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Annotated list of the species of the genus *Ceratina* (LATREILLE) occurring in the Near East, with descriptions of new species (Hymenoptera: Apoidea: Xylocopinae)

M. TERZO

A b s t r a c t : 28 species of the genus *Ceratina* are present in the Near East. Eight species and one subspecies are new and completely described. Most of them are compared with similar sympatric species. *Ceratina schwarzi* KOCOUREK 1998 is redescribed. Synonymy, distributions and references for identification are given for all species.

K e y w o r d s . - Hymenoptera, Apoidea, Xylocopinae, *Ceratina*, new species, East Mediterranean region, synonymy, distribution.

Introduction

Ceratina LATREILLE is a cosmopolitan genus of bees belonging to the family Anthophoridae. Small carpenter bees are 3-15 mm in body length, relatively hairless, mostly solitary in behavior, and excavate their nests in the pith of dry stems. The most common subgenus in the Mediterranean region is *Euceratina* HIRASHIMA, MOURE & DALY 1971.

The taxonomy of small carpenter bees has been revised recently by DALY (1983) for North Africa and Iberian Peninsula. TERZO & RASMONT (1993) record the distribution of species occurring in France. But for the East Mediterranean region, the genus *Ceratina* has not been revised since FRIESE's monographs (1896, 1901). However, some new species have been added for this region: *C. cypriaca* MARVOMOUSTAKIS 1954 from Cyprus; *C. zwakhalsi* TERZO & RASMONT 1997 from East Turkey; *C. teunisseni* TERZO 1997 from Crete. TERZO et al.(in press) provide an annotated list of the species occuring in the Çukurova region (Turkey).

The choice of the considered area takes advantage of the large collection of the Oberösterreichisches Landesmuseum of Linz, mostly due to the enormous collection of the late K. Warncke and the late M. Kocourek's collection. The author has studied more than two thousand unidentified small carpenter bees, taken especially in Balkan and East Mediterranean countries and Central Asia. Many specimens were collected in very interesting regions at present almost inaccessible such as the province of Hakkari in Turkey.

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Material and methods

The type specimens studied were mainly from the Oberösterreichisches Landesmuseum of Linz (Austria, OLL) but also from the collections of Pater A.W. Ebmer (Austria: Puchenau, CEP), M. Schwarz (Austria: Ansfelden, CSA), Ing. G. van der Zanden (Netherlands: Eindhoven, CGZ), the Rijkshistorische Museum Leiden (Netherlands, RML), the Zoologische Staatssammlung München (Germany, ZSM) and the Staatliches Museum für Naturkunde Stuttgart (Germany, SMNS).

The distributions are based mainly on original data in numerous European museums and private collections. Data were managed by „Microbanque Faune-Flore software" (RASMONT et al. 1993). The coordinates of localities are in Degrees-minutes as specified in „The Times Atlas of the World" (1993) and the „Geoname Digital Gazetteer" (1995).

Measurements of head width were taken with an ocular micrometer to the nearest 0.014 mm. The legend of those measurements are given in figs 1 to 3 and are inspired by DALY (1973). The descriptions of new species are hierarchic. They exclude the common generic and subgeneric characters given by DALY (1983) and HIRASHIMA (1971).

Annotated list of the species of the genus *Ceratina* (LATREILLE 1802) occurring in the Near East

The determination key of FRIESE (1901) is not sufficient to identify all the species of the Near East and must be supplemented by the following: MAVROMOUSTAKIS (1954), TERZO (1997) and TERZO & RASMONT (1996, 1997).

Some distribution maps and biogeographic considerations are given by TERZO (1997), TERZO & RASMONT (1996, 1997) and TERZO et al. (in press). DALY (1983), TERZO et al (1994) and LE GOFF & TERZO (in press) provide some ethological and ecological considerations.

Subgenus *Ceratina* (LATREILLE 1802)

C. cucurbitina (ROSSI 1972)

Apis cucurbitina ROSSI 1792: 145; [Italy: Etruria]; location of type unknown.

Hylaeus albilabris FABRICIUS 1793: 305; [Barbariae] (coastal North Africa); location of type unknown. Synonymized by GERSTAECKER, 1869: 174.

Ceratina decolorans BRULLÉ 1832: 340. Synonymized by GERSTAECKER 1869: 174. Lectotype ♂ designated by DALY 1983: 40; [Greece: Morée (Div. Peloponnisos)]; Muséum National d'Histoire Naturelle, Paris.

Distribution: all Mediterranean countries but Lybia and Egypt. To the North reaching Germany, the former Czechoslovakia, Roumania and Crymea (Ukraine). To the South-West as far as Agadir (Morocco). To the East reaching East Turkey and along all the East Mediterranean coast. Present in all main Mediterranean islands except Cyprus.

C. parvula SMITH 1854

Ceratina parvula SMITH 1854: 223; ♀; [Albania]; British Museum of Natural History, London. Holotype examined by DALY (1983).

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Ceratina pygmaea LICHTENSTEIN 1872: LXXIII; ♀; [France: Montpellier]; Muséum d'Histoire Naturelle, Geneva. Synonymized by LICHTENSTEIN 1876: 90, confirmed by DALY 1983: 42.
Ceratina scintilla COCKERELL 1931: 351; ♀; [Morocco: Asni]; British Museum of Natural History, London. Synonymized by DALY 1983: 42.

Distribution: thermomediterranean species present all along the Mediterranean coast but Lybian and Egyptian coast. Also present in Bulgaria, in the center of Morocco, South Portugal, East Turkey and Turkmenistan. Present in all main Mediterranean islands. Quite rare in collections.

Subgenus *Euceratina* HIRASHIMA, MOURE & DALY 1971

C. acuta FRIESE 1896

Ceratina acuta FRIESE 1896: 57; ♀; [Hungary]; location of type unknown.

Distribution: East Mediterranean region, reaching Slovakia to the North-East. Very common in Greece, including Crete. Present in nearly all Turkey, in Caucasus and Israel. Absent in Cyprus.

C. bifida FRIESE 1900

Ceratina bifida FRIESE 1900: 86; ♂; [Asia Minor: Mersin; Syria]; Museum für Naturkunde der Humboldt-Universität, Berlin.

Distribution: East-thermomediterranean species, present along the Mediterranean coast of South Turkey, Syria , Lebanon, and Israel. Absent in Cyprus.

C. chalcites GERMAR 1839

C. chalcites chalcites GERMAR 1839

Megilla chalcites ILLIGER 1806: 139 nomen nudum nec DALY 1983: 47.
Ceratina aenea BRULLÉ 1832: 341; ♂; [Greece: Tripolis]; location of type unknown. Synonymized by FRIESE 1896: 45.
Ceratina chalcites GERMAR 1839: 21; ♂; [Portugal; Sicily]; location of type unknown.
Ceratina egregia GERSTAECKER 1896: 176; ♂; [Greece: Naxos, Attica; Sicily; Spain: Andalousia; Italy: Tirol]; Museum für Naturkunde der Humboldt-Universität, Berlin. Holotype ♂ examined. Synonymized by FRIESE 1896: 45.

Distribution: in North and East Mediterranean countries, absent in Africa and all main Mediterranean islands but Corsica and Sicily. To the East reaching Caucasus and East-Turkey except the province of Hakkari where it is replaced by the subspecies *C. chalcites ebmeri*, and northern Iran.

C. chalcites ebmeri TERZO ssp. nov.

Distribution: endemic of the province of Hakkari (Turkey).

C. chalybea CHEVRIER 1872

Ceratina chalybea CHEVRIER 1872: 491. Lectotype ♂ designated by DALY 1983: 48; [Switzerland: Nyon]; Muséum d'Histoire Naturelle, Geneva.
Ceratina hungarica MOCSARY 1879: 23; ♂; [Hungary: Grebenácz]; Természettudomanyi Mùzeum, Budapest. Synonymized by DALY 1983: 48.

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Ceratina callosa algeriensis FRIESE 1896: 59. Lectotype ♂ designated and synonymized by DALY 1983: 48; [Algeria: Tlemcen]; Museum für Naturkunde der Humboldt-Universität, Berlin.

Ceratina callosa cephalica COCKERELL 1931: 350; ♀; [Morocco: Ifrane]; British Museum of Natural History, London. Synonymized by DALY 1983: 48.

Distribution: same as *C. cucurbitina* but absent in Balearic Islands, Sardinia, Syria, Lebanon and Israel, and present in Georgia.

C. christellae TERZO sp. nov.

Distribution: Turkey, provinces of Antalya and Hakkari, Azerbaijan and northern Iran (Elburz).

C. chrysomalla GERSTAECKER 1869

Ceratina chrysomalla GERSTAECKER 1869: 183; ♂; [Greece: Rhodes (Mermeriza)]; Museum für Naturkunde der Humboldt-Universität, Berlin. Holotype ♂ examined.

Distribution: all regions of Turkey but Black Sea coast, northern Greece, Cyprus and Azerbaijan.

C. cyanea (KIRBY 1802)

Apis cyanea KIRBY 1802: 308. Lectotype ♀ designated by YARROW 1970: 171; [England: east of Suffolk]; British Museum of Natural History, London.

Ceratina coerulea CHEVRIER 1872: 490; [Switzerland: Nyon]; location of type unknown. Synonymized by FRIESE 1896: 53.

Ceratina chevrieri TOURNIER 1876: 86; [France]; location of type unknown. Synonymized by FRIESE 1896: 53.

Ceratina cyanea imitatrix MARKOWSKY 1938: 76. Lectotype ♀ designated by DALY 1983: 49; [Germany: Mittenwalde]; Museum für Naturkunde der Humboldt-Universität, Berlin.

Distribution: all Europe until Norway and Sweden, and North Mediterranean countries. Absent in Morocco, Syria, Lebanon, Israel, Cyprus and Balearic Islands. To the East reaching Caucasus and Ural Montains. Very rare in Algeria and Tunisia.

C. cypriaca MAVROMOUSTAKIS 1954 stat. nov.

Ceratina dallatorreana FRIESE subsp. *cypriaca* MAVROMOUSTAKIS 1954: 576, ♀, [Pera Pedi, 2000 ft., 27.v.1929]; location of type unknown.

Distribution: endemic of Cyprus.

C. dallatorreana FRIESE 1896

Ceratina dallatorreana FRIESE 1896: 50; [Mallorca Baleare; Yugoslavia; Spain; Syria]; location of type unknown.

Distribution: all Mediterranean countries and main Mediterranean islands except Lybia and Egypt. To the North reaching Austria and Bulgaria. To the East reaching Caucasus. The male recorded in the Pyrenees by FRIESE, has been seen (MNHUB) and synonymized with *C. saundersi* DALY 1983 by TERZO & RASMONT (1997). Also in U.S.A. (introduced in California), where another male has been found, seen by the author, and described by DALY (1983).

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C. dalyi TERZO sp. nov.

D i s t r i b u t i o n : Iran, Kopet Dag.

C. denesi TERZO sp. nov.

D i s t r i b u t i o n : Turkey, province of Adana.

