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Taxonomic Studies on *Coptosoma* (Laporte, 1832) Species (Heteroptera: Plataspidae) from Turkey

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Abstract: *Coptosoma* (Laporte, 1832) (Heteroptera: Plataspidae) species of Turkey were studied and their morphological characters were reviewed. The species of *Coptosoma* living in Turkey are: *C. maurum seidenstuckeri* Davidova-Vilimova and Štys, 1980, *C. oenderi* n.sp., *C. putoni* Montandon, 1898, *C. costale* Stål, 1876, *C. mucronatum* Seidenstücker, 1963, *C. scutellatum* (Geoffroy), 1785, *C. lodosi* n.sp. Two Indian species, *C. indicum* (Distant 1892) and *C. noualhieri* Montandon 1896 were described in new concepts. The variations on some characters between specimens from Turkey and the other sides were discussed and the new species, *C. oenderi* and *C. lodosi*, were described and their diagnostic characters were illustrated.

Key words: *Coptosoma*, species, Turkey

INTRODUCTION

Up to now *Coptosoma* (Laporte, 1832) (Heteroptera: Plataspidae) species have been studied by Bodenheimer (1937) Davidová and Štys (1976a, b and 1980), Ghauri (1965), Hoberlandt (1956 and 1977), Horvath (1883 and 1901), Montandon (1896 and 1898), Scudder (1959), Seidenstücker (1957, 1958, 1960 and 1963), Singh-Pruthi (1925), Stål (1876), Lodos and Önder (1978). A very good literature review was given by Davidova and Štys (1980). Viskens (1995) gave four species of *Coptosoma* from Europe, *mucronatum* Seidenstücker, 1963 (Stehlík, 1970), *scutellatum* (Geoffroy, 1785), *cribraria* (Fabricius, 1798) and *globus* Fabricius (= *scutellatum*).

On Turkish species Seidenstücker (1957, 1958 and 1960) worked very well and collected the most of the species from several parts of Turkey. Seidenstücker (1963) gave detailed information on the Anatolian *Coptosoma* species and worked on genital morphologies of *Coptosoma scutellatum* (Geoffroy) and *C. mucronatum* Seidenstücker and described the latter as a new species. Lodos and Önder (1978) is another detailed work on Turkish species of *Coptosoma* and they made descriptions of 5 species, *C. maurum* Vidal, 1938, *C. putoni* Montandon, 1898, *C. costale* Stål, 1876, *C. mucronatum* Seidenstücker, 1963 and *C. scutellatum* (Geoffroy), provided an identification key for them, gave their distributions and hosts and illustrated each species. Davidova and Štys (1980) worked on taxonomy and phylogeny of the West Palaearctic Plataspidae, gave the following statements for their work: The present study contains the revision of the taxonomy and distribution of all West Palaearctic taxa and phena; three keys are provided, two based on male genital characters only. Special attention was paid to the phallus which is described and illustrated in detail; it offers excellent diagnostic characters and in a holophyletic group of taxa of Syrian origin exhibits a unique

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asymmetry, recorded for the first time. The homology and evolution of some of its features are discussed in broader context. The utility, taxonomic weight and states of individual characters are summarized in the chapter on diagnostic characters, which precedes the revision proper. Also terminology is explained there, bauplans of more complicated structures are described and applied methods are specified. Zoogeographical analysis is also included and we have then attempted to reconstruct the phylogeny of the complex of species studied by the methods of cladistic analysis. Two alternative cladistic hypotheses are represented and the limited applicability of the cladistic hypotheses is presented and the limited applicability of the cladistic methods for interpretation of phylogeny in the present case is discussed. A short account of the bionomy and development of the West Palaearctic *Coptosoma* species, partly based on original observation is also presented.

Önder *et al.* (2006) gave a list of 6 species of *Coptosoma*, *C. maurum*, *C. putoni*, *C. costale*, *C. mucronatum*, *C. scutellatum*, *C. anatolicum* Horvardt, 1883 from Turkey and their distribution records.

The present work is based on review of the morphologies of the *Coptosoma* species, on the materials mainly newly collected and obtained from the museums mentioned below. The specimens of the genus from Turkey and of the two species from India found in the Ege University, İzmir are studied by following the new concepts created by Davidova and Štys (1980) and some new morphological characters of the species of Turkey and two of Indian species were given and identification keys based on somatic characters and male genitalia were provided.

MATERIALS AND METHODS

The specimens of *Coptosoma* sp. were obtained from the Museums of the Department of Plant Protection, Agriculture faculty, Ege University, Bornova, İzmir and of the Department of Plant Protection, Agriculture faculty, Mustafa Kemal University, Antakya, Hatay.

The photographs were taken from stereo-microscope and light-microscope by aid of digital camera.

The abbreviations of Davidova and Štys (1980) used in the text are follows: L = Length, W = Width (all in millimeters), MD = mandibular plates, Oi = ocular index (minimum interocular distance: maximum width of eye); T_{8,9,10} = tergum 8,9,10 respectively (the latter two longitudinally subdivided); V₇ = ventrite 7; 1 VLF = first valvifer; VLTG₉ = ventral laterotergite 9; au = auricle of the posterior opening; cd = central depression; dla = dorsolateral angle; dm = dorsal margin; lm = lateral margin; p = paramere; pg = proctiger; sdk = subdorsal keel, ti = transverse impression; vd = ventral depression; vm = ventral margin; vt = ventral tubercle. The others created by us are: OOL = distance between ocellus and eye; a = distance between reaching point of T₁₀ to VLTG₉ and anterior corner of VLTG₉; b = maximum length of VLTG₉; c = distance between ocelli; d = depth of pronotum.

Descriptions of pygophores of some species stated in the text were taken from Davidova and Štys (1980).

***Coptosoma* sp. (Laporte, 1832)**

Synonyms are given by Davidova and Štys (1980) as follows:

Coptosoma (Laporte, 1832): 73. Type species: *Cimex globus* Fabricius, 1794 = *Cimex scutellatus* Geoffroy, 1785 = *Coptosoma scutellatum*.

Number of the species: 328 species (37 Palaearctic, 78 Afrotropical, 172 Oriental and 41 Australasian (Davidova and Štys, 1980).

Identification Key for the Species of *Coptosoma* (Hemiptera: Plataspidae) from Turkey and Two from India

- 1-Body with a pale yellow band on dorso-lateral margin (India) (Fig. 8A, 9B).....2
 --Body without pale yellow band dorso-laterally (Turkey) (Fig. 1A, 4A).....3
 2-Pronotum with anterior margin medially black (Fig. 8C); antennae with 3rd segment thick, almost 2.5 x as long as broad (8D).....*C. indicum*
 -- Pronotum with anterior margin medially pale yellow (Fig. 9B); antennae with 3rd segment elongate, about 4-5 x as long as broad (Fig. 9C).....*C. noualhier*
 3- Base of scutellum with two large yellowish-red symmetrical spots (3A and B).....4
 --Base of scutellum without pale spots, wholly black (Fig. 1A).....6
 4-Anteclypeus shorter than MD, its apex enclosed by apices of MD (Fig. 3B); external margin of MD with distinct of antero-lateral angles, their latero-proximal and mesal margins of MD parallel-sided, anterior margins of head markedly upturned.....*C. putoni*
 --Anteclypeus at least slightly longer than MD, its apex free (Fig. 4D); External margin of MD without any indication of antero-lateral angles, simply arcuate5
 5- Ground color mainly black (Fig. 4A, B); external margin of MD having lateral and mesal margins markedly convergent (Fig. 4D); OOL 2.33 x diameter of ocellus and 1.8x width of eye; L: 3.60-3.81; W: 3.10-3.38 mm.....*C. maurum seidenstueckeri*
 -- Ground color mainly reddish brown (Fig. 5A); external margin of MD having lateral and mesal margins markedly upturned (Fig. 5B); OOL 1.25 x diameter of ocellus and half of width of eye; L: 3.00; W: 2.5 mm.....*C. oenderi* n.sp.
 6-Anteclypeus shorter than MD, its apex enclosed by apices of MD (Fig. 6C); MD dilated and their latero-proximal margins of MD parallel-sided ($\sigma\sigma$), or moderately rounded and their latero-proximal margins slightly convergent ($\text{♀}\text{♀}$) anterior and lateral margins of head tickened and upturned.....*C. costale*
 -- Anteclypeus only slightly shorter to longer than MD, its apex free (Fig. 1D and 7B); MD not dilated, their external margins rounded, without antero-lateral angles, strongly convergent, hence head rounded; anterior and lateral margins of head thickened but not upturned7
 7-Scutellum with posterior margin triangular (Fig. 7A); OOL 0.33x width of eye.....*C. lodosi* n. sp.
 -- Scutellum with posterior margin circular (Fig. 6A and B); OOL at least 0.45x width of eye.....8
 8- $\sigma\sigma$: posterior part of scutellum in dorsal view subtruncate, with conspicuous yellow pilosity (Fig. 1C); sculpture of posterior and antero-lateral parts of scutellum ($\sigma\sigma, \text{♀}\text{♀}$): alveoles deeper, coarse, more closely situated (interalveolar distance about 2-3 times as long as alveolar diameter), cuticle between alveoles rugose (Fig. 1B).....*C. mucronatum*
 -- $\sigma\sigma$: posterior part of scutellum in dorsal view rounded, almost bare (Fig. 2C and D); sculpture of posterior and antero-lateral parts of scutellum ($\sigma\sigma, \text{♀}\text{♀}$): alveoles shallow, finer, situated more apart (interalveolar distance about 4 times as long as alveolar diameter), cuticle between alveoles smooth (Fig. 2B).....*C. scutellatum*

