27°03´S 69°41´W, 2000 m, 10.xi.2004, R. Constantin lgt., (AHEC). Paratypes (4 ♂♂, 7 ♀♀): the same data as holotype, (7 AHEC, 2 JHAC, 2 MK). Type specimens were labelled with red, printed labels bearing the text as follows: "HOLOTYPE [or PARATYPE, respectively] *Trogoderma constantini* sp. n. J. Háva & M. Kadej det. 2008".

Description. Habitus (Fig. 25) (BL: 2.2; BW: 0.9). Dorsal integument (head, pronotum and triangular area in anterior part of the elytra, close to the elytral suture) dark brown and brown (rest of elytral surface). Ventral integument with thorax, abdomen (SL: 1.0; SW: 1.0; Fig. 26) and femur brown, tibia and tarsus light brown. Pubescence of dorsal surfaces and undersurfaces light golden. Head with pubescence consisting of entirely of golden hairs and median ocellus distinct. Antenna 11-segmented, covered with gold pubescence (Figs 27-28); configuration in male as illustrated (Fig. 27), in female as in Fig. 28. Antennal segments I, V-XI brown, II-IV light brown in male; I, VI(VII)-XI brown, II-V(VI) light brown in female. Disc of pronotum subhemispherical (PL: 0.5; PW: 0.8), margins not broadly explanate. Scutellum visible but minute. Elytra with punctures of disc subequal in size to those of pronotum - punctures small and slightly pronounced. Pubescence of elytra consisting of golden hairs. Prosternum punctate, prosternal process moderately long without median carina. Antennal fossa occupying all of hypomeron, deeply excavated, floor of fossa microscopically punctate. Mesosternal disc with punctures of disc subequal in size to those of pronotum and prosternum, metasternum without discal striae. First visible abdominal sternite with distinct oblique discal striae. Morphological abdominal segment VIII as in (Fig. 31); abdominal sternite IX as in (Fig. 30), abdominal tergite X as in (Fig. 32). Male genitalia as in (Fig. 29).

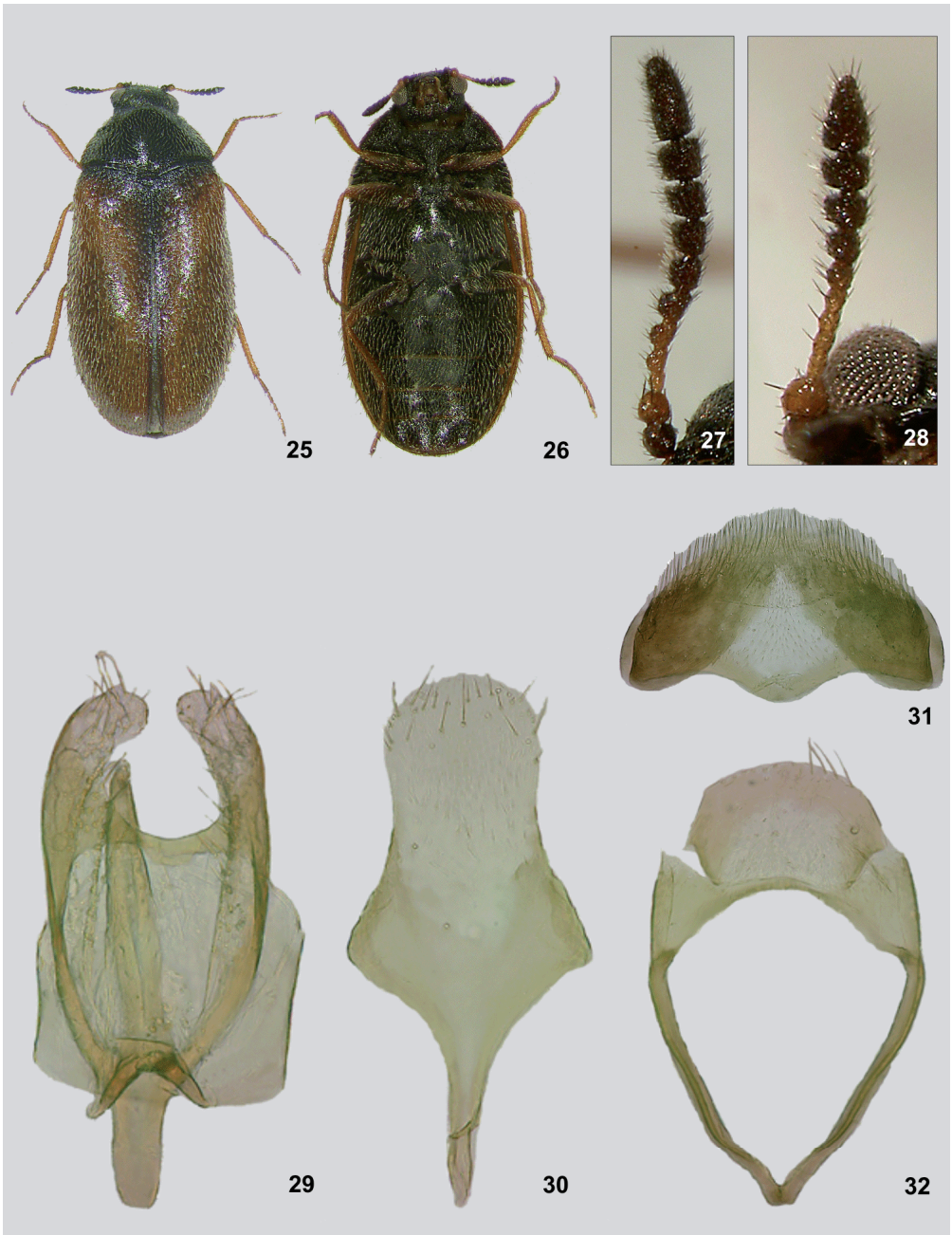
Female similar to the male, but differs by the form of antennae.