C. dentiventris GERSTAECKER 1869

Ceratina dentiventris GERSTAECKER 1869: 178; ♂; [Portugal; Sicily: Ragusa]; Museum für Naturkunde der Humboldt-Universität, Berlin. Holotype ♂ examined.

D i s t r i b u t i o n : all northern Mediterranean countries except Portugal, Lebanon, Syria and Israel. In southern Mediterranean countries only present in Tunisia. Present in the main Mediterranean islands except the Balearic Islands and Cyprus. To the North reaching the North of Italy and the South of Romania. To the East reaching the Turkestan.

C. loewi GERSTAECKER 1869

Ceratina loewi GERSTAECKER 1869: 184; ♂; [Küste Klein-Asien (Kos, Mermeriza, Adalia); Museum für Naturkunde der Humboldt-Universität, Berlin. Holotype ♂ examined.

D i s t r i b u t i o n : South Romania, Greece including Crete, West part of Turkey, Caucasus (FRIESE 1901), Israel.

R e m a r k s . The specimens from Crete are all similar to the holotype. The specimens from other regions are morphologically more variable and resemble *C. neocollosa* DALY 1983 which is perhaps the same species.

C. mandibularis FRIESE 1896

Ceratina mandibularis FRIESE 1896: 61; ♂; [Jordan: Jericho; Lebanon: Brumana; Israel: Jaffa (= Tel Aviv); Turkey: Mersin]; location of type unknown.

D i s t r i b u t i o n : East-thermomediterranean species, along the Mediterranean coast of South Turkey, Syria, Jordan, Lebanon, Israel and Cyprus.

C. moricei FRIESE 1899

Ceratina laevifrons var. *moricei* FRIESE 1899: 4; ♂. Lectotype ♂ designated by DALY 1983: 55; [Jordan: Jericho]; University Museum, Oxford.

D i s t r i b u t i o n : East-thermomediterranean species, along the Mediterranean coast of South Turkey, Syria, Jordania, Lebanon, Israel and Cyprus.

C. nigroaenea GERSTAECKER 1869

Ceratina nigroaenea GERSTAECKER 1869: 181; ♀; [Fumas]; Museum für Naturkunde der Humboldt-Universität, Berlin. Holotype ♀ examined.

D i s t r i b u t i o n : East-Mediterranean species, present in Greece including Crete, in all Turkey but Black Sea coast, in Israel and Caucasus. Absent in Cyprus. All the localities given by FRIESE (1901) have been reported to *C. gravidula* GERSTAECKER 1869 (TERZO & RASMONT 1996).

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C. nigrolabiata FRIESE 1896

Ceratina cyanea nigolabiata FRIESE 1896: 54; ♂. Lectotype ♂ designated by DALY 1983: 55; [Hungary: Budapest]; Museum für Naturkunde der Humboldt-Universität, Berlin.

D i s t r i b u t i o n : in all northern Mediterranean countries and islands except the Balearic Islands, Sardinia and Cyprus. To the North reaching Slovakia and Crymea (Ukraine). To the East reaching Israel and Caucasus.

C. rasmonti TERZO sp. nov.

D i s t r i b u t i o n : East-Turkey, provinces of Agri and Van.

C. sakagamii TERZO sp. nov.

D i s t r i b u t i o n : Central and East-Turkey, Crete.

C. schwarziana TERZO sp. nov.

D i s t r i b u t i o n : East-Turkey, province of Hakkari.

C. tibialis MORAWITZ 1895

Ceratina tibialis MORAWITZ 1895: 19; ♀ Zoological Institute of Russian Academy of Sciences, St-Petersburg. Lectotype ♀ designated by TERZO (1998); [Kosch-Lagar].

Ceratina ahngeri KOKUJEV 1905: 126; ♀; [K.O. Angerom v Zakaspiskoi oblast (Kopet dag) 23.VI]; Zoological Institute of Russian Academy of Sciences, St. Petersburg. Holotype ♀ examined.

?*Ceratina corinna* NURSE 1904.

D i s t r i b u t i o n : from the South of Turkey, Syria and Israel to Iran, Tadjikistan and Turkmenistan.

C. warnckei TERZO sp. nov.

D i s t r i b u t i o n : East-Turkey, provinces of Hakkari, Kahraman Maras and Siirt.

C. zandeni TERZO sp. nov.

D i s t r i b u t i o n : Turkey and Greece.

C. zwakhalsi TERZO & RASMONT 1997

D i s t r i b u t i o n : mountains of East Turkey.

Subgenus *Neoceratina* PERKINS 1912

C. bispinosa HANDLIRSCH 1889

Ceratina bispinosa HANDLIRSCH 1889: 269; ♂; location of type unknown.

D i s t r i b u t i o n : Mediterranean coast of Turkey, Lebanon, Syria, Israel, Jordania, Greece including Crete, Cyprus and Croatia.

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C. schwarzi KOCOUREK 1998

Distribution: East-Mediterranean countries from Adriatic coast of South Italy to Iran. To the North reaching South Romania and to the South reaching Israel. Present in Crete and Cyprus. Absent in North-East Turkey.

Descriptions of the new species and subspecies

Ceratina (*Euceratina*) *chalcites ebmeri* TERZO ssp. nov.

Measurements: Male (paratype from Daglica): wing, 10.2 mm; hamuli 8-9; eye, 202: 246: 197: 187 clypeus, 104*159: 60: 136; interocellar, 38: 71: 45: 76, Ø 22; frontal carina, 83; malar area, 7*67; interalveolar, 63: 43: 57: 64, Ø 23. Female (Holotype): wing, 9.5 mm; hamuli 9; eye, 214: 246: 231: 226; clypeus, 97*177: 63: 144; interocellar, 33: 81: 60: 98, Ø 21; frontal carina, 97; malar area, 11*95; interalveolar, 70: 57: 62: 70, Ø 22.

Structure: This subspecies doesn't differ in structure from the type subspecies. DALY (1983) gives the last description of the species.

Color: Body entirely black, without any metallic reflections (blue metallic reflections in *C. chalcites* GERMAR). Wings color entirely brown (more or less clear at base in *chalcites* GERMAR). Ivory marks: same as type species.

Similar species. Because of its very large size, *C. chalcites* can't be confused with any other species except *C. chrysomalla* which is also very large. However, the body of *C. chrysomalla* has only green metallic reflections, *C. chalcites chalcites* has blue metallic reflections and *C. chalcites ebmeri* is entirely black, without any metallic reflections. Compared with the type subspecies, *C. c. ebmeri* is also larger: the wing of *C. c. ebmeri* is 9.50 mm long, while that of *C. c. chalcites* is 8.26 mm long.

Derivatio nominis: The subspecies *C. chalcites ebmeri* is named for Pater Andreas Werner Ebmer who has collected the holotype.

Material examined: Holotype: Turkey, province of Hakkari, W-Kaval, Suvarihalil Geçidi (37°30'N 43°20'E), 22.vii.1986, 1 ♀, leg. A.W. Ebmer (CEP). Type's labels: "TÜRKEY Suvari-Halil-Paß, 2200-2400 m (W Kaval) 22. Juli 1986 leg. A.W. EBMER \ *Ceratina chalcites ebmeri* Terzo ♂ HOLOTYPE ". Paratypes: TURKEY, Prov. of Hakkari: same locality than holotype, 6♀♀, leg. A.W. Ebmer (CEP); 10 km NE-Daglica (=Oramar, 37°25'N 44°11'E), 29.vi.1985, 1 ♀ 3♂♂, leg. M. Schwarz (CSA); Yuksekova (37°35'N 44°17'E) - Semdinli (37°18'N 44°34'E), 5.vi.1987, 1 ♂, leg. Madl (CSA).

Ceratina (*Euceratina*) *christellae* TERZO sp. nov. (Figs 4,5,10)

Measurements: Male (Holotype): wing, 3.6 mm; hamuli 6; eye, 98: 113: 92: 81; clypeus, 40*68: 29: 78; interocellar, 25: 34: 17: 35, Ø 13; frontal carina, 56; malar area, 3*34; interalveolar, 28: 24: 38: 45, Ø 13. Female (paratype from Beytissebap): wing, 4.5 mm; hamuli 6; eye, 112: 130: 113: 97; clypeus, 50*80: 34: 90; interocellar, 28: 46: 18: 45, Ø 13; frontal carina, 63; malar area, 3*45; interalveolar, 35: 27: 46: 54, Ø 14.

Structure: Maxillary palpi 6; mandible with three apical teeth; hypostomal carina, seen in lateral profile, weak and slightly curved; puncture on face very dense, with 8-9 punctures along hind limit of clypeus; punctures on mesoscutum between notauli a puncture width or more apart, with 3 or 4 punctures on the same line between notauli and

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the median line. Male: ventral pubescence of hind leg as in fig. 4; ventral pubescence of sterna 1-5 short and sparse, that of sterna 4-5 slightly longer; apex of tergum 7 long, bidentate, sides slightly concave (fig. 5); median emargination of sternum 5 large and shallow; sternum 6 as in fig. 5; genitalia as in fig. 10. Female: keel on tergum 6 weak with basal convexity and median concavity.

Color: Body including sterna dark blue. Ivory marks: absent on female pronotal lobes; small spot on male pronotal lobes; absent on female labrum; entire male clypeus and male labrum; small oval on female clypeus with or without small marks on lateral lobes; on triangular base of mandibles except on a large basal band; basal spot on all tibia, largest on hind tibia.

Similar species: Because of the white mandibles of the male and the small ivory marks on lateral lobes of female clypeus, *C. christellae* has never been distinguished from *C. mandibularis*. They are in fact very different and, excluding ivory marks, both species resemble and belong to the group of *C. cyanea* and *C. acuta*. The following characters distinguish *C. christellae* and *C. mandibularis*:

C. christellae	*C. mandibularis*
- pronotal lobes black or with a very small ivory mark	- ivory mark on entire pronotal lobes
- punctures on mesoscutum with 3 or 4 punctures on the same line between notauli and the median line.	- punctures on mesoscutum with 2 or 3 punctures on the same line between notauli and the median line.
♂	♂
- basal black band on mandible two or three times longer than malar area	- basal black band on mandible no longer than malar area
- ventral pubescence on hind tibia as long or longer than the greatest width of tibia (fig. 4)	- ventral pubescence on hind tibia shorter than the greatest width of tibia (fig. 6)
- ventral pubescence of hind femora with some longer setae at the middle length of femora (fig. 4)	- ventral pubescence of hind femora without long setae (fig. 6)
- sterna 4-5 with testaceous pubescence	- sterna 4-5 with white and plumose pubescence
- sternum 6 with rounded apical lobes (fig. 5)	- sternum 6 with acute apical lobes (fig. 7)
- distance between apical spines of tergum 7 greater than spine width (fig. 5)	- distance between apical spines of tergum 7 less than spine width (fig. 7)
- gonostyli 2 times longer than broad (fig. 10)	- gonostyli slightly longer than broad (fig. 11)
♀	♀
- clypeus with a central ivory mark more or less large and with or without ivory marks on lateral lobes	- clypeus with a central ivory mark very large, sometimes merged with the large ivory marks of lateral lobes
- keel on tergum 6 weak with basal convexity and median concavity.	- keel on tergum 6 strong with a large basal convexity and a median concavity.