Key to Males, Based on the Structure of the Pygophore of the Species of Turkey

(male of *lodosi* n.sp. is unknown; mainly taken from the keys of Davidova and Štys (1980))

- 1-Subdorsal keel with one continuous, long to short group of hairs (Fig. 1J-L); paramers axe-shaped (Fig. 1N-P) or broadly hockey-stick-shaped2
 --Group of hairs on subdorsal keel subdivided into two parts by medial bare area (Fig. 3F); paramers broadly hockey-stick-shaped (Fig. 3H-K).....4
 2-Dorsal margin of posterior facies (Fig. 1J and K) steeply rising towards medial tubercle, which having

a short, narrow clusters of long, stiff, yellow hairs. Ventral tubercle small, ventrally with conspicuous, fine yellow hairs. Dorsal edges of auricles of posterior opening not bifurcate. Ventral edge of posterior opening thickened, elevated, without ventral plate; paramers axe-shaped*C. mucronatum*
 --Dorsal margin of posterior facies rounded, without tubercle (Fig. 2J-L); group of hairs on subdorsal keel long. Ventral tubercle large, ventrally with inconspicuously pilose. Dorsal edges of auricles of posterior opening bifurcate. Ventral edge of posterior opening not thickened and not elevated, with ventral plate; paramers axe-shaped or broadly hockey-stick-shaped3
 3- Groups of hair on subdorsal keel shorter, hairs longer, finer, denser and equally long (Fig. 2J and K). Transverse impression absent; cuticle above the ventral depression without conspicuous pilosity. Dorsal margin of central depression close to posterior opening. Ventral depression and tubercle absent; paramers axe-shaped (Fig. 2H-K).....*C. scutellatum*
 --Groups of hair on subdorsal keel longer, hairs shorter, stiff, sparser and medially shorter (Fig. 4F). Transverse impression present; conspicuous transverse group of hairs developed dorsal to it. Dorsal margin of central depression widely separated from posterior opening by wrinkled area. Ventral depression and tubercle present; paramers broadly hockey-stick-shaped (Fig. 27 C of Davidova and Štys (1980)*C. maurum seidenstückeri*
 4- Groups of hair on subdorsal keel longer, reached to dorsolateral angle (Fig. 5E and F); ventral angles of central depression not reaching lateral margin; transverse impression almost absent; ventral depression indistinct; ventral tubercle broad, its apical pointed*C. oenderi* n.sp.
 --Groups of hair on subdorsal keel shorter, not reached to lateral corners (Fig. 3F and 6E); ventral angles of central depression merging with lateral margin; transverse impression distinct.....5
 5-Central depression only dorsally sharply delimited, transverse impression close to its dorsal margin (Fig. 3F). Ventral depression not conspicuously wrinkled, ventral tubercle small, broad. Auricles of posterior opening large. Upper margin of ventral plate deeply sinuate.....*C. putoni*
 -- Central depression sharply delimited all around, far apart from transverse impression (Fig. 6E). Ventral depression markedly wrinkled, ventral tubercle broad, sharply pointed. Auricles of posterior opening small. Upper margin of ventral plate straight.....*C. costale*

***Coptosoma mucronatum* (Seidenstücker, 1963)**

Material examined: Type material: Paratypes: 1 ♂, Turkey:

Other material: Hadim, Konya, 4.7.80, *Alhagi*, (10 ♀♀, 13 ♂♂), Gülnar, Mersin, 25.05.84, Y-7 (2 ♀♀, 2 ♂♂), Eğridir, Isparta, 9.7.63, Y.ot (4 ♀♀, 3 ♂♂), Nurhak, Kahramanmaraş, D. 23.07.84, *Ononis* (3 ♀♀, 2 ♂♂), Göksun, Kahramanmaraş, 12.6.85, *Ononis* (1 ♀, 1 ♂), Gediz, Kütahya, 12.06.75, *Echinops* (1 ♀, 1 ♂)

Distribution: Turkey, European part of the USSR, Kazakhstan, Bulgaria, Hungary, Czechoslovakia, Slovakia.

Description (taken from Davidova and Štys (1980), but the figures are original)

Measurements: Males (N = 20): total L 3.0-3.62 (M = 3.2); L without head 2.8-3.2 (M = 3.0); max. W 2.7-3.29 (M = 2.9); head, L 0.65-0.78 (M = 0.71); head, max. W 1.05-1.15 (M = 1.10). Ocular index (N = 15) 2.73-3.15 (M = 3.00).

Females (N = 20): total L 3.6-4.2 (M = 3.8); L without head 3.1-3.7 (M = 3.4); max. W 2.9-3.2 (M = 3.0); head, L 0.65-0.78 (M = 0.72); head, max. W 1.09-1.18 (M = 1.13). Ocular index (N = 15) 2.75-3.17 (M = 2.97).

Ground colour: black (rarely with a slight indication of violet luster) (Fig. 1A)

Head (Fig. 1D). Shape and sculpture: Of the rounded type; external margins of MD evenly accurate. Anteclypeus about as long as MD, its apex free, pilose, laterally markedly overlapped by MD.

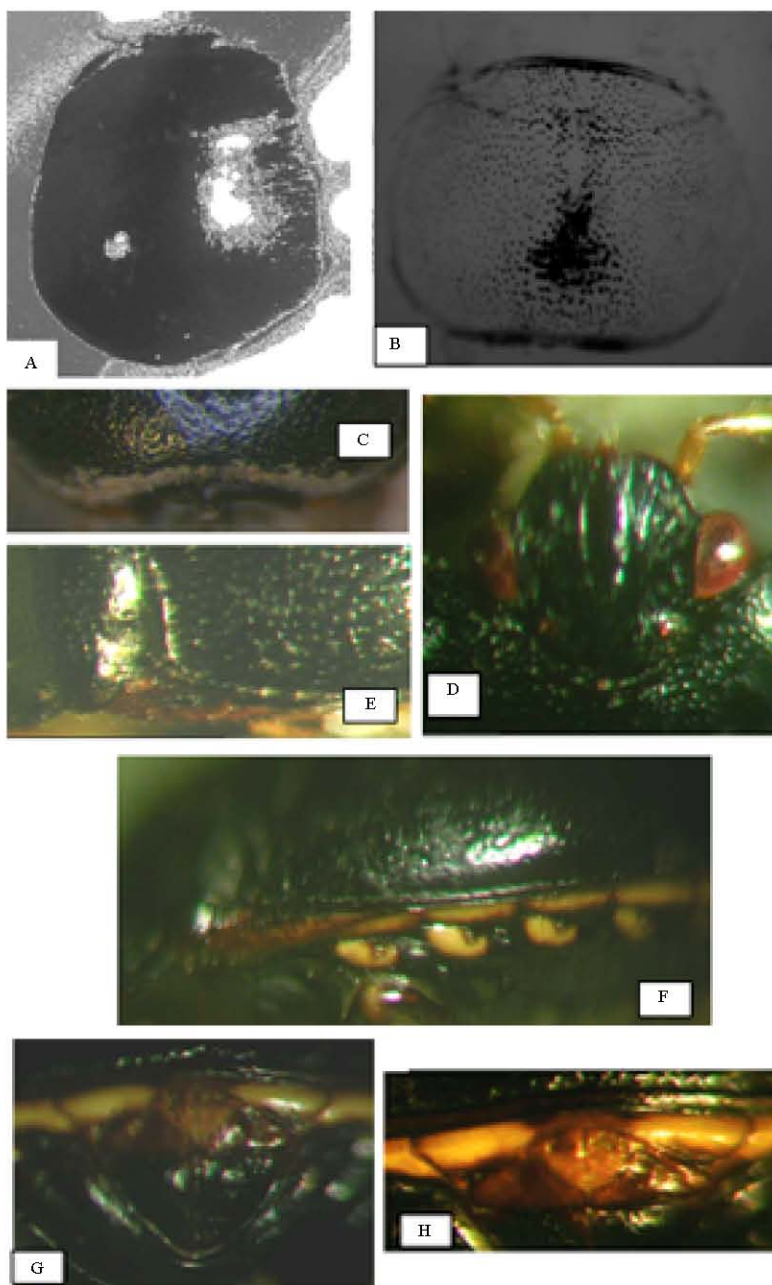


Fig. 1: *Coptosoma mucronatum* Seidenstücker
A: general appearance; B: scutellum; C: Posterior margin of scutellum, male; D: head in frontal view; E: base of forewing; F: connexivum and spiracular callosities; G-I: female terminalia, E: general appearance, H: upper region