Differential diagnosis. The new species differs by the characters mentioned in the following key.

Etymology. Patronymic, dedicated to the collector of the new species, Robert Constantin (Saint-Lô, France).

KEY TO CHILEAN SPECIES

1(20) Antennae normal, not pectiniform
2(13) Elytral integument bicolorous
3(8) Body form flatted, elongate and narrow
4(7) First visible abdominal sternite with distinct oblique discal striae
5(6) Elytra black or brown with three transverse reddish fasciae covered by white or grey pubescence (rarely specimens presented on each elytron only one transverse fascia); first visible abdominal sternite without distinct oblique discal striae ..... *Trogoderma angustum* (Solier in Gay, 1849)
6(5) Elytra brownish-yellow without fasciae or with one ill defined fasciae presented in anterior half; first visible abdominal sternite without distinct oblique discal striae ..... *Trogoderma constantini* sp. n.



Figs 25-32. *Trogoderma constantini* sp. n.: 25- habitus (dorsal aspect); 26- habitus (ventral aspect); 27 male antenna; 28- female antenna; 29- 8th abdominal segment; 30- male genitalia; 31- 9th abdominal sternite; 32- 10th abdominal tergite.

7(4) First visible abdominal sternite without distinct oblique discal striae; elytra brown, shining with two defined patterns; pronotum finely punctate ..... *Trogoderma variegatum* (Solier in Gay, 1849)
8(3) Body form relatively short
9(10) First visible abdominal sternite with distinct oblique discal striae; body black (synanthropic species) .... *Trogoderma glabrum* (Herbst, 1783)
10(9) First visible abdominal sternite without distinct oblique discal striae
11(12) Elytra light reddish brown with small clearly defined patterns (synanthropic species) .... *Trogoderma granarium* Everts, 1898
12(11) Each elytron with one transverse light reddish fascia covered by yellowish-golden pubescence; apical part of elytron reddish brown (not synanthropic species) ..... *Trogoderma subtile* Reitter, 1881
13(2) Elytral integument unicolorous, without reddish or yellow spots or fasciae covered by unicolorous pubescence
14(17) Body black, matt
15(16) Antennal club consisting of 6 segments; first visible abdominal sternite without distinct oblique discal striae; aedeagus (Fig. 5); 9th sternite (Fig. 6) ..... *Trogoderma chileanum* sp. n.
16(15) Antennal club consisting of 8 segments; first visible abdominal sternite with distinct oblique discal striae;aedeagus (Fig. 13); 9th sternite (Fig. 14) ..... *Trogoderma nubleana* sp. n.
17(14) Body dark brown, shine [antennal club consisting of 8 segments]
18(19) Prosternum finely punctate, prosternal process moderately long without median carina; ventral surfaces covered by light golden pubescence; first visible abdominal sternite without distinct oblique discal striae; aedeagus (Fig. 21); 9th sternite (Fig. 22) ..... *Trogoderma santiagoi* sp. n.
19(18) Prosternum coarsely punctate, prosternal process moderately short without median carina; ventral surfaces covered by yellowish-grey pubescence; first visible abdominal sternite without distinct oblique discal striae ..... *Trogoderma obscurum* Pic, 1936
20(1) Antennae pectiniform
21(22) Elytral integument bicolorous; each elytron with three or four reddish transverse fasciae covered by white pubescence ..... *Trogoderma rubiginosum* (Solier in Gay, 1849)
22(21) Elytral integument unicolorous; first visible abdominal sternite with distinct oblique discal striae; elyra black or dark brown, matt; pronotum coarsely punctate ..... *Trogoderma vicinum* (Solier in Gay, 1849)

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