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Derivatio nominis: *C. christellae* is named for author's wife.

Material examined: Holotype: Turkey, prov. of Antalya, Selimiye (= Side, 36°46'N 31°22'E), 1♂, 7.iv.1977, leg. K. Warncke (OLL). Type's labels: "TK - Antalya: Side 7-IV-77 leg. Warncke \ *Ceratina christellae* Terzo HOLOTYPE ♂". Paratypes: AZERBAIJAN: Lenkoran, Azfilial Girkan Reserve (38°37'N 48°47'E), 31.v.1996 2♀♀, leg. M. Hauser (SMNS). IRAN: prov. of Elburs, Karaj (35°43'N 51°07'E), 12.vii.1977 1♀, leg. A. Ebmer (CEP). TURKEY. Prov. of Antalya: Selimiye (36°46'N 31°22'E), 7.iv.1977 12♂♂, leg. K. Warncke (OLL). Prov. of Hakkari: Beytisebap (37°35'N 43°10'E), 13.vi.1984 1♀, leg. K. Warncke (OLL); Daglica (37°22'N 44°06'E), 13.vi.1984 1♀, leg. K. Warncke (OLL); Semdinli (37°18'N 44°34'E), 12.vi.1981 1♂ 1♀, leg. K. Warncke (OLL); Varagoz (37°25'N 44°13'E), 7.viii.1983 1♂ 4♀♀, leg. K. Warncke (OLL); Yuksekova (37°35'N 44°17'E), 28.vi.1985 2♀♀, leg. W. Schacht (OLL).

***Ceratina* (*Euceratina*) *dalyi* TERZO sp. nov.**

Measurements: Female (Holotype): wing, 4.7 mm; hamuli 7; eye, 130: 148: 138: 123; clypeus, 69*98: 37: 96; interocellar, 31: 48: 21: 46, Ø 15; frontal carina, 63; malar area, 6*50; interalveolar, 43: 31: 49: 57, Ø 14.

Structure: Female: maxillary palpi 6; mandible with three apical teeth; hypostomal carina, seen in lateral profile, weak and straight, slightly larger behind; face with puncture generally dense but with some impunctate areas behind eyes and lateral ocelli, between antennae and clypeus, and with a very large impunctate area on paraclypeal area, around the anterior tentorial pit, and with fine and scattered punctures on supraclypeal area; puncture on clypeus scattered; puncture on scutellum and mesoscutum between notauli sparse and fine; puncture on sterna deep and dense; wax gland on sterna 2 and 3 normal; keel on tergum 6 almost straight, with a slight concavity at mid length. Male: unknown.

Color: Body mostly shiny black with green reflections; sterna black. Ivory marks: small longitudinal stripe or oval on clypeus; basal spot on tibiae.

Similar species. Punctures almost absent on mesoscutum, large impunctate area around the anterior tentorial pit and reduced ivory mark distinguish *C. dalyi* from all other green species which are of the same size.

Derivatio nominis: *Ceratina dalyi* is named for Prof. Howell V. Daly of the University of California (Berkeley, U.S.A.).

Material examined: Holotype: ♀, Iran, prov. of Mashhad, Zoshk, near Shandiz (36°18'N 59°10'E), 19.vii.1977, leg. P. A.W. Ebmer (CEP). Type's labels: "Iran, oberhalb Zoshk, bei Shandiz W Mashad, 1600-2000 m, 19.7.1977, leg. A.W. Ebmer \ *Ceratina dalyi* Terzo HOLOTYPE ♀". Paratype: IRAN, prov. of Mashhad, Kopet Dag, 15 km N-Quchan (37°04'N 58°32'E), 18.vii.1977 1♀, leg. P. A.W. Ebmer (CEP).

***Ceratina* (*Euceratina*) *denesi* TERZO sp. nov. (figs 8,9,12)**

Measurements: Male (Holotype): wing, 5 mm; hamuli 7-8; eye, 127: 140: 115: 92; clypeus, 62*83: 32: 87; interocellar, 28: 41: 18: 42, Ø 15; frontal carina, 56; malar area, 4*43; interalveolar, 36: 24: 42: 50, Ø 15.

Structure: Male: maxillary palpi 6; mandible with three apical teeth; hypostomal

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carina, seen in lateral profile, weak and slightly curved; puncture on face very dense, with 8-9 punctures along hind limit of clypeus; puncture on clypeus scattered and present on all surface of clypeus; punctures on mesoscutum between notauli wide and irregularly scattered, in places a puncture width or more apart, in other places less than a puncture width apart, with 2 to 4 punctures on the same line between notauli and the median line; ventral pubescence of hind leg as in fig. 8; apex of ventral edge of hind coxa with a small spine (fig. 8); apex of tergum 7 in pointed angle, sides straight (fig. 9); median emargination of sternum 5 narrow; sternum 6 as in fig. 9; genitalia as in fig. 12. Female: unknown.

Color: Body mostly shiny black with blue reflections; sterna mostly black with very few metallic reflections. Ivory marks: entire labrum; almost entire clypeus; entire pronotal lobes; basal stripe on front tibia extending nearly all length of tibia; basal spot on tibia II; large basal stripe on hind tibia extending half length of tibia; small mark on tegulae.

Similar species. *Ceratina denesi* can't be confused with any other species. It is blue and too small to be confused with the large and greenish *C. loewi*. On the other hand, the presence of a small tooth on the coxa, like in *C. bifida*, *C. chrysomalla*, *C. cypriaca*, *C. loewi* and *C. tibialis* differentiate it from all small blue species. However, the blue species *C. teunisseni* Terzo (1997) from Crete has a very small tooth on hind coxa. It is easily distinguished from *C. denesi* by its large hypostomal carina that is weak in *C. denesi*.

Derivatio nominis: *Ceratina denesi* is named for K. Denes senior and junior who have caught many bees in the western Palearctic region, including the holotype of this species.

Material examined: Holotype: ♂, Turkey, prov. of Adana, Silifke (36°22'N 33°57'E), 21.v.1995, leg. K. Denes jun. (OLL). Type's labels: "Turcia mer.95 Silifke 21.5 K.Denes jun.lgt. \ *Ceratina denesi* Terzo HOLOTYPE ♂".

Ceratina (*Euceratina*) *rasmonti* TERZO sp. nov. (Fig 13)

Measurements: Female (Holotype): wing, 4.5 mm; hamuli 5; eye, 129: 133: 118: 104; clypeus, 63*90: 31: 85; interocellar, 28: 31: 18: 41, Ø 17; frontal carina, 59; malar area, 3*45; interalveolar, 35: 27: 43: 53, Ø 15.

Structure: Female: maxillary palpi 6; mandible with three apical teeth; hypostomal carina, seen in lateral profile, weak and slightly curved (fig. 13); puncture on supraclypeal area scattered, a puncture width or more apart; puncture on vertex, between and behind lateral ocelli almost absent; vertex behind lateral ocelli depressed (fig. 13); preoccipital area carinate (fig. 13); punctures on mesoscutum along median line dense, less than a puncture width apart, and very scattered along notauli, 2-3 punctures on a central line between notauli and the median line; keel on tergum 6 weak and straight, partially obscured by punctures; wax glands half-moon shaped on sternum 2, different on sternum 3. Male: unknown.

Color: Body, including sterna, bright green-gold. Ivory marks: large oval on clypeus, width half the length; entire pronotal lobes; absent on labrum; basal stripe on tibia I-II extending half of length of tibia; basal stripe on hind tibia large and extending more than half length of tibia.

Similar species. *Ceratina rasmonti* is similar to *C. dallatorreana*. The following characters distinguish those species:

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C. rasmonti	*C. dallatorreana*
– hypostomal carina, seen in lateral profile, weak and slightly curved (fig. 13)	– hypostomal carina, seen in lateral profile, weak and straight (fig. 14)
– puncture on vertex beween and behind lateral ocellars almost absent	– puncture on vertex between and behind lateral ocellars dense
– preoccipital area carinate (fig 13)	– preoccipital area not carinate (fig. 14)
– punctures on mesoscutum dense, less than a puncture width apart along median line and very scattered along notauli, 2-3 punctures on a central line between notauli and the median line	– punctures on mesoscutum regularly dense, less than a puncture width apart between notauli, 6 punctures on a line between notauli and the median line
– wax gland on sternum 3 normal, on sternum 2 half-mon shaped	– wax gland on sterna 2-3 half-moon shaped
– basal ivory marks on tibia II and III as stripe extending half or more length of tibia.	– basal ivory marks on tibia II and III as spots.

Derivatio nominis: *C. rasmonti* is named for Prof. Dr In. Pierre Rasmont of the University of Mons-Hainaut (Belgium).

Material examined: Holotype: Turkey, prov. of Van: Ercek (38°39'N 43°36'E), 1♀, 10.viii.1979, leg. K. Warncke (OLL). Type's labels: "TK: Erçek/Van 10-VIII-79 leg. Warncke \ *Ceratina, rasmonti* Terzo, HOLOTYPE ♀". Paratypes: TURKEY. Prov. of Van: Ercek (38°39'N 43°36'E), 3.viii.1983 2♀♀, leg. K. Warncke (OLL). Prov. of Agri: Agri (39°44'N 43°04'E), 27.iv.1993 1♀, leg. K. Denes (OLL).

Ceratina (*Euceratina*) *sakagamii* TERZO sp. nov. (Figs 15, 16, 17)

Measurements: Male (Holotype): wing, 4 mm; hamuli 5-6; eye, 111: 115: 94: 81; clypeus, 52*73: 28: 76; interocellar, 21: 31: 28: 35, Ø 13; frontal carina, 56; malar area, 3*36; interalveolar, 29: 18: 38: 46, Ø 14. Female (paratype from Seydisehir): wing, 4 mm; hamuli 5; eye, 109: 118: 101: 91; clypeus, 49*76: 28: 77; interocellar, 25: 32: 14: 35, Ø 13; frontal carina, 56; malar area, 3*35; interalveolar, 32: 22: 42: 50, Ø 13.

Structure: Maxillary palpi 6; hypostomal carina, seen in lateral profile, weak and curved. Male: mandible with two apical teeth; clypeus convex; puncture on supraclypeal area scattered, a puncture width or more apart; puncture on mesoscutum between notauli dense, less than a puncture width apart, with 4 to 6 punctures on the same line between notauli and the median line; punctures almost absent on clypeus; ventral pubescence of hind leg as in fig. 15; sternum 2 with a small central teeth; central pubescence of sterna 2-4 longer and denser than on the sides; apex of tergum 7 short, triangular, rounded at tip (fig. 16); median emargination of sternum 5 shallow; sternum 6 as in fig. 16; genitalia as in fig. 17; keel on tergum 6 absent. Female: puncture absent on clypeal ivory mark, present elsewhere on clypeus; puncture on supraclypeal area very scattered and irregular, in places two punctures widths or more apart; puncture on mesoscutum between notauli less scattered than male, in some places a puncture width apart, in other places less than a puncture width apart, with 4-5 punctures on the same line between notauli and the median line; keel on tergum 6 partially obscured by punctures; wax glands half-moon shaped on both sterna 2 and 3.