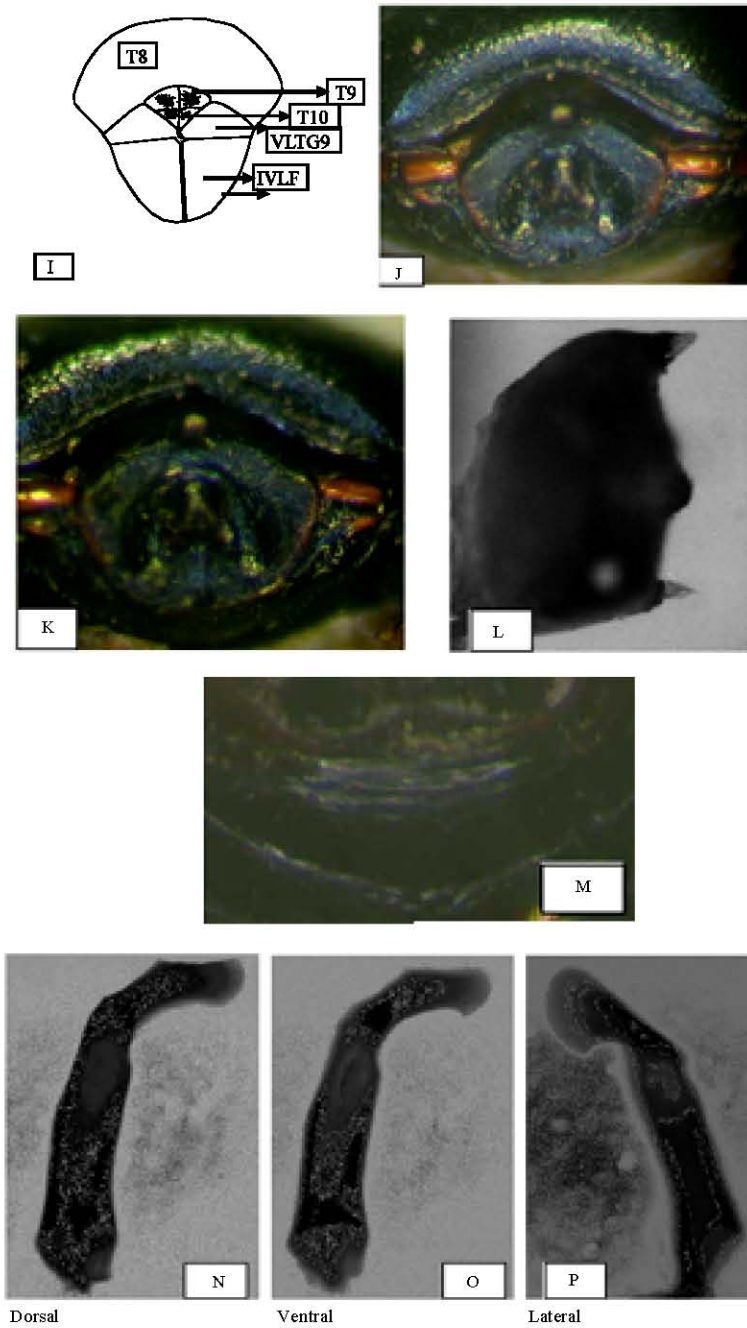


Fig. 1: *Coptosoma mucronatum* Seidenstücker
 I: scheme showing the terminology; J-L: male, J: detail of posterior margin of scutellum and pygophore; K: pygophore, posterior facies, L: same, in lateral view, M: V7; N-P: parameres, views as indicated

Anterior margin of head rounded. Anterior and lateral margins of MD broadly rounded, not raised, not widened in front of eyes. Ocular index 2.73-3.17.

Coloration. All black, exceptionally apices of MD and apex of anteclypeus slightly brownish.

Antennae. Segments 1, 2 and proximal 2/3 of 3 pale brownish, rest brown-black.

Labium reaching usually middle of abdominal ventrite 3.

Pronotum. Humeral tubercles sharp, conspicuous. Cuticle mesad of lateral intramarginal areas rugulose and markedly coarsely alveolized, usually black as the rest of pronotum, rarely brownish.

Scutellum (Fig. 1B). Posterolateral angles (dorsal view) not well marked, but general outline subtruncate. Posterior margin in ♂ (posterior view) deeply excavated, with dense, long, stiff, pale hairs (Fig. 1C). Detailed shape posterior (Fig. 1J) margins as illustrated.

Alveolization sparsest in central part of disc, denser laterad; densest on posterior part and anterolaterally-here (Fig. 1B) alveoles deeper than in *C. scutellatum*, coarse, interalveolar distance about 2-3 times larger than alveolar diameter and cuticle among alveoles (in ♂♂ in posterior part only) rugose. Few individuals with slightly brownish lateral and posterior margins.

Forewing (Fig. 1E). Coloration as illustrated. Alveoles slightly darker than surroundings. Almost no contrast between individual parts, fractures distinguishable by structure only.

Connexivum (Fig. 1F). Dark inter-segmental lines present. Ventral margin sharply impressed and markedly sinuate. Lateral edge with more (♂♂) or less (♀♀) distinct, well marked darker keel on segments 3-7 in ♂♂, 3-6 in ♀♀; both dorsal and ventral surfaces moderately convex. Only central part of each segment yellow; dorsally (sometimes only) and ventrally with broad dark brown to black strip, inter-segmental lines brown.

Spiracular callosities (Fig. 1F). Conspicuous; shape as illustrated. Pre-spiracular sector all pale yellow, the pale region reaching below and behind spiracle (extent larger in ♀♀ than in ♂♂); post-spiracular sector all dark, sometimes with small paler spots. Dark regions mostly black, sometimes dark to pale brown.

Sculpture of ventrites. Alveoles fine, dispersed. Wrinkles on anterior segments fine and sparse, missing on posterior segments.

Female terminalia (Fig. 1G-I). Shape: 1 VLF narrow, considerably longer than wide. Mesal margin of VLTG₉ short, posterior margin steeply arcuately rising towards rounded posterolateral angle, lateral margin then abruptly sloping towards acutangular anterolateral angle. T₁₀ large, its lateral angle reaching posterolateral angle of VLTG₉. Each hemitergite of T₉ almost triangular, its upper margin strongly convex, with semi-elliptical impressions delimited by ridges.

Sculpture: 1 VLF longitudinally rugulose; VLTG₉ smooth, with slightly indicated rugae; T₁₀ finely granulose; T₉ laterally smooth, mesally granulose.

Pilosity: T₉ and medial part of VLTG₉ with distinct, short, pale pilosity. Also 1 VLF finely and sparsely pilose along its mesal margin.

Coloration: 1 VLF black-brown; VLTG₉ pale brown; T₁₀ yellow-brown; lateral parts and ridges of T₉ pale brown, impressions black-brown.

Pygophore (Fig. 1J-L), posterior facies. Shape, sculpture and pilosity: Dorsolateral angles pronounced. Dorsal margin steeply rising mesad to a medial, rather sharp tubercle. Subdorsal keel sharp and conspicuous, with a short medial cluster of long, dense, yellow hairs exceeding the tubercle. Transverse impression absent. Central depression rather larger, sharply delimited all around. Ventral depression small, shallow; ventral tubercle small, low; both conspicuously pilose.

Posterior opening long and narrow; its dorsal edge rounded, lateral edges slightly incurved into the opening. Auricles large; their dorsal edges simple and almost straight; lateral outlines also almost straight. Ventral edge of posterior opening strikingly thickened and medially incurved into the opening, without ventral plate. V₇ with anterior margin medially triangular

Coloration: Pygophore unicolorous, black.

Parameres (Fig. 1N-P) as illustrated. Hypophysis longer than that of *C. scutellatum*, narrowed distad of its base, then strongly widening, apex broadly rounded; outline of hypophysis axe-shaped. Group of hairs (8-10) narrow, situated between peduncle and hypophysis and perpendicular to the former.

Comments: OOL 1.5x diameter of ocellus and 2.33-2.5x width of eye. Maximum length of VLTG₉ 2.5x distance between reaching point of lateral angle of T₁₀ to anterior margin of VLTG₉ and anterolateral angle of VLTG₉, T₉ as long as T₁₀. Hypophysis dorsally with a tooth. V₇ with posterior margin having a hollow medially.

***Coptosoma scutellatum* (Geoffroy, 1785)**

Davidova and Štys (1980) gave detailed information about the specimens collected by several authors from different parts of Turkey and distributions as Turkey, Cyprus, Lebanon and Syria.

Material examined: Kahramanmaraş, 1♀, 11.6.1985, Yonca, Gavurdağı, B-9, 3♀♀, 8.6.85, Göksun, 11♀♀, 4♂♂, Y. ot, 22.07.1984, 1♀, 12.06.1985, Y. ot, Elbistan, 1♀, 22.07.1984, Y. ot, Çamlıyayla, Mersin, 2♀♀, 1♂, 10.07.86 Y. ot, Özmal, Artvin, 1♀, 1♂, 800 m, 25.8.69, Y. ot, Zonguldak, 2♀♀, 1♂, 16.7.79 Y. ot, Ulus, 3♀♀ 17.7.79, Y. ot, Ereğli, 4♀♀, 1♂ 16.7.79 Y. ot, Samsun, 6♀♀, 3♂♂, 14.6.1977, Trifolium, Y. ot, Gülhisar, Burdur, 1♀, 8.8.1975 Y. ot, Çankırı 1♀, 4.8.79, Y. ot, Mersin, Güzelolluk 2♀♀, 6.7.86, Leguminosae, Cehennemdere, 1♀, 9.7.1986, *Onobrychis oxydole*, Hatay, Yayladağ, 1♀, 1.6.85, Istanca, 1♀, 2♂♂, Meşe, Küre, Kastamonu, 30.5.67 Y. ot (1♂), Çorum 6.6.73, Y. ot, (1♂), Dursunbey, Balıkesir, 13.7.72, Papatya, (1♂), Saimbeyli, Adana, 11.7.86, Vicia, (1♂), Tekirdağ, 28.6.72, Y. ot (1♂), Kumru, Ordu, 13.7.78, Y. ot, (1♂), Borçka, Artvin, 10.8.85, Y. ot, (1♂), Şebinkara Hisar, Giresun, 12.7.78, Y. ot, (1♂), Dalmatia Milna, Serbia, 29.6.1977, 3 ♀♀, 1♂).