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Color: Body shiny dark with blue or green reflections; sterna black. Ivory marks: on pronotal lobes; absent on female labrum and clypeus; almost entire on male clypeus; large rectangle on male labrum; basal stripe on male front tibia; spot on male tibia II-III and all female tibiae, larger on tibia III than on tibia II.

Similar species. The male of *C. sagakamii* looks like *C. dentiventris* because of numerous characters, especially because of the small size and the presence of a spine on sternum 2. Except this spine, the description given here looks also like the description given by DALY (1983) for the male of *C. dallatorreana* (seen by the author). However, the associated females of *C. sakagamii* do not resemble the females of *C. dallatorreana*. The following characters distinguish *Ceratina sakagamii* and *C. dentiventris*:

C. sakagamii	*C. dentiventris*
♂	♂
– labrum with a large rectangular ivory marks	– labrum with a small oval ivory mark
– punctures on supraclypeal area scattered, a puncture width or more apart	– punctures on supraclypeal area dense, less than a puncture width apart
– puncture on mesoscutum dense, less than a puncture width apart, with 4-6 punctures on the same line between notauli and median line	– puncture on mesoscutum scattered, more than a puncture width apart, with 2-3 punctures on the same line between notauli and median line
– ventral pubescence on hind femora equal in length at middle and at base (fig. 15)	– ventral pubescence on hind femora longer at base than at middle (fig. 18)
– emargination of sternum 5 shallow	– emargination of sternum 5 deep
– submedian lobes of sternum 6 short and broadly rounded (fig. 16)	– submedian lobes of sternum 6 long and truncate at tip (fig. 19)
♀	♀
– clypeus black, without ivory mark	– clypeus with a narrow ivory mark
– punctures on supraclypeal area very scattered, at places two puncture widths or more apart.	– puncture on supraclypeal area dense, a puncture width or less apart.

Derivatio nominis: *C. sakagamii* is named to pay homage to Shoichi F. Sakagami (1927-1996).

Material examined: Holotype: TURKEY, prov. of Kars, Karakurt (40°10'N 42°36'E), 1♂, 8.viii.1979, leg. K. Warncke (OLL). Type's labels: "TK: Karakurt/Kars 8-8-79 leg. Warncke \ *Ceratina sakagamii* Terzo HOLOTYPE ♂". Paratypes: TURKEY. Prov. of Agri: Patnos (39°14'N 42°52'E), 29.v.1980 1♀, leg. K. Warncke (OLL). Prov. of Hakkari: 5 Km N-Daglica (=Oramar, 37°24'N 44°06'E), 11.vi.1981 1♀, leg. K. Warncke (OLL); Varagoz (37°25'N 44°13'E), 6.viii.1986 1♂, leg. K. Warncke (OLL); 20 Km N-Yuksekova (37°46'N 44°17'E), 12.viii.1979 1♂, leg. K. Warncke (OLL). Prov. of Konya: Aksehir (38°22'N 31°24'E), 2.viii.1991 1♂ 1♀, leg. K. Warncke (OLL); Eregli (37°30'N 34°02'E), 7.viii.1991 1♂, leg. K. Warncke (OLL); Seydisehir (37°25'N 31°51'E), 4.viii.1991 3♀♀, leg. K. Warncke (OLL); Taskent (36°55'N 32°31'E), 6.viii.1991 12♂♂ 1♀, leg. K. Warncke (OLL).Prov. of

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Mut: Sertavul (?), 1.vi.1967 1♀, leg. K. Kusdas (OLL). Prov. of Nevsehir: Zelve (38°40'N 34°53'E), 25.viii.1991 1♂, leg. K. Warncke (OLL). Prov. of Nigde: Camardi (37°49'N 35°00'E), 10.viii.1991 2♀♀, leg. K. Warncke (OLL). Prov. of Van: Gevas (38°18'N 43°06'E), 29.vi.1993 1♀, leg. K. Denes (OLL). GREECE, prov. of Iraklion (Crete): Phaistos (35°03'N 24°48'E), 23.vi.1965 1♂, leg. A. Giordani-Soika (OLL). IRAN. Prov. of Khorasan: Zoshk (36°20'N 59°11'E), 19.vii.1977 1♀, leg. J. Gusenleitner (OLL). Prov. of Mazandaran: Polur (35°52'N 52°03'E), 22.vii.1977 2♂♂, leg. A. Ebmer (CEP). Prov. of Sari: 75 Km S-Chalus (36°00'N 51°26'E), 13.vii.1977 2♀♀, leg. J. Gusenleitner (OLL); 50 Km S-Chalus (36°13'N 51°25'E), 26.vii.1977 1♀, leg. A. Ebmer (CEP). Prov. of Tehran: Ab Ali (36°33'N 51°58'E), 12-13.vii.1965 1♀, leg. A. Giordani-Soika & G. Mavromoustakis (OLL). Elburs mountains, Sausee, N-Kesly (?), 19.VII.1965 1♀, leg. *unknown*.

***Ceratina* (*Euceratina*) *schwarziana* TERZO sp. nov. (Figs 21-24)**

Measurements: Male (paratype from Beytissebap): wing, 4.2 mm; hamuli 6; eye, 99: 123: 104: 94; clypeus, 56*74: 25: 74; interocellar, 28: 38: 13: 42, Ø 14; frontal carina, 53; malar area, 3*39; interalveolar, 35: 22: 38: 42, Ø 14. Female (Holotype): wing, 4.9 mm; hamuli 6; eye, 130: 164: 146: 140; clypeus, 67*118: 33: 97; interocellar, 29: 53: 34: 63, Ø 15; frontal carina, 69; malar area, 3*63; interalveolar, 45: 35: 49: 57, Ø 17.

Structure: Mandible with three apical teeth; punctures on mesoscutum between notauli very scattered and sparse, almost absent, with one or two punctures on the same line between notauli and the median line; puncture on scutellum almost absent on a broad transversal band. Male: hypostomal carina, seen in lateral profile weak and straight; puncture on supraclypeal area sparse, with large area without punctures; ventral pubescence of hind leg as in fig. 21; apex of tergum 7 short and bidentate (fig. 22); median emargination of sternum 5 narrow and shallow; sternum 6 as in fig. 22; genitalia as in fig. 23. Female: front edge of clypeus with a broad but shallow emargination (fig. 24); hypostomal carina, seen in lateral profile weak and curved; puncture on clypeus scattered and almost absent on ivory mark; puncture on vertex very scattered, a puncture width or more apart; keel on tergum 6 with a strong basal convexity but obscured by puncture, a median concavity and weak at apex.

Color: Body mostly shiny black with blue-green reflections; sterna and last tergum black without metallic reflection. Ivory marks: absent on female labrum; small spot on male labrum; large oval on female clypeus; irregular and broadly bordered with black on male clypeus; absent on pronotal lobes; basal spot on all tibia, slightly larger on hind tibia.

Similar species. Because of the scattered punctures on the paraocellar area, *C. schwarziana* belongs to the group of *C. nigrolabiata, C. moricei* and *C. laevifrons.* The males of all those species have also the apex of last tergum bilobate and a similar vesture on hind legs. However, the male of *C. nigrolabiata* is different by its small clypeal ivory mark and its black labrum. The males of *C. moricei* and *C. laevifrons* are different by their entire white pronotal lobes and labrum. *Ceratina moricei* is also different by its green color and *C. laevifrons* by its body puncture everywhere largely scattered. The female of *C. schwarziana* is immediately distinguished from all others by the emargination of the clypeus front edge.

Derivatio nominis: *C. schwarziana* is named for Maximilan Schwarz (Ansfelden, Austria) who showed me for the first time female of this species.

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Material examined: Holotype: Turkey, prov. of Hakkari, Sat Dagi, S-Varagoz (37°25'N 44°13'E), 1 ♀, 6.viii.1982, leg. K. Warncke (OLL). Type's labels: "TK-Hakkari 2000m S Varegös/Mt.Sat 6-8-82 K.Warncke \ *Ceratina schwarziana* Terzo HOLOTYPE ♀". Paratypes: TURKEY, prov. of Hakkari: S-Beytisebap (37°35'N 43°10'E), 10.viii.1983 1 ♂, leg. K. Warncke; 10 Km NE-Daglica (= Oramar, 37°25'N 44°11'E), 29.vi.1985 1 ♀, leg. M. Schwarz (CSA); Sat Dagi, S-Varagoz (37°25'N 44°13'E), 18.vi.1984 1 ♀, 6.viii.1986 1 ♀, leg. K. Warncke (OLL).

Ceratina (*Euceratina*) *warnckei* TERZO sp. nov. (Figs 25-27, 30)

Measurements: Male (Holotype): wing, 4.9 mm; hamuli 5-6; eye, 134: 133: 115: 101; clypeus, 59*87: 31: 88; interocellar, 25: 38: 14: 35, Ø 15; frontal carina, 62; malar area, 3*49; interalveolar, 35: 22: 42: 53, Ø 15. Female (paratype from Uludere): wing, 4.7 mm; hamuli 5-6; eye, 140: 146: 132: 112; clypeus, 63*95: 35: 93; interocellar, 32: 42: 21: 43, Ø 15; frontal carina, 66; malar area, 6*53; interalveolar, 39: 31: 49: 60, Ø 14.

Structure: Maxillary palpi 6; mandible with three apical teeth; hypostomal carina, seen in lateral profile weak and straight; puncture on face very dense, with 8-9 punctures along hind limit of clypeus; puncture on clypeus scattered and present on all surface of clypeus; punctures on mesoscutum between notauli very scattered, a puncture width or more apart, with two or three punctures on the same line between notauli and the median line; terga 2-5 with a subapical line of strong spines. Male: ventral pubescence of hind leg as in fig. 25; apex of tergum 7 short, pointed but in obtuse angle (fig. 26), with the tip, seen in lateral profile, posteriorly directed (fig. 27); median emargination of sternum 5 very large and deep, obscured by long setae; sternum 6 as in fig. 26; genitalia as in fig. 30. Female: keel on tergum 6 strong and as a large convexity.

Color: Body mostly shiny black with green or less often blue reflections; sterna mostly black with very few metallic reflections. Ivory marks: absent on female labrum; entire male labrum; long oval on female clypeus; almost entire male clypeus; entire pronotal lobes; basal spot on all tibia, slightly extended on hind tibia; small mark on tegulae.

Similar species. Because of the presence of a subapical line of strong spines on terga 2-5, *C. warnckei* can be confused with *C. ferghanica* from Central Asia but is distinguished from all other species. *Ceratina ferghanica* is large and blue with black pronotal lobes and *C. warnckei* is smaller and greenish with white pronotal lobes. Moreover, the absence of spine on hind coxa makes distinguishable the male of *C. warnckei* from other greenish species like *C. loewi, C. chrysis, C. tibialis, C. chrysomalla* and *C. cypriaca.*

Derivatio nominis: *C. warnckei* is named for late Klaus Warncke (1937-1992) who collected the holotype. His life and his wife's ended too soon in a car crash when collecting bees in Egypt. He collected a so large number of bees in west Palearctic region, including numerous specimens of the new species described here, that the majority of the new species should be dedicated to him.

Material examined: Holotype: Turkey, prov. of Hakkari: Uludere (37°27'N 42°51'E), 1 ♂, 6.vi.1977, leg. K. Warncke (OLL). Type's labels: "TK-Hakkari: Paß E Uludere 6-VI-77 leg. Kl.Warncke \ *Ceratina warnckei* Terzo HOLOTYPE ♂". Paratypes: TURKEY. Prov. of Hakkari: Beytisebap (37°35'N 43°10'E), 10.viii.1983 1 ♀, 13.vi.1984 2 ♀ ♀, leg. K. Warncke (OLL); Tanin Daglari (37°29'N 43°00'E), 14.viii.1979 1 ♂, leg. K. Warncke (OLL); Uludere (37°27'N 42°51'E), 6.vi.1977 1 ♂ 1 ♀, leg. K. Warncke (OLL); Varagoz (37°25'N 44°13'E),

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6.viii.1986 1♂ 2♀♀, leg. L. Blank (OLL); idem, 17.vi.1984 1♀, 6.viii.1986 1♀, leg. K. Warncke (OLL). Prov. of Kahraman Maras: Goksun (38°03'N 36°30'E), Pürin Geçidi, 10.vii.1990 1♀, leg. A. Ebmer (CEP). Prov. of Siirt: Sirnak (37°32'N 42°28'E), 14.viii.1991 1♀, leg. K. Warncke (OLL).

Ceratina (Euceratina) zandeni TERZO sp. nov. (Figs 28, 29, 31)

Measurements: Male (Holotype): wing, 4.4 mm; hamuli 6; eye, 123: 106: 104: 87; clypeus, 56*77: 31: 80; interocellar, 25: 25: 15: 39, Ø 15; frontal carina, 56; malar area, 5*42; interalveolar, 29: 20: 39: 45, Ø 15. Female (paratype from SiKia, 23.viii.1978): wing, 4.3 mm; hamuli 5; eye, 126: 115: 112: 101; clypeus, 56*81: 31: 85; interocellar, 28: 35: 17: 39, Ø 15; frontal carina, 63; malar area, 3*42; interalveolar, 32: 25: 44: 55, Ø 14.

Structure: Male: maxillary palpi 6; hypostomal carina, seen in lateral profile, weak and straight; mandible with two apical teeth; puncture on vertex, between and behind lateral ocellars almost absent; vertex behind lateral ocelli depressed; puncture on supraclypeal area and mesonotum dense, less than a puncture width or more apart, with six to seven punctures on the same line between notauli and the median line; punctures almost absent on clypeus; preoccipital area carinate; ventral pubescence of hind leg as in fig. 28; sternum 2 with a small central teeth; sterna 3 and 4 with bilateral raised impunctuate areas, those on sternum 3 very large, those of sternum 4 very narrow and looking like small teeth; central pubescence of sterna 1-5 longer and denser than on the sides; graduli on sterna 3-5 and on terga 2-4 very marked, those of tergum 3 followed by a strong groove, subdivided medially and showing two submedian fossae; apex of tergum 7 short, triangular, rounded at tip (fig. 29); median emargination of sternum 5 shallow; sternum 6 as in fig. 29; genitalia as in fig. 31; keel on tergum 6 very rounded and almost absent. Female: similar to *C. dallatorreana*.

Color: Male: Body, including sterna, shiny with green reflections; legs and antennae brownish. Ivory marks: pronotal lobes; almost entire on clypeus; large rectangle on labrum; basal stripe on almost all length of front and hind tibiae, longer but narrower on front tibia; basal spot on female tibia, larger on tibia III than on tibia II.

Similar species. The male of *C. zandeni* looks like *C. dentiventris* and *C. sakagamii* especially because of the presence of a spine on sternum 2. It can be distinguished from both species easily by its large fossae on tergum 3, its larger size and its greenish body. For the moment, both associated females of *C. zandeni* cannot be distinguished from the females of *C. dallatorreana*.

Derivatio nominis: *C. zandeni* is named for Ing. Gijs van der Zanden (Eindhoven, Netherlands).

Material examined: Holotype: Greece, prov. of Thessaloniki, Peninsula of Sithonia: Sikia (40°02'N 23°56'E), 1♂, 22.viii.1978, leg. K. Warncke (OLL). Type's labels: "GR- Sithonia: Sikia 22-8-78 leg.K.Warncke \ *Ceratina zandeni* Terzo HOLOTYPE ♂". Paratypes: GREECE, prov. of Thessaloniki (Sithonia): Sikia, 1♀ 22.viii.1978, 1♀ 23.viii.1978, leg. K. Warncke (OLL). ISRAEL, Beersheba (31°15'N 34°47'E), 1♂ 18.v.1951, leg. P.M.F. Verhoeff (CGZ).

Redescription of *Ceratina* (*Neoceratina*) *schwarzi* KOCOUREK 1998 (Figs 36, 37, 40, 45, 46)

Measurements: Male: wing, 3.2 mm; hamuli 6; eye, 95: 91: 77: 66; clypeus,

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50*56: 15: 52; interocellar, 21: 22: 4: 14, Ø 10; frontal carina, 40; malar area, 3*32; interalveolar, 28: 13: 28: 35, Ø 10. Female: wing, 3.2 mm; hamuli 5-6; eye, 90: 84: 81: 67; clypeus, 49*59: 17: 57; interocellar, 22: 26: 6: 24, Ø 10; frontal carina, 45; malar area, 1*32; interalveolar, 31: 15: 32: 40, Ø 10.

Structure: Maxillary palpi 5; mandible with 2 apical teeth; hypostomal carina, seen in lateral profile, weak and straight; puncture on face very scattered, almost absent everywhere except between antennae and on vertex where it is dense, and around ocelli, along eyes and on paraclypeal area where it is fine and more or less scattered; lateral side of gena with at most 2 lines of punctures along upper external side of eye; punctures on mesoscutum dense on collar, almost absent elsewhere except along the median line. Male: ventral pubescence of hind leg as in fig. 36; apex of tergum 7 bidentate, distance between the teeth longer than tooth length (fig. 40); sternum 2 without median tooth; apex of sternum 6 as in fig. 37; genitalia as in figs. 45 and 46.

Color: Body black; ivory marks: absent on female labrum; often on male labrum; long rectangle on female clypeus, sometimes reduced or totally absent; like an inverted T on male clypeus; entire pronotal lobes; basal spot on tegulae; basal spot on tibia, extended until half length on tibia III, extended until all length of male tibia I, sometimes slightly extended on female tibia I; apical strip on ventral edge of male front femora, sometimes also on female front femora but then always very reduced.

Similar species. Following HIRASHIMA (1971), the subgenus *Neoceratina* is composed of several species groups. *Ceratina schwarzi* belongs to the group including the following species: *C. bispinosa* HANDLIRSCH 1889, sympatric species, *C. nigra* HANDLIRSCH 1889 from Turkestan and perhaps *Ceratina tabescens* COCKERELL 1912 from Seychelles. The general punctuation, and especially the number of lines of punctures on the gena along the upper external side of eye, distinguish the females of those species: more than 3 for *C. tabescens*, 2 or 3 for *C. bispinosa*, 1 or 2 for *C. schwarzi* and only 1 with scattered punctures for *C. nigra*. More over, the female of the sympatric species, *C. bispinosa*, present always an big ivory mark on the ventral edge of front femora, sometimes present but always reduced in *C. schwarzi*. About the females of the allopatric species, *C. tabescens* present a very flat scape, more or less round for the other species, and the female of *C. nigra* is smaller with the general puncture almost absent. The male of *C. tabescens* is unknown. A small tooth of sternum 2 and the apex of tergum 7 with two teeth which are near (fig. 39) are enougth to identify easily the male of *C. bispinosa*. Moreover the form and vestiture of hind legs (fig. 34), apex of sternum 6 (fig. 35) and genitalia (figs. 43, 44) are also characteristic of the male of *C. bispinosa*. The form and pubescens of hind legs (fig. 32 and 36), apex of sternum 6 (fig. 33 and 37) and genitalia (figs. 41, 42, 45, 46) distinguish the males of *C. nigra* and *C. schwarzi*.

Material examined: BULGARIA. Prov. of Blagoevgrad: Sandanski (41°35'N 23°16'E), v.1967 1♀, vii.1967 1♂ 2♀♀, 17.v.1972 1♂, 18.v.1979 2♀♀, 19.v.1979 1♀, leg. M. Kocourek (OLL). Prov. of Sofiya: Kresna (41°44'N 23°09'E), 12.v.1979 1♀, leg. M. Kocourek (OLL); Melnik (41°31'N32°24'E), 13.viii.1993 1♀, leg. M. Halada (OLL). Prov. ?: Slancev Brjag (?), 8.viii.1968 1♂ 1♀, leg. M. Kocourek (OLL). CYPRUS: Paphos (34°45'N 32°38'), 6.vii.1987 1♂ 1♀, leg. P. A.W. Ebmer (CEP); Yiolou (34°55'N 32°28'E), 5.vi.1987 1♀, leg. P. A.W. Ebmer (CEP). GREECE. Prov. of Ioannina: 10 Km NE-Ioannina (39°40'N 20°51'E), 1.vii.1996 1♀, leg. M. Halada (CSA); Saloniki (39°31'N 20°33'E), 19.viii.1976 1♀, leg. K. Warncke (OLL). Prov. of Mitilini: Samos: Vourliotes (37°46'N 26°51'E), 20.vii.1997 1♀, leg. P. A.W. Ebmer (CEP). Prov. of Rethimni (Creta): Spili (35°13'N 24°32'E), 20.vii.1993