Description: Similar to *mucronatum* excepts as follows: most of the discriminating characters have been correctly pointed out by Seidenstücker (1963) and by Davidova and Štys (1980).

Head with OOL 1.83x diameter of ocellus and about 0.5x width of eye. Ocular index 3.0.

Pronotum. Humeral tubercles narrow, conspicuous.

Scutellum (Fig. 2A): Posterolateral angles (dorsal view) well marked, but general outline subtruncate. Posterior margin in ♂ (posterior view) medium-deep excavated, with sparse and short, detailed shape of posterior margins (Fig. 2C and D) as illustrated.

Alveoles spars on disc, denser laterad; alveoles in anterolateral and posterior parts shallow, interalveolar distance about 4 times larger than alveolar diameter.

Spiracular callosities (Fig. 2B): Conspicuous; shape as illustrated. Prespiracular sector and anterior part of postspiracular sector yellow, with narrow brown bordering; coloration post-spiracular sector variable.

Female terminalia (Fig. 2C). Shape: 1 VLF 1.14x as long as wide. Max. length of VLTG₉ 5x distance between reaching point of lateral angle of T₁₀ to anterior margin of VLTG₉ and anterolateral angle of VLTG₉, T₉ 1.25x length of T₁₀. V₇ with a hollow medially close to anterior margin.

Sculpture: 1 VLF posterior with fine wrinkles; T₁₀ coarsely granulose;

Coloration: 1 VLF and VLTG₉ black-brown

Pygophore (Fig. 2G, J-L), posterior facies. Shape, sculpture and pilosity (Davidova and Štys, 1980): Dorsolateral angles only slightly distinct. Subdorsal keel sharp and conspicuous, with continuous dense row of fine, rather long, yellow hairs. Transverse impression absent. Central depression rather narrow, except for dorsolateral sectors sharply delimited. Ventral depression inconspicuous; ventral tubercle small; both conspicuously pilose.

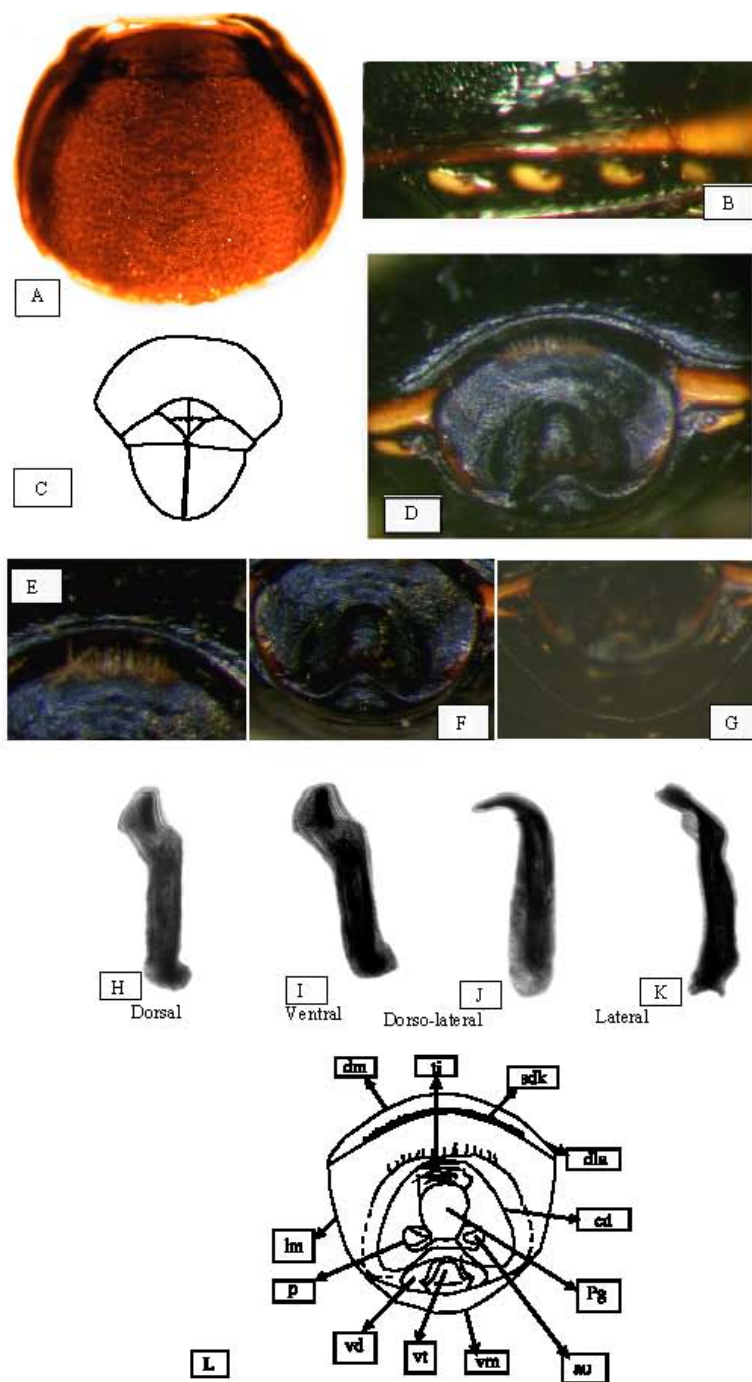


Fig. 2: *Coptosoma scutellatum* (Geoffroy)
 A: scutellum; B: spiracular callosities; C: Female terminalia; D-F: pygophore, D: posterior
 facies; E: upper margin; F: lower part; G: V7; H-L: parameres, views as indicated

Posterior opening large; its dorsal edge rounded lateral edges moderately incurved into the opening. Auricles rather large; their dorsal edges only slightly dorsolaterally directed dorsal edges bifurcate; their lateral outlines rounded. Ventral edge of posterior opening medially disappearing, but ventral plate clearly separated, rather small, with moderately sinuate upper margin. V_7 with anterior margin rounded (Fig. 2G).

Coloration: Pygophore unicolorous, brown- black.

Parameres (Fig. 2H-K) as illustrated. Hypophysis shorter than that of *C. mucronatum*, narrowed distad of its base, then strongly widening, apex broadly rounded; outline of hypophysis axe-shaped.

Comments: Davidova and Štys (1980) stated that ventral depression and tubercle absent on pygophore, but the specimens examined with inconspicuous ventral depression and a distinct small tubercle.

***Coptosoma putoni* (Montandon, 1898)**

Davidova and Štys (1980) gave detailed information about the specimens collected by several authors from several parts of Turkey and distributions stated as Turkey.

Material examined: 2 ♀♀ 6 ♂♂, Aslanlıköy, Hilvan, Diyarbakır, 05.05.2006., *Onobrychis sativa* (Lam.), 21 ♀♀ 12 ♂♂, Maden, Niğde, 06.06. 2006, *Hedysarum varium* Willd.

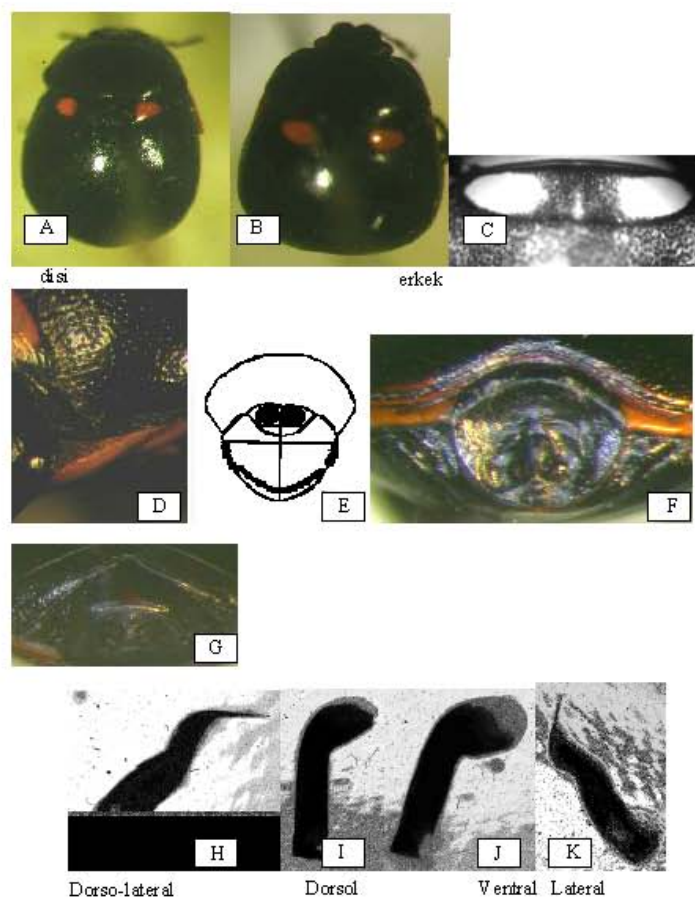


Fig. 3: *Coptosoma putoni* Montandon

A-B: general appearance, A. female, B. male; C. scutellum, anterior part; D. base of forewing; E. female terminalia; F. pygophore, posterior facies; G. V_7 ; H-K. parameres, views as indicated

Description: Davidova and Štys (1980) gave a very good description for male and female. Some additional characters as follows:

Body as seen in (Fig. 3A and B). Head with OOL 2x diameter of ocellus and 0.66x width of eye. Alveoles of pronotum dense with some rugose between alveoles (Fig. 3C), proximal spots almost smooth, with fine pale yellow hairs. Forewing coloration as illustrated (Fig. 3D).