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1 ♀, leg. P. A.W. Ebmer (CEP). Prov. of Thessaloniki: Nikitas (40°12'N 23°42'E), 26.viii.1978 1 ♂, leg. K. Warncke (OLL). Prov. of Tripolis: Sofiko (37°47'N 23°03'E), 9.v.1992 1 ♀, leg. H. Rausch (OLL). Prov. ?: Pandroson (?), 15.vii.1994 1 ♂, leg. P. A.W. Ebmer (CEP). IRAK: prov. of Baghdad: Baghdad (33°20'N 44°26'E), 21-30.v.1989 2 ♀♀, leg. I. Bohae (OLL). IRAN. Prov. of Khuzestan: Haft Tappeh (32°03'N 48°24'E), 29.vi-1.vii.1965 2 ♂♂ 3 ♀♀, leg. Soika & Mavromoustaksi (OLL). Prov. of Sari: Ab'Ali (35°46'N 52°05'E), 11.vii.1965 1 ♀, leg. Soika & Mavromoustaksi (OLL). ITALY: prov. of Puglia: Promontorio del Gargano (41°50'N 16°00'E), 16.ix.1993 1 ♀, leg. Amu (coll. A. Muller; Switzerland: Schaffhaussen). JORDANY. Prov. of Amman: Shuna (31°54'N 35°34'E), 30.iv.1996 2 ♀♀, leg. M. Halada (CSA). Prov. of Irbid: Irbid (32°33'N 35°51'E), 30.viii.1981 1 ♂, leg. Ph. Pronk (RML). Prov of Karak: 30 Km N-Tafila (30°52'N 35°36'E), 2.v.1996 1 ♂, leg. M. Halada (CSA). Prov. of Ma'an: 10 Km N-ruins of Petra (30°20'N 35°26'E), 3.v.1996 1 ♀, leg. M. Halada (CSA). MAKEDONIJA: Stari Dojran (41°11'N 22°43'E), 11.vi.1977 1 ♀, leg. J. Hladil (OLL). ROMANIA: prov. of Bucuresti: Vlahii (44°12'N 27°52'E), 14.viii.1993 1 ♂ 2 ♀♀, leg. M. Halada (OLL). SYRIA. Prov. of Dimashq: Az Zabadani (33°42'N 36°06'E), 22.v.1980 1 ♀, leg. MUHLE (OLL); Rankus (40 Km N-Dimashq), 23.v.1996 1 ♂, leg. M. Halada (CSA); 40 Km NE- Dismashq, 13.v.1996 13 ♀♀ 8 ♂♂, 22.v.1996 3 ♀♀, leg. M. Halada (CSA). Prov. of Idlib: Jisr ash Shughur (35°48'N 36°20'E), 10-11.v.1996 3 ♀♀, leg. M. Halada (CSA). Prov. of As Suwayda: Anata (50 Km SE-As Suwayda: 32°43'N 36°33'E), 20-21.v.1996 1 ♀, leg. M. Halada (CSA). TURKEY. Prov. of Adana: Adana (37°02'01"N 35°22'05"E), 18.x.1997 2 ♂♂ 21 ♀♀ ex nest, leg. M. Terzo (UMH); Anavarduz (37°14'54"N 35°53'41"E), 2.vii.1997 2 ♀♀ ex nest, leg. M. Terzo (UMH); Çiçekli (37°11'05"N 35°18'09"E), 13.x.1997 1 ♂ 3 ♀♀ ex nest, leg. M. Terzo (UMH); Dogakent (36°50'12"N 35°20'17"E), 1.vii.1997 1 ♂ ex nest, leg. M. Terzo (UMH); Etekli (37°26'37"N 35°14'27"E), 31.vii.1997 8 ♀♀ ex nest, leg. M. Terzo (UMH); Imamoglu (37°12'09"N 35°36'22"E), 14.x.1997 49 ♀♀ ex nest, leg. M. Terzo (UMH); idem (37°19'43"N 35°44'34"E), 14.x.1997 1 ♂ 3 ♀♀ ex nest, leg. M. Terzo (UMH); Kabasakal (37°03'22"N 35°13'11"E), 12.x.1997 2 ♂♂ 8 ♀♀ ex nest, leg. M. Terzo (UMH); Kapikaya (37°14'06"N 35°01'05"E), 12.x.1997 1 ♀ ex nest, leg. M. Terzo (UMH); Kozan (37°23'49"N 35°46'37"E), 14.x.1997 1 ♂ 1 ♀ ex nest, leg. M. Terzo (UMH); Kurteppe (37°03'43"N 35°16'51"E), 12.x.1997 1 ♂ 1 ♀ ex nest, leg. M. Terzo (UMH); Mustafalar (37°07'27"N 35°31'00"E), 14.x.1997 1 ♀ ex nest, leg. M. Terzo (UMH). Prov. of Ankara: Ankara (39°45'N 32°50'E), 2.viii.1979 1 ♂ 1 ♀, leg. K. Warncke (OLL); idem, 5.vi.1934 1 ♂, leg. M. Kocourek (OLL). Prov. of Antalya: Myra (?), 16.iv.1981 1 ♀, leg. K. Warncke (OLL); Perge (36°59'N 30°46'E), 15.iv.1981 1 ♂, leg. K. Warncke (OLL). Prov. of Aydin: Balat (37°31'N 27°17'E), 22.iv.1981 1 ♀, leg. K. Warncke (OLL). Prov. of Gaziantep: Kilis, 27.iv.1976 1 ♀ (36°44'N 36°40'E), 1 ♀ (36°43'N 36°41'E), leg. K. Warncke (OLL). Prov. of hakkari: Beytisebap (37°35'N 43°10'E), 10.viii.1983 4 ♂♂ 10 ♀♀, leg. K. Warncke (OLL); Hakkari (37°22'N 43°28'E), 1.vi.1980 1 ♂, leg. K. Warncke (OLL); Uludere (37°27'N 42°44'E), 4.vi.1980 6 ♂♂ 4 ♀♀, leg. K. Warncke (OLL). Prov. of Hatay: Topbogazi (36°28'N 36°15'E), 14.iv.1976 1 ♂, leg. K. Warncke (OLL). Prov. of Içel: Beylice (37°06'04"N 34°41'21"E), 19.x.1997 1 ♀ ex nest, leg. M. Terzo (UMH); Kurtçukuru (37°10'14"N 35°45'15"E), 19.x.1997 1 ♀ ex nest, leg. M. Terzo (UMH); Meselik (37°04'09"N 34°46'36"E), 19.x.1997 2 ♀♀ ex nest, leg. M. Terzo (UMH); Ulas (37°01'N 34°47'E), 15.vi.1979 2 ♀♀, Holszchuh & Ressl (OLL). Prov. of Kakraman Maras: Basdervis (37°43'16"N 37°09'55"E), 16.x.1997 1 ♀ ex nest, leg. M. Terzo (UMH); Çaglayancerit (37°44'36"N 37°16'34"E), 16.x.1997 1 ♀ ex nest, leg. M. Terzo (UMH); Dönük (37°27'22"N 36°45'05"E), 15.x.1997 2 ♂♂ 6 ♀♀ ex nest, leg. M. Terzo (UMH); Emiroglu (37°20'17"N 37°04'50"E), 15.x.1997 1 ♀ ex nest, leg. M. Terzo (UMH); 2 km-E of Göllühüyük (37°22'38"N 36°54'55"E), 15.x.1997 2 ♂♂ 3 ♀♀ ex nest, leg. M. Terzo (UMH); Kilavuzlu (37°37'31"N 36°49'53"E), 16.x.1997 1 ♀ ex nest, leg. M. Terzo (UMH); Uzunsögüt (37°24'43"N 36°46'51"E), 15.x.1997 1 ♀ ex nest, leg. M. Terzo (UMH). Prov. of Konya: Madensehri (37°26'N 33°11'E), 22.vi.1984 1 ♂, leg. K. Warncke (OLL). Prov. of Malatya: Malatya (38°20'N 38°19'E), 31.v.1983 2 ♂♂, leg. K. Warncke (OLL). Prov. of Mardin: Midyat

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(37°24'N 41°50'E), 25.v.1983 2♂♂, leg. K. Warncke (OLL). Prov. of Nevsehir: Acigol (38°33'N 34°31'E), 7.vii.1993 1♀, leg. M. Halada (OLL). Prov. of Sivas: Yarhisar (?), 24.vi.1994 1♂, leg. Jirousek (OLL).

Discussion

In the western Palearctic region, the eastern part of Turkey is a very important distribution center. It is well known for bumblebees (REINIG & RASMONT 1983). FRIESE's monographs (1896, 1901) show that it is also the case for the small carpenter bees. TERZO & RASMONT (1997) by the discovery of the first mountain species of small carpenter bees, *C. zwakhalsi*, confirm this opinion. This paper reveals indeed that almost all the species of the subgenus *Euceratina* occurring in the Near East are present in East-Turkey and not the reverse. Exceptions are made for the insular endemic species *C. cypriaca* from Cyprus and *C. teunisseni* from Crete and for species that probably originate from the Maghreb such as *C. chalybea*.

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Zusammenfassung

28 Arten der Bienengattung *Ceratina* sind im Nahen Osten vertreten. Darunter wurden 9 Arten und eine Unterart als neue Taxa erkannt und ausführlich beschrieben sowie mit ähnlichen Arten verglichen. Synonymie, Verbreitung und Literaturhinweise zur Identifizierung wurden für alle behandelten Arten angeführt.

References

DALY H.V. (1973): Bees of the genus *Ceratina* in America North of Mexico (Hymenoptera: Apoidea). — University of California Publications in Entomology **74**: 115 p. + 2 pl.

DALY H.V. (1983): Taxonomy and ecology of Ceratinini of North Africa and the Iberian Peninsula (Hymenoptera: Apoidea). — Systematic Entomology **8**: 29-62.

FRIESE H. (1896): Monographie der Bienengattung *Ceratina* (LATR.) (Palearktische Formen). — Természetrajzt Füzetek **19**: 34-65.

FRIESE H. (1901): Die Bienen Europa's (Apidae europaeae) nach ihren Gattungen, Arten und Varietäten auf vergleichend morphologisch-biologischer Grundlage. Theil VI. Solitäre Apiden. — Druck von C. Lampe, Innsbruck, 284 p.

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GERSTAECKER A. (1869): Beiträge zur näheren Kenntniss einiger Bienen-Gattungen. — Stettiner entomologische Zeitung **30**/4-6: 139-184.

HIRASHIMA Y. (1971): Subgeneric classification of the genus *Ceratina* LATREILLE of Asia and West Pacific, with comments on the remaining subgenera of the world (Hymenoptera, Apoidea). — Journal of the Faculty of Agriculture **16**(4): 349-375.

KOCOUREK M. (1998): Beiträge zur Kenntnis der Gattung *Ceratina* in der Westpaläarktis und dem turkestanischen Becken (Hymenoptera, Apidae). — Entomofauna **19**: 533-548.

LE GOFF G. & M. TERZO (in press): Nouvelles observations sur *Ceratina parvula* SMITH en France et en péninsule ibérique (Hymenoptera, Xylocopinae). — Bulletin de la Société Entomologique de France.

LICHTENSTEIN J. (1876): Observation à propos de la Revue critique des espèces du genre *Ceratina* LAT. (Hyménoptères) de M.H. Tournier. — Petites Nouvelles Entomologiques **2**: 90.

MAVROMOUSTAKIS G.A. (1954): On the bees of Cyprus. — Annals and Magazine of Natural History **12**(7): 578-588.

RASMONT P., BARBIER Y. & A. EMPAIN (1993): Microbanque Faune-Flore, logiciel de banques de données biogéographiques. logiciel MS-DOS version 3.0. — Université de Mons-Hainaut, jardin Botanique National de Belgique, XV+200+20+3+34+14 pp.

REINIG W.F. & P. RASMONT (1983): Über den anatolischen *Megabombus* (*Thoracobombus*) *pascuorum* (SCOPOLI, 1763) (Hymenoptera, Apidae). — Spixiana **6**(2): 153-165.

TERZO M. (1997): Une nouvelle espèce du genre *Ceratina* en Crète (Hymenoptera: Anthophoridae, Xylocopinae). — Entomologische Berichten, Amsterdam **57**(6): 97-100.

TERZO M. (1998): Lectotype designations of bees of the subfamily Xylocopinae in the collections of the Zoological Institute of Russian Academy of Sciences in St. Petersburg (Hymenoptera, Apoidea). Bulletin de la Société Entomologique de France **103** (4): 333-335.

TERZO M., KAFTANOGLU O. & P. RASMONT (in press): Biogéographie du genre *Ceratina* LATREILLE (Hymenoptera, Apoidea) dans la Çukurova et les environs immédiats (Turquie). — Annales de la Société Entomologique de France.

TERZO M. & P. RASMONT (1996): Redescription de *Ceratina gravidula* GERSTAECKER 1869 et de *Ceratina nigroaenea* GERSTAECKER 1869 (Hymenoptera, Apoidea, Xylocopinae). — Bulletin de la Société Entomologique de France **101**(1): 5-12.

TERZO M. & P. RASMONT (1997): *Ceratina zwakhalsi* et *Ceratina verhoeffi*, deux nouvelles espèces de la région ouest-paléarctique (Hymenoptera, Apoidea, Xylocopinae). — Tijdschrift voor Entomologie **140**: 221-236.

TERZO M., RASMONT P., VERHAEGHE J-C. & C. DECUYPER (1994): Rearing *Ceratina cucurbitina* (ROSSI) (Hymenoptera, Anthophoridae, Xylocopinae). p. 530 in Les insectes sociaux, XII Congres of the International Union for the Study of Social Insects. Paris, Sorbonne, 21-27 août 1994, Publication Université Paris Nord, 583 p.

YARROW I.H.H. (1970): Kirby's species of British bees: designation of holotypes and selection of lectotypes. Part 2. The species of *Apis* LINNAEUS now included in genera other than *Bombus* LATREILLE and *Psithyrus* LEPELETIER. — Proceedings of the Royal Entomological Society of London B **39**(11-12): 163-176.

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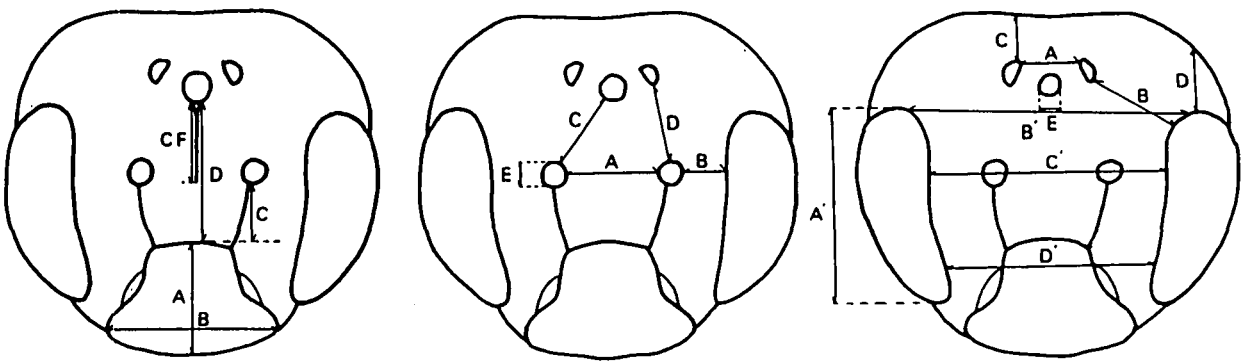

Figs. 1-3: cephalic views of female heads showing measurements. **1** – clypeus (A, B, C, D), frontal carina (CF); **2** – interalveolar (A, B, C, D, Ø E); **3** – interocellar (A, B, C, D, Ø E), eye (A', B', C', D'). Malar area (not shown): length * breadth.

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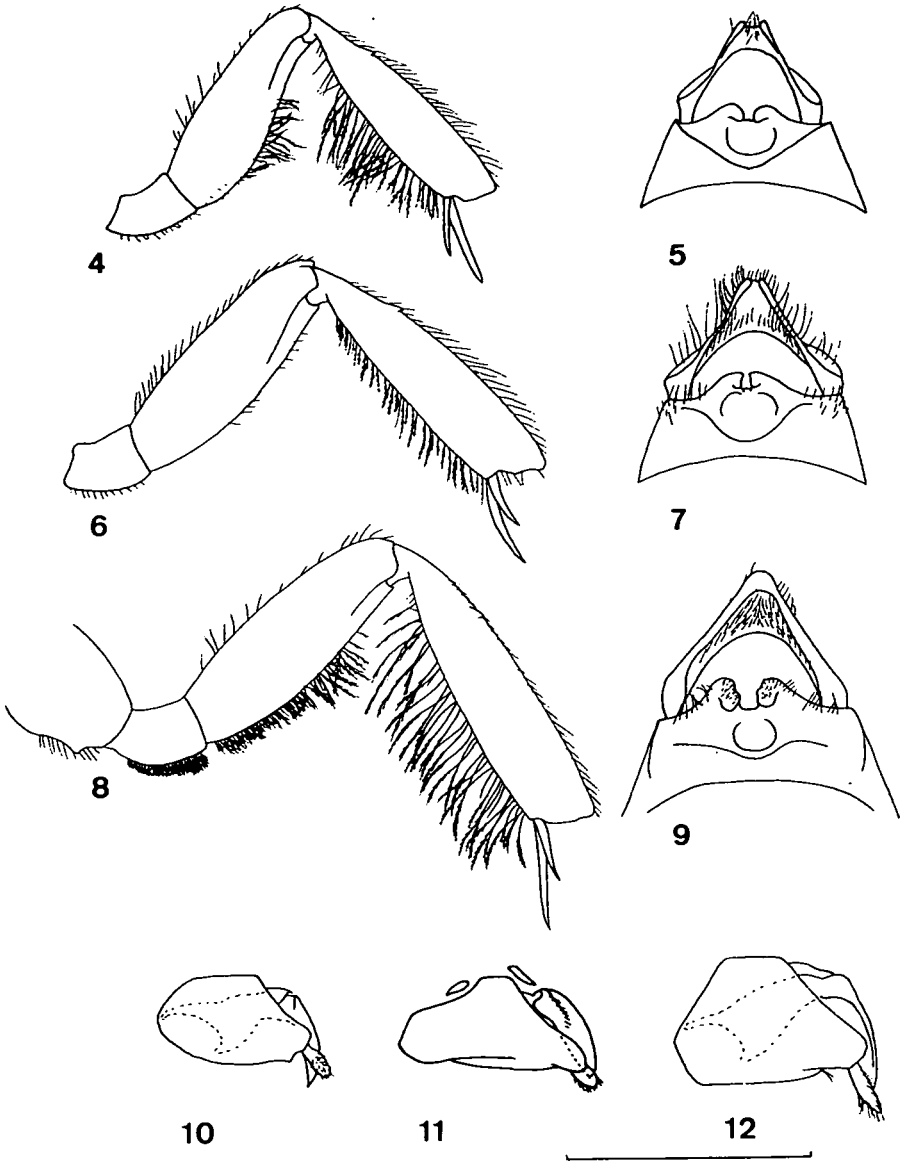

Figs. 4, 6, 8: left hind legs of males showing part of the vestiture; **5, 7, 9**: ventral views of apical segments of male abdomens showing the sternum 6 and apex of tergum 7; **10-12**: lateral view of male genitalia (scale line = 1 mm). **4, 5, 10**: *Ceratina christellae* sp. nov.; **6, 7, 11**: *C. mandibularis*; **8, 9, 12**: *C. denesi* sp. nov.

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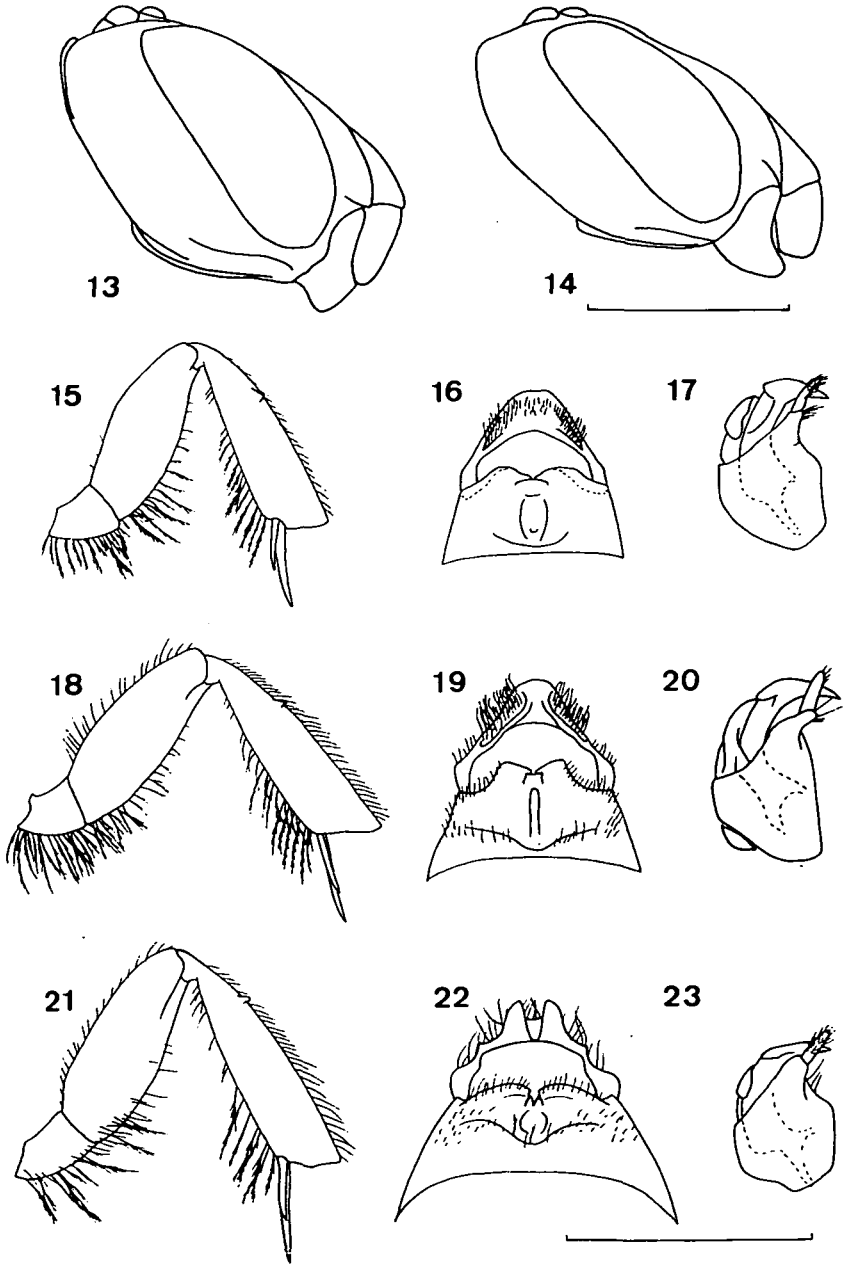

Figs. 13, 14: lateral view of head of females (scale line = 1 mm); **15, 18, 21**: left hind legs of males showing part of the vestiture; **16, 19, 22**: ventral views of apical segments of male abdomens showing the sternum 6 and apex of tergum 7; **17, 20, 23**: lateral views of male genitalia (scale line = 1 mm). **13**: *C. rasmonti* sp. nov.; **14**: *C. dallatorreana*; **15-17**: *C. sakagamii* sp. nov.; **18-20**: *C. dentiventris*; **21-23**: *C. schwarziana* sp. nov.