Female terminalia (Fig. 3E): 1 VLF about as long as wide. Max. length of VLTG₉, 4.6x distance between reaching point of lateral angle of T₁₀ to anterior margin of VLTG₉, and anterolateral angle of VLTG₉, T₉ 1.8x length of T₁₀. V₇ with a shallow hollow medially close to posterior margin.

Pygophore (Fig. 3F), posterior facies. Shape, sculpture and pilosity (Davidova and Štys 1980): Dorsolateral angles distinct. Subdorsal keel conspicuous, with two brushes of short, stiff, sparse, pale hairs separated by smooth surface. Transverse impression accurate, long, close to central depression. Central depression rather large, only dorsally sharply delimited, connected with non-depressed regions by rugose areas on other sides; area between its dorsal margin and dorsal edge of posterior opening densely transversely wrinkled. Ventral depression small, shallowly wrinkled; ventral tubercle small, wide; both conspicuously pilose. Posterior opening large; its dorsal edge rounded, lateral edges only insignificantly incurving into the opening. Auricles large; their dorsal edges bifurcate, markedly directed dorsad; their lateral outlines almost straight. Ventral edge of posterior opening gradually disappearing mesad, with clearly demarcated large ventral plate deeply sinuate upper margin. V₇ with anterior margin triangular (Fig. 3G).

Parameres (Fig. 3H-K) as illustrated. Hypophysis apex rounded, about half length of peduncle.

***Coptosoma maurum seidenstueckeri* (Davidova and Štys, 1980)**

The synonyms were stated by Davidova and Štys (1980) as follows: *Coptosoma maurum*, partim: Seidenstücker, 1960:145 (host plants, records from Çiftelhan, Belen), *C. maurum*: Seidenstücker, 1963:159 (Host plant)

Material examined: Davidova and Štys (1980) selected the type series from Belen, Hatay and from Ulukışla, Niğde collected by Seidenstücker. Our materials are: 1♂, Karatepe, Kadirli, Adana, 1♀, Gülnar, Mersin, 24.05. 1984, leg. Y-S., 1♀, Belen, Antakya, 12-15.05. 1958, leg. G. Seidenstücker, det. Seidenstücker, 72.

Distribution: Turkey

Description: Davidova and Štys (1980) gave a very good description for male and female. Some additional characters as follows: Body in dorsal view as seen in Fig. 4A and B and ventral view as Fig. 4C. Head (Fig. 4D) with OOL 2.33x diameter of ocellus and 0.54x width of eye. Alveoles of pronotum dense, proximal spots smooth, with fine pale yellow hairs. Forewing coloration as illustrated (Fig. 4E).

Female terminalia similar that of *C. putoni*, except as follows: Max. length of VLTG₉, 5x distance between reaching point of lateral angle of T₁₀ to anterior margin of VLTG₉, and anterolateral angle of VLTG₉, T₉ 1.5x length of T₁₀. V₇ without hollow.

Pygophore (Fig. 4F), posterior facies. Shape, sculpture and pilosity (Davidova and Štys, 1980): Dorsolateral angles distinct. Subdorsal keel (Fig. 4G) pronounced, with thin, continuous brush of short (still shorter medially), stiff, sparse setae. Transverse impression arcuate, rather short; a row of longer, finer, paler hairs situated above the impression. Central depression narrow, sharply delimited all around; a densely transversely wrinkled area situated between dorsal margin of central depression and posterior opening. Ventral depression rather large and deep, wrinkled; ventral tubercle (Fig. 4H) large and broad. Posterior opening rather large; its dorsal edge rounded lateral edges moderately incurved into the opening and with very short bifurcation. Auricles large; their dorsal edges bifurcate, convex and markedly directed dorsolaterad; their lateral edges double margined; their lateral outlines convex. Ventral edge of posterior opening medially disappearing, with sharply delimited, rather large ventral plate with slightly sinuate upper margin. V₇ with anterior margin triangular (Fig. 4H).

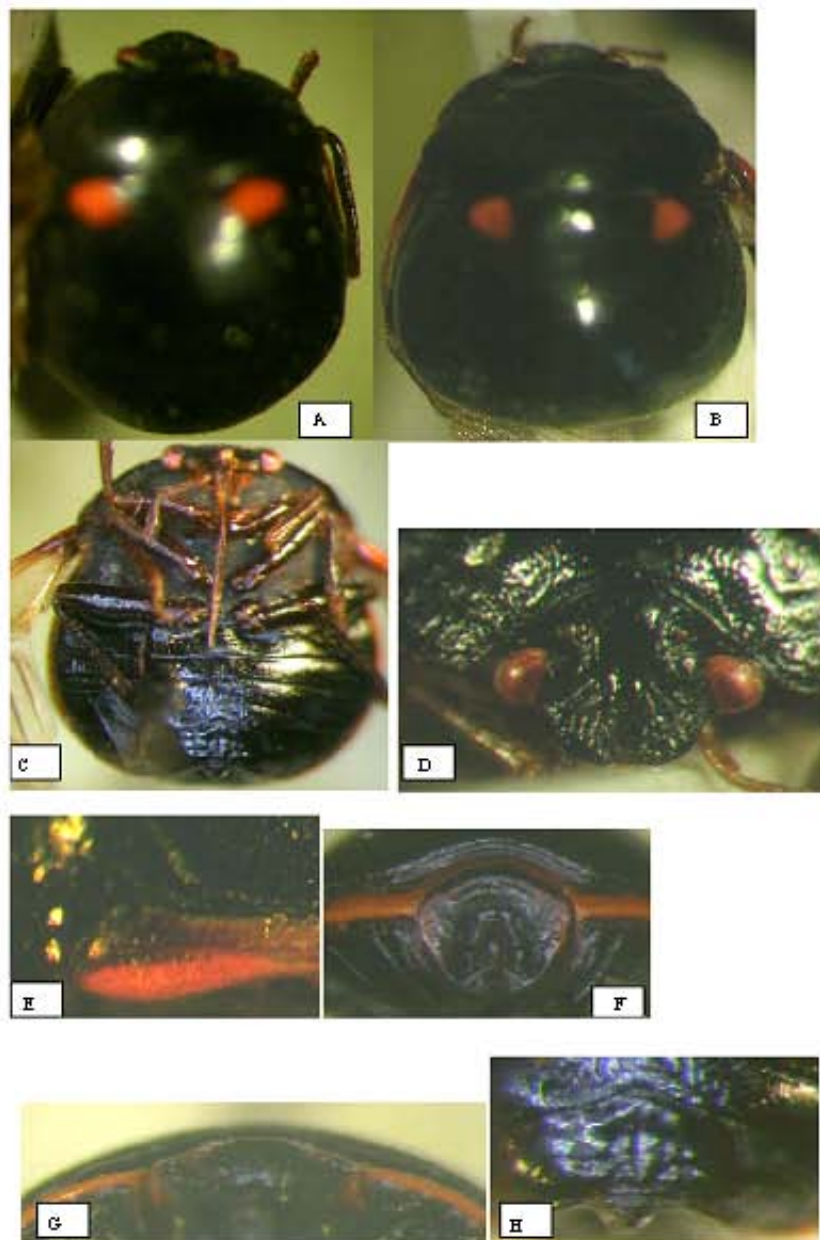


Fig. 4: *Coptosoma maurum seidenstueckeri*, Davidova and Štys
A-B: general appearance, A: female, B: male; C: body, in ventral view; D: head in frontal view;
E: base of forewing; F: detail of posterior margin of scutellum and pygophore, posterior
facies; G: pygophore upper part; H: V7

***Coptosoma oenderi* n. sp.**

Material examined: Holotype, ♂. Turkey (Anatolia): Avanos, Nevşehir, 26.06. 1980, leg. Y. Karsavuran, deposited in the Museums of the Department of Plant Protection, Agriculture faculty, Ege University, Izmir.

Distribution: Turkey (Central Anatolia).

Description:

Measurements: Holotype, ♂: total L = 3.0 mm; L without head: 2.7 mm; max. W: 2.5 mm; head, L = 0.6 mm; W = 1.0 mm; ocular index: 3.0.

Body as seen Fig. 5A. Ground colour: brownish-black.

Head (Fig. 5B). Shape and sculpture: the rounded type; external margins of MD accurate, anterolateral angles not indicated. Anteclypeus about as long as MD, its apex free, pilose, laterally markedly overlapped by MD. Anterior margin of head obtusangular, but broadly rounded. Anterior and lateral margins of MD broadly rounded, interiorly raised, not widened in front of eyes. OOL 1.25x diameter of ocellus and 0.5x width of eye. Ocular index 3.0.

Coloration: All dark brown, exceptionally apices of MD and apex of anteclypeus reddish.

Antennae. Segments 1-3 dirty yellow, rest pale brown.

Labium reaching usually middle of abdominal ventrite 3.

Pronotum. Humeral tubercles not very conspicuous. Lateral intramarginal areas usually reddish, the rest of pronotum brownish-black.

Scutellum: posterolateral angles (dorsal view) not well marked, but general outline subtruncate. Posterior margin (posterior view) deeply excavated, with dense, long, stiff, pale hairs. Alveoles between proximal spots markedly dense. Proximal spots reddish, without alveoles. Hind margin red.

Forewing (Fig. 5C). Coloration as follow: clavus dark brown, articular sclerit and endocorium brown, exocorium reddish brown. Alveoles slightly darker than surroundings. Connexivum (Fig. 5D). Inter-segmental lines not present. Ventral margin sharply impressed and markedly sinuate. Lateral edge less distinct, well marked darker keel on segments 5-7 both dorsal and ventral surfaces moderately convex.

Spiracular callosities (Fig. 5D). Conspicuous; shape as illustrated. Pre-spiracular sector all red, the red region reaching below and behind spiracle; post-spiracular sector all dark brown around spiracular setae.

Sculpture of ventrites. Alveoles fine, dispersed. Wrinkles on anterior segments fine and sparse, missing on posterior segments.

Pygophore (Fig. 5E and F), posterior view. Shape, sculpture and pilosity: Dorsolateral angles pronounced. Subdorsal keel pronounced, with a thin, continuous dense, yellow hairs, reached to dorsolateral angle, except medially bare. Transverse impression almost absent medially, inconspicuous laterad. Ventral angles of central depression not reaching lateral margin. Ventral depression small, shallow; ventral tubercle small, broad, its apical pointed; both conspicuously pilose. Posterior opening long and narrow; its dorsal edge rounded, lateral edges slightly incurved into the opening. Coloration: Pygophore medially brown, posterior opening and margin reddish brown. V_7 with anterior margin triangular (Fig. 5G).

Diagnosis: *Coptosoma oenderi* is similar to *C. putoni* and *C. maurum seidenstückeri* from which it differs in having smaller, reddish brown body and from *putoni* in having central impression with ventro-lateral margin not conducting lateral margin of facies, in *putoni* body larger, at most brownish black and central impression with ventro-lateral margin distinctly conducting lateral margin of facies; the new species also differs from *m. seidenstückeri* by shape of pygophore having subdorsal keel with two thin brushes of hairs medially separated by smooth area, in *seidenstückeri* subdorsal keel with brushes of hairs not separated medially; *C. oenderi* also differs all of the known species by the characters stated in the keys.

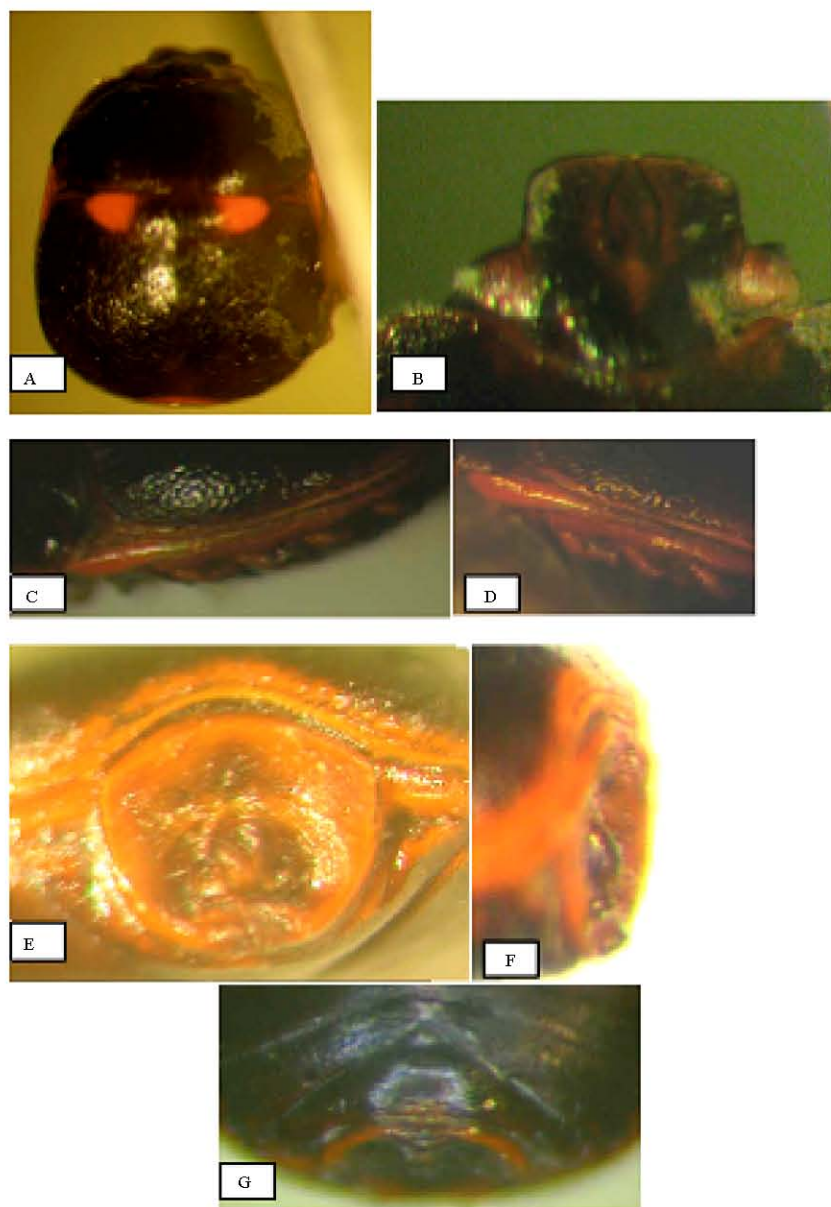


Fig. 5: *Coptosoma oenderi* n.sp.

A: male, general appearance, B: head in frontal view, C: base of forewing, D: connexivum and spiracular callosities, E-F: pygophore, E: posterior facies, F: lateral view, G: V7

***Coptosoma costale* (Stål, 1876)**

Davidova and Štys (1980) gave detailed information about the specimens collected by several authors from several parts of Turkey and distributions as Turkey, Cyprus, Lebanon and Syria.

Material examined: 12 ♀♀ 5 ♂♂, Karatepe, Kadirli, Adana, 07.06.1984, *Onobrychis*, 2 ♀♀ 2 ♂♂, Gülnar, Mersin, 24.05.1984, *Onobrychis*, 2 ♀♀ 1 ♂, Cehennemdere, Mersin, 9.07.1986, *O. oxydoula*, 3 ♀♀ 2 ♂♂, Yayladağ, Hatay, 1.6.85, *Onobrychis*, 2 ♀♀ 2 ♂♂, Güzeloluk, Belen, Hatay, 29.5.85, *O. oxydontha*, 1 ♀, 6.07.1986, Leguminosae, 1 ♀ 2 ♂, Zorkun Yaylasi, Osmaniye, 08.06.1984, *Onobrychis*, 1 ♀, Kahramanmaraş, 11.06.1985, Yonca, 2 ♀♀, Antalya, 11.5.89, Agac,

Description: Davidova and Štys (1980) gave a very good description for male and female. Some additional characters as follows: Body in dorsal view as seen in Fig. 6A and B, Head (Fig. 6C) with

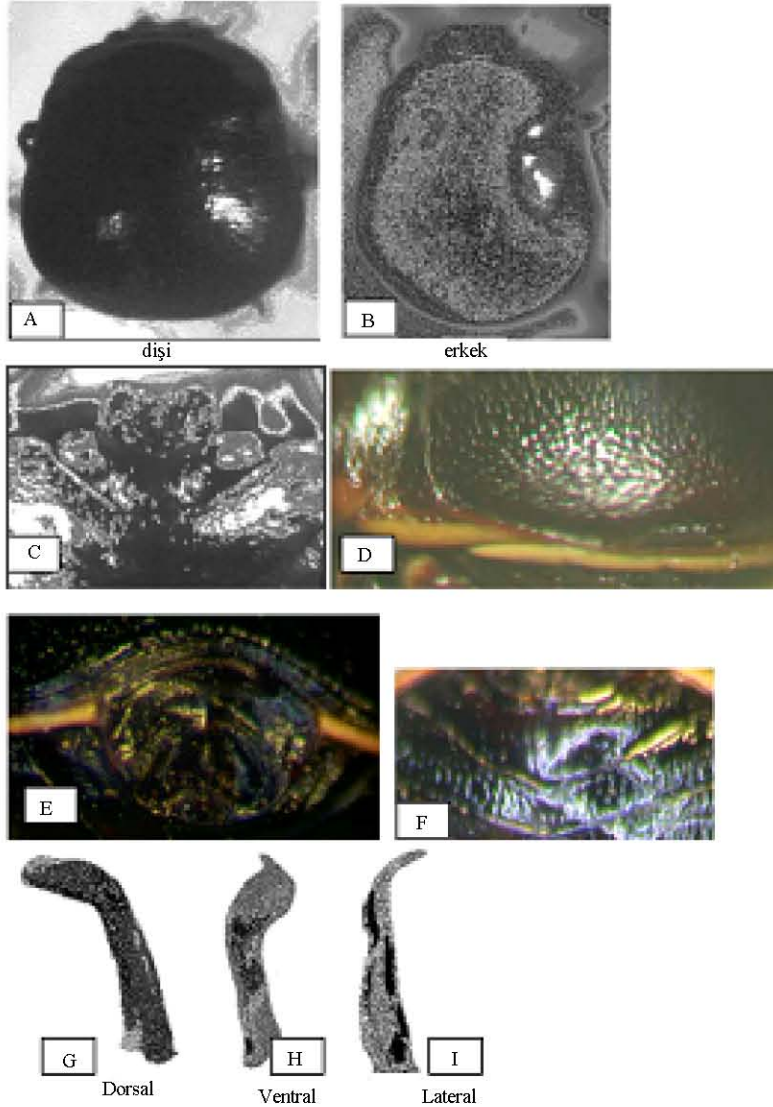


Fig. 6: *Coptosoma costale* Stål

A-B: general appearance, A: female, B: male; C: head in frontal view; D: base of forewing; E: detail of posterior margin of scutellum and pygophore; F: V7; G-I: parameres, views as indicated

OOL 1.16x in♀ and 1.4x in ♀ diameter of ocellus and about half of width of eye. Alveoles of pronotum dense, proximal spots smooth, with fine pale yellow hairs. Forewing coloration as illustrated (Fig. 6D).