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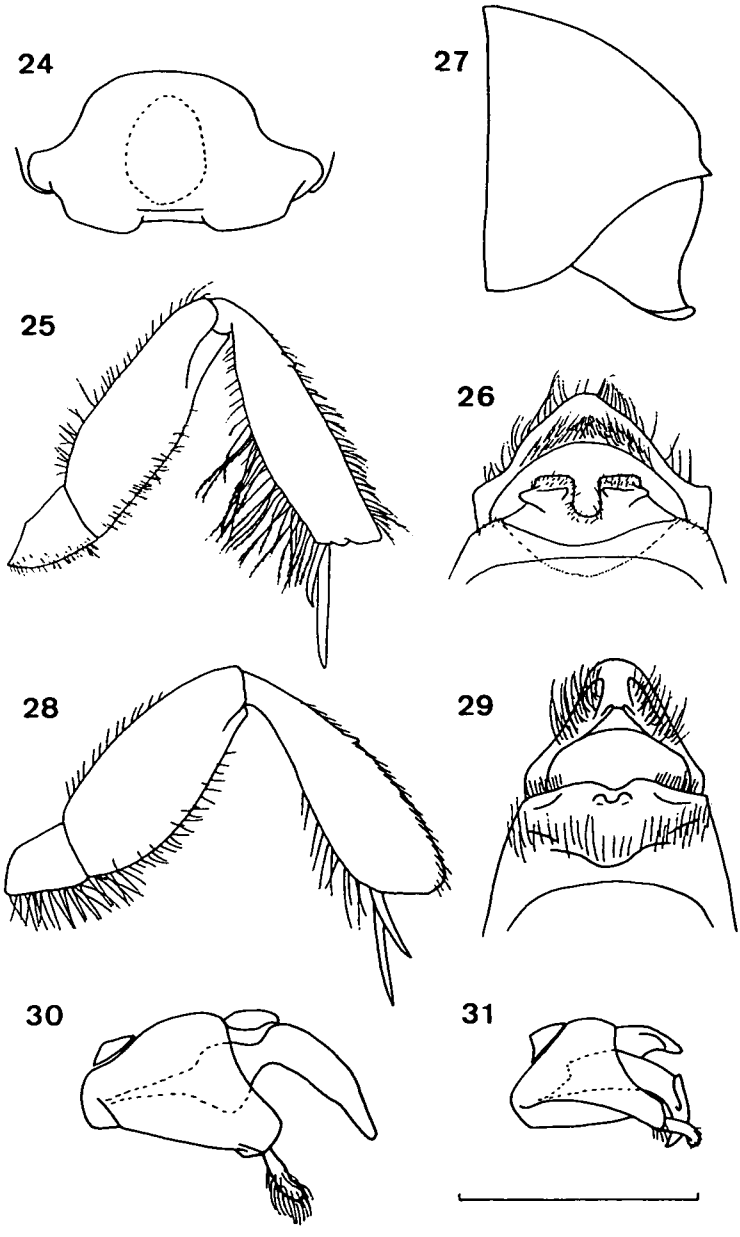

Figs. 24: female clypeus showing the emargination on anterior marge (ivory mark in dotted line); **25, 28**: left hind legs of male showing part of the vestiture; **26, 29**: ventral views of apical segments of males abdomens showing the sternum 6 and apex of tergum 7; **27**: lateral view of apical segments of male abdomen; **30, 31**: lateral views of male genitalia (scale line = 1 mm). **24**: *C. schwarziana* sp. nov.; **25-27, 30**: *C. warnckei* sp. nov.; **28, 29, 31**: *C. zandeni* sp. nov.

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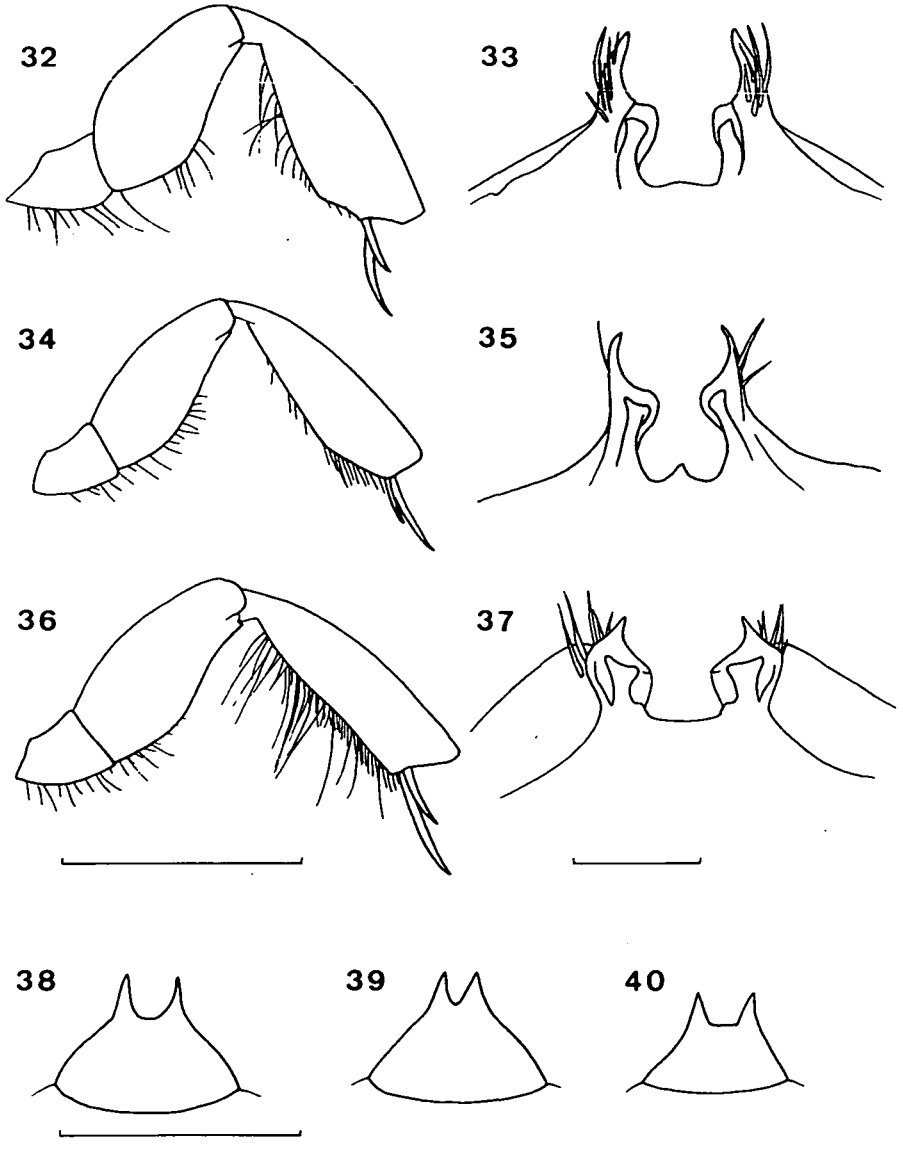

Figs. 32, 34, 36: left hind legs of males showing form and part of the vestiture of tibiae (scale line = 1 mm); **33, 35, 37**; ventral views of apical male sternum 6 (scale line = 0.1 mm); **38-40**: dorsal views of apical male tergum 7 (scale line = 1 mm). **32, 33, 38**: *C. nigra*; **34, 35, 39**: *C. bispinosa*; **36, 37, 40**: *C. schwarzi*.

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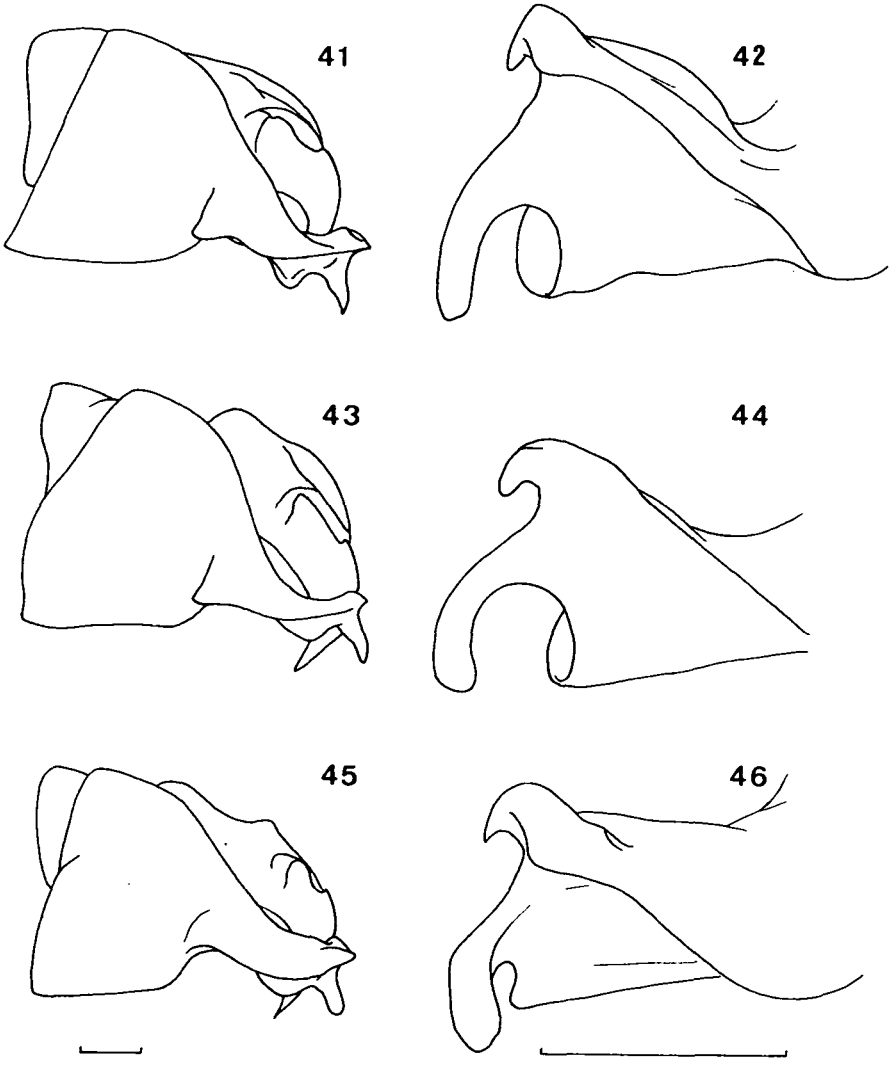

Figs. 41, 43, 45: lateral views of male genitalia (scale line = 0.1 mm); **42, 44, 46**: frontal views of left gonostyli of male genitalia (scale line = 0.1 mm). **41, 42**: *C. nigra*; **43, 44**: *C. bispinosa*; **45, 46**: *C. schwarzi*.

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