Female terminalia similar that of *C. putoni*, except as follows: Max. length of VLTG₉ 6x distance between reaching point of lateral angle of T₁₀ to anterior margin of VLTG₉, and anterolateral angle of VLTG₉, T₉ 1.9x length of T₁₀, V₇ without hollow.

Pygophore (Fig. 6E), posterior facies. Shape, sculpture and pilosity (Davidova and Štys, 1980): Dorsolateral angles distinct. Subdorsal keel pronounced, sharp, with two dense brushes thin, of short and fine hairs medially separated by smooth area. Transverse impression accurate, rather short; a row of longer, finer, paler hairs situated above the impression. Short longitudinal keel running from transverse impression to dorsal edge of posterior opening. Central depression sharply delimited all around, ventrolaterally almost conducting margin posterior facies; Ventral depression small, shallow, wrinkled; ventral tubercle small, sharp, almost smooth; both finely, inconspicuously pilose. Posterior opening rather small; its dorsal edge rounded, moderately pointed, lateral edges distinctly incurved into the opening. Auricles large; their dorsal edges bifurcate, markedly directed dorso-laterad; their lateral outlines moderately rounded. Ventral edge of posterior opening medially disappearing, with clearly delimited ventral plate with slightly straight upper margin. V₇ with anterior margin broadly triangular (Fig. 6F).

Paramers (Fig. 6G-I) as illustrated. Apex of hypophysis rounded.

***Coptosoma lodosi* n.sp.**

Material examined: Holotype, ♂. Turkey (Anatolia): Mazıdağı, Mardin, 5.06. 1976, herb, leg. Y. Karsavuran, deposited in the Museums of the Department of Plant Protection, Agriculture faculty, Ege University, İzmir.

Distribution: Turkey (Southeastern Anatolia).

Description:

Measurements: Holotype, ♀: total L = 4.1 mm; L without head: 3.8 mm; max. W: 3.5 mm; head, L = 0.7 mm; W = 1.2 mm; ocular index: 2.77.

Ground colour: black.

Body as seen Fig. 7A.

Head (Fig. 7B). Shape and sculpture: the rounded type; external margins of MD arcuate, anterolateral angles not indicated. Anteclypeus about as long as MD, its apex free, laterally markedly overlapped by MD. Anterior margin of head obtuse angular, but broadly rounded. Anterior and lateral margins of MD broadly rounded, anteriorly not raised and widened in front of eyes. OOL 1.60x diameter of ocellus and 0.33x width of eye. Ocular index 2.77.

Coloration: All black, exceptionally eyes and ocelli reddish.

Antennae (Fig. 7C). Segments 1- 3 dirty yellow, the others brownish black.

Labium reaching usually middle of abdominal ventrite 4.

Pronotum. Black, Humeral tubercles conspicuous, reddish. d = 0.50 mm.

Scutellum (Fig. 7A). Posterolateral angles in dorsal view not well marked. Posterior margin in dorsal view distinctly V-shaped. Alveoles markedly dense. Proximal spots absent. Hind margin reddish brown.

Forewing (Fig. 7D). Coloration as follow: clavus black, articular sclerit and endocorium dark brown, exocorium reddish brown. Alveoles distinctly darker than surroundings. Connexivum (Fig. 7E). Inter-segmental lines indicated by dark lines. Ventral margin sharply impressed and markedly sinuate.

Spiracular callosities (Fig. 7E). Conspicuous; shape as illustrated. Pre-spiracular sector medially yellow, sides brownish red, the red region reaching below and behind spiracle; post-spiracular sector all dark brown to black.

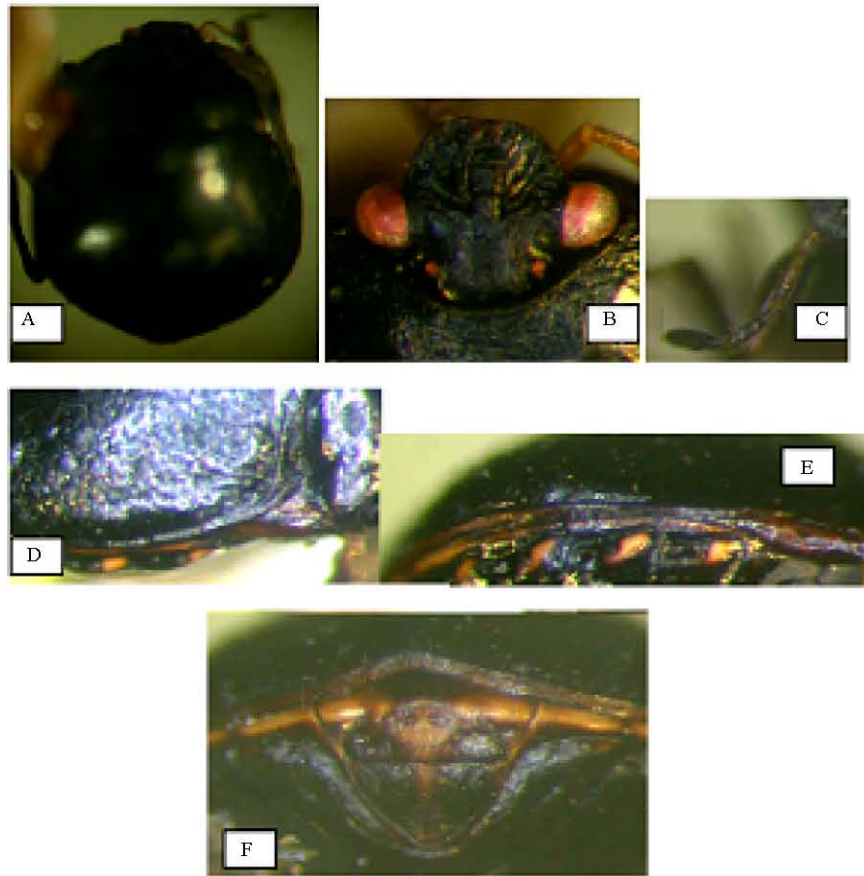


Fig. 7: *Coptosoma lodosi* n.sp. A: general appearance, female, B: head in frontal view; C: antenna; C: base of forewing; D: connexivum and spiracular callosities; E: female terminalia, posterior facies

Sculpture of ventrites. Alveoles fine, dispersed. Wrinkles on anterior segments fine and sparse, missing on posterior segments.

Female terminalia (Fig. 7F). Shape: 1 VLF 1.2x as long as wide. Mesal margin of VLTG₉ short, posterior margin steeply accurately rising towards rounded posterolateral angle, lateral margin then abruptly sloping towards acutangular anterolateral angle. Maximum length of VLTG₉ 2.7x distance between reaching point of lateral angle of T₁₀ to anterior margin of VLTG₉ and anterolateral angle of VLTG₉, T₉ 1.56x length of T₁₀. Each hemitergite of T₁₀ almost triangular, each hemitergite of T₉ with upper margin convex, with semi-elliptical impressions delimited by ridges. V₇ with a hollow anteriorly.

Sculpture: 1 VLF longitudinally rugulose; VLTG₉ with slightly indicated rugae; T₁₀ finely granulose; T₉ laterally smooth, mesally granulose.

Pilosity: T₉ and medial part of VLTG₉ with distinct, short, pale pilosity.

Coloration: 1 VLF black, medially brown; VLTG₉ medially pale brown; T₁₀ yellow, lateral parts and ridges of T₉ pale brown, impressions black-brown.

Diagnosis: *Coptosoma iodosi* is similar to *C. mucronatum* and *C. scutellatum* from which it differs in having posterior margin of scutellum distinctly V-shaped and also by the characters stated in the keys.

***Coptosoma indicum* (Distant, 1892)**

Doripus indicus Distant 1892.

Coptosoma indicum (Distant): Montandon 1896 (New combination).

Distribution: India: Haora (Ulberia), Tandaja.

Material studied: 2 ♀♀, India: Tandaja, 31.10. 1976, leg. M. Ralin, det. by A. A. Khan, 1982.

Description: Female: l = 4.5 mm, w = 4.1-4.2 mm, l without head = 4.1-4.2 mm. Body (Fig. 8A and B) with ground color black having pale yellow band around the whole dorso-lateral margin of body, except anterior margin of pronotum medially black. Head (Fig. 8C) medially black MD yellow, OOL 1.25x diameter of ocellus and 0.42x width of eye; ocular index = 2.45; d = 0.5 mm. Antennae (Fig. 8D) with the first three segments yellow, 4th and 5th testaceous. 3rd segment about twice as long as max width. Scutellum with deep, dense alveoles. Legs yellowish brown. Forewing (Fig. 8E) coloration as illustrated. Convexivum (Fig. 8F) with intersegmental lines absent, uniformly yellow. Spiracular callosities (Fig. 8F): shape as illustrated. Mostly all yellow including double setae, except postspiracular sector narrowly black.

Female terminalia: (Fig. 8G). VLF black, posterior half yellow. Shape: 1 VLF 1.27x as long as wide. Maximum length of VLTG₉, 7x distance between reaching point of lateral angle of T₁₀ to anterior margin of VLTG₉, and anterolateral angle of VLTG₉, T₉ 0.75x length of T₁₀. Each hemitergite of T₁₀ almost triangular, each hemitergite of T₉ with upper margin convex, with semi-elliptical impressions delimited by ridges. Sculpture of ventrites with deep, dense alveoles, almost without wrinkles.

***Coptosoma noulhieri* (Montandon, 1896)**

Material studied: 2 ♀♀, India: Changamanga, 15.06. 1969. Leg. I. Ahmed, host: *R. sumatarian*, det. By A.A. Khan, 1982.

Distribution: India.

Description: Female: l = 6.7 mm, w = 6.0 mm, l without head = 6.2 mm.

Body (Fig. 9A) with ground color black having pale yellow band around the whole dorso-lateral margin of body. Head (Fig. 9B) medially black MD yellow, OOL 1.25x diameter of ocellus and 0.31x width of eye; ocular index = 2.53; d = 0.8 mm. Scutellum with deep, dense alveoles, having hind margin (Fig. 9G) yellow. Legs light brown. Antennae (Fig. 9C) light brown, 3rd segment about 4x as long as max width. Forewing (Fig. 9D) coloration as illustrated. Convexivum (Fig. 9E) with intersegmental lines absent, uniformly yellow. Spiracular callosities (Fig. 9E): shape as illustrated. Mostly all yellow including double setae and postspiracular sector, except surrounding of double setae brown.

Female terminalia (Fig. 9F and G): almost wholly yellow, except VLF medially and anteriorly black Shape: 1 VLF as long as wide. Maximum length of VLTG₉, 6x distance between reaching point of lateral angle of T₁₀ to anterior margin of VLTG₉, and anterolateral angle of VLTG₉, T₉ 2x length of T₁₀. Each hemitergite of T₁₀ almost triangular, each hemitergite of T₉ with upper margin convex, with semi-elliptical impressions delimited by ridges. Sculpture of ventrites with deep, dense alveoles, almost without wrinkles.

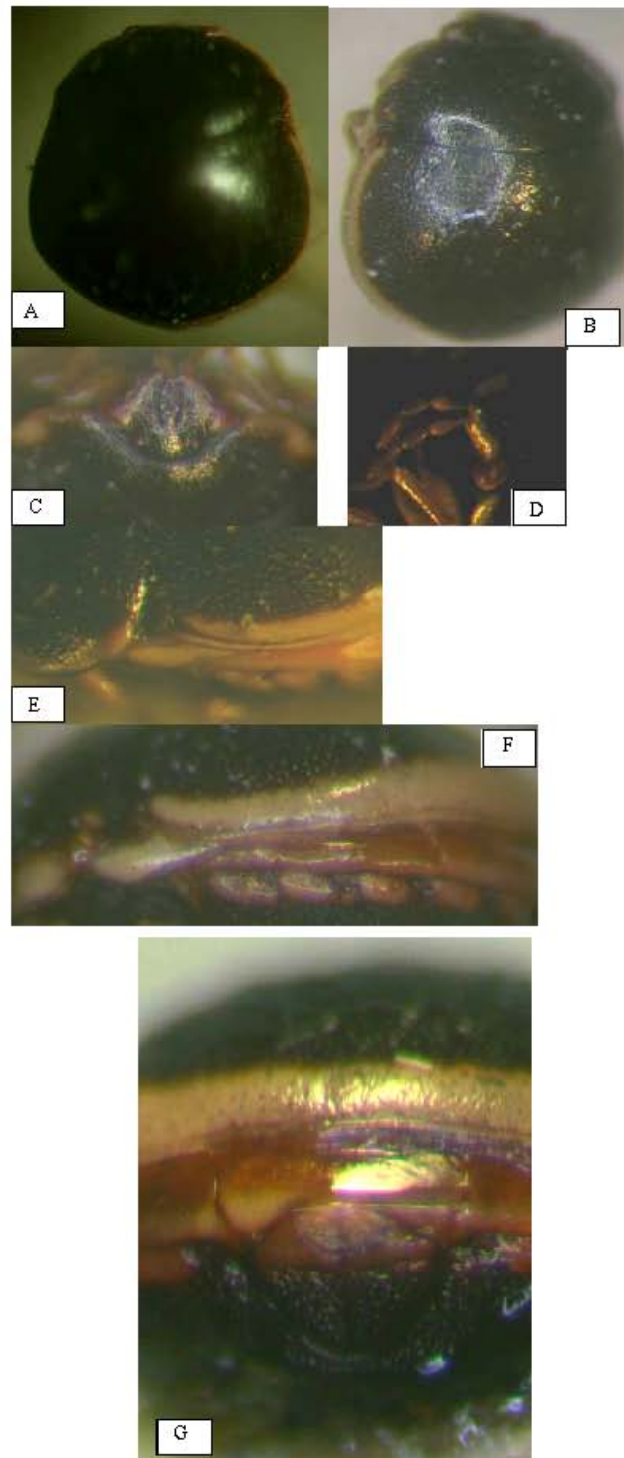


Fig. 8: *Coptosoma indicum* (Distant)

A: general appearance, female, B: body in dorso-lateral view, C: head in frontal view, D: antenna, E: base of forewing, F: connexivum and spiracular callosities, G: female terminalia, posterior facies

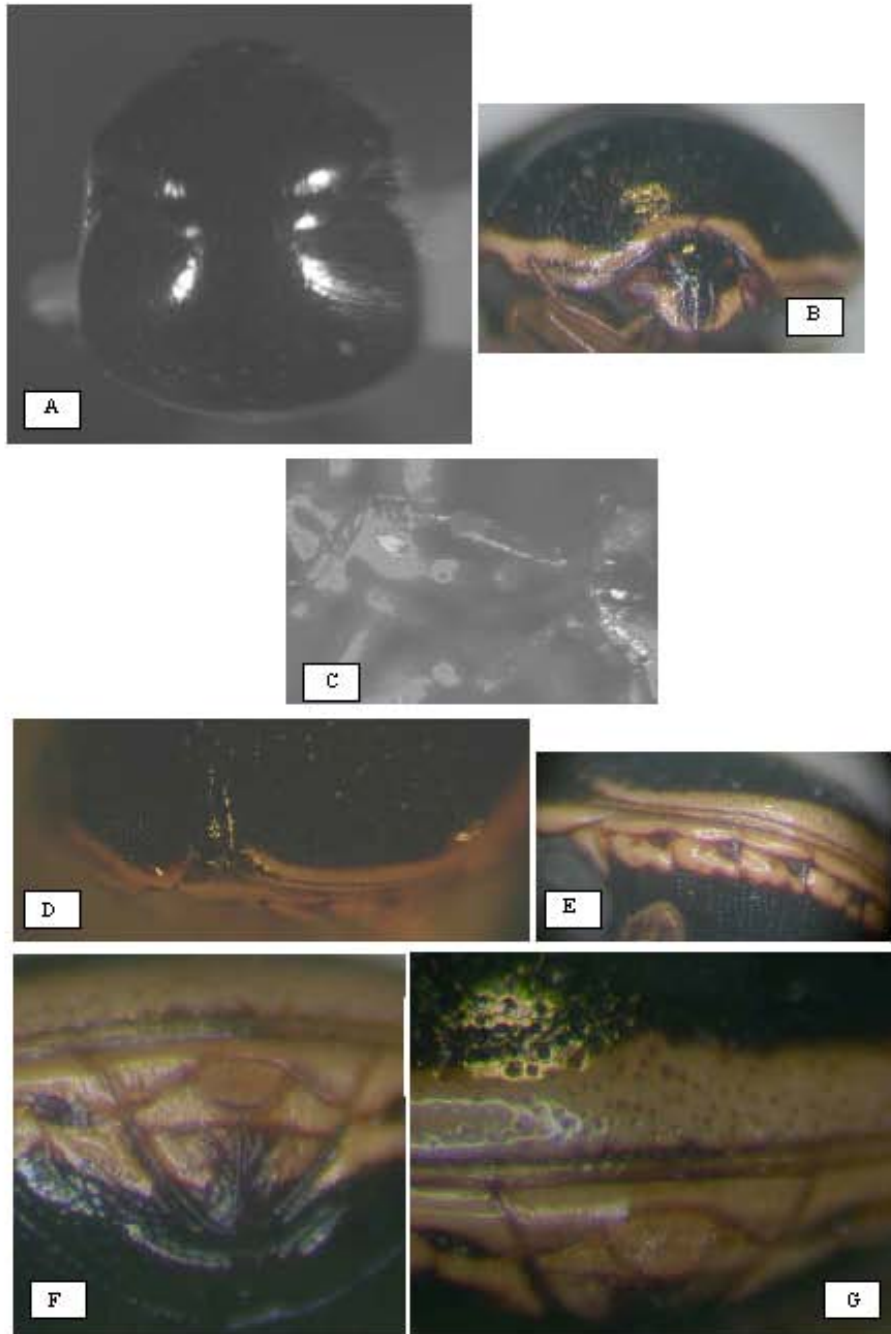


Fig. 9: *Coptosoma noulhieri* Montandon

A: general appearance, female, B: head in frontal view, C: antenna; D: base of forewing, E: connexivum and spiracular callosities, F: female terminalia, posterior facies; G: posterior part of scutellum

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