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THE GENUS CARABUS IN ISRAEL

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ABSTRACT

The 7 species of Carabus occurring in Israel, belong to the following subgenera; Trachycarabus (hermonensis n, sp.); Tomocarabus (mendelssohni n, sp.); Procerus (syriacus ssp. galilaeus n. ssp.); Chaetomelas (cf. praestigiator Mor,; bytinskii n. sp.); Lamprostus (hemprichi Dej, with the following subspecies: elonensis n. ssp.; sidonicus Lap., damascenus Lap.) and Procrustes (impressus Klug with the following subspecies: impressulus n. ssp.; dani n, ssp.; carmelita Lap.; jordanicus n. ssp.; palaestinus Lap.; hybridus Glbnegevensis n. ssp. hureishanus n. ssp.). Of the last two species distribution maps of their subspecies are given.

Introduction

The first author to investigate the Carabus-populations in Israel was Lapouge (1907, 1914) who described 3 subspecies of C. impressus Klug: var. carmelita, var. palaestinus and var. saronicus (= var. hybridus Gglb.), and one of C. hemprichi Dej.: var. sidonicus. Also Bodenheimer (1937) mentions only these two species, the first with 4 subspecies and the second with 3 sub- species (all of which however are mis nominations).

Very doubtful literary records are found of 3 more species: C. maurus ssp. osculati Osc. C. syriacus Kol. and C. rumelicus Chaud. the occurrence of which could not be verified in the localities mentioned.

It is chiefly due to the intensive collecting of Prof. H. Bytinski-Salz during the last 30 years, that the number of Carabus species could be increased to seven, most of the new species occurring on the Northern border of Israel and/or at Mount Hermon. The number of ssp. of C. impressus has been increased to 8 and that of C. hemprichi to 3.

Material

Through the kindness of Prof. H. Bytinski-Salz I received the whole material of Carabini of his collection (ByS.) and of the Department of Zoology of the Tel Aviv University (ZTA). A few specimens were also received from the Gordon House of Natural Studies, Deganiah and of the Ussishkin House at Dan. Numerous specimens were also collected (Sch.) during my visits to Israel

in February - April 1968, 1969, 1970, so that the total number of available specimens reached more than 200.

As formerly only a few specimens were known from places separated from each other by long distances, the present material enables us to give a more detailed picture of the distribution of each subspecies.

Concerning references, usually only the original quotation and a few more relevant citations are given. A more complete bibliography may be found in: Breuning St.; Monographie der Gattung Carabus Lfg. 1 - 10. 1935-38, Troppau C. S. R.

Acknowledgments

It is a great pleasure to me to thank all scientists and institutions, which have helped me in my investigations. Firstly to Prof. H. Bytinski-Salz and Prof. H. Mendelssohn who not only supported financially our researches, but also organized various collecting trips in Israel. To Dr. F. Janczik of the Natur-historische Museum Wien, who kindly lent to me all Carabus types of Ganglbauer and other specimens for comparison. I also owe much to the expert of the genus Carabus: Prof. Dr. C. Mandl, with whom I cleared up many taxonomic questions during long discussions.

KEY TO THE SUBGENERA OF CARABUS IN ISRAEL

1. Mandibulae short and broad, inner margin approximately straight, inner side abruptly bent, below the tip. (Fig. 1). Labrum always broader than the base of clypeus. Margin of pronotum always with setae 2

\- Mandibulae long, narrow and pointed, inner margin arched uniformly toward the tip, or if straight or only slightly bent, not pointed but obtuse (Fig. 2). In the subgenera included here pronotal margin always without setae 4

Note: C. (Lamprostus) syrus Roeschke and saulcyi Pioch. have short mandibles but the missing pronotal setae and the quaternary intervals on the elytrae place these two species here.

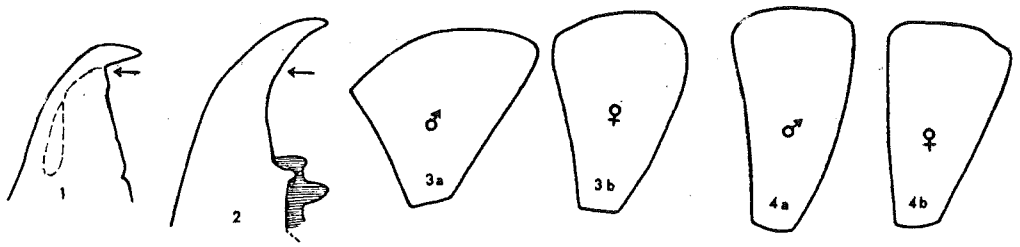

Fig. 1. C. (Trachycarabus) scabriusculus Ol. (Vienna). Left mandible (Type of an Brevimandibulate Carabus).

Fig. 2. C. (Procrustes) coriaceus L. (Vienna). Left mandible (Type of an Longimandibulate Carabus).

Fig. 3. C. (Tomocarabus) mendelssohni n. sp. Last maxillary joint. a) male, b) female.

Fig. 4. C. (Trachycarabus) hermonensis n. sp. Last maxillary joint. a) male, b) female.

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2. In the female, last maxillary joint broad, triangular, in the male axe shaped (Fig. 3a, b). Submentum levelled ..... Tomocarabus Reitt.

- Last maxillary joint in male and female elongate triangular (Fig. 4a, b)...3

3. Submentum thickened into a transverse pad ..... (Archicarabus Seidl.)

- Submentum plane ..... Trachycarabus Seidl.

4. Labrum divided into three flaps (Fig. 5). Mental tooth truncate ore bifid ..... Procrustes Bonn.

- Labrum always divided into two flaps (Fig. 6). Mental tooth normal, more or less pointed 5

5. Last joint of the maxillary palpi strongly triangular (♂) or axe-shaped (♀). In the male, anterior tarsi not widened and soled. Sculpture of elytrae coarsely tuberculate, body broad and large: 37-44 mm. Procerus Dej.

- Last joint of maxillary palpi in both sexes widened, only slightly triangular. Sculpture of elytrae varying but always much finer than preceeding. Male anterior tarsi widened and soled Body more slender and smaller:.....6

Mandibles elongated, extremely long and slender (Fig. 7). Basal spike of the first tooth of right mandible reduced, always shorter than the apical . Relatively large species (25 - 35 mm) with slender habitus and abdominal pores. Sculpture of elytrae with punctate stripes .... Chaetomelas Thoms.

Mandibles always shorter and broader, with normal teeth (Fig. 8). Sculpture of elytrae without punctate stripes. Abdominal pores absent .... Lamprostus Motsch.

Note: In Lamprostus saulcyi Pioch. remains of abdominal pores are sometimes visible. However, the form of mandibles, the very fine sculpture of elytrae and the broad form of the body refer this species into the Subg. Lamprostus Motsch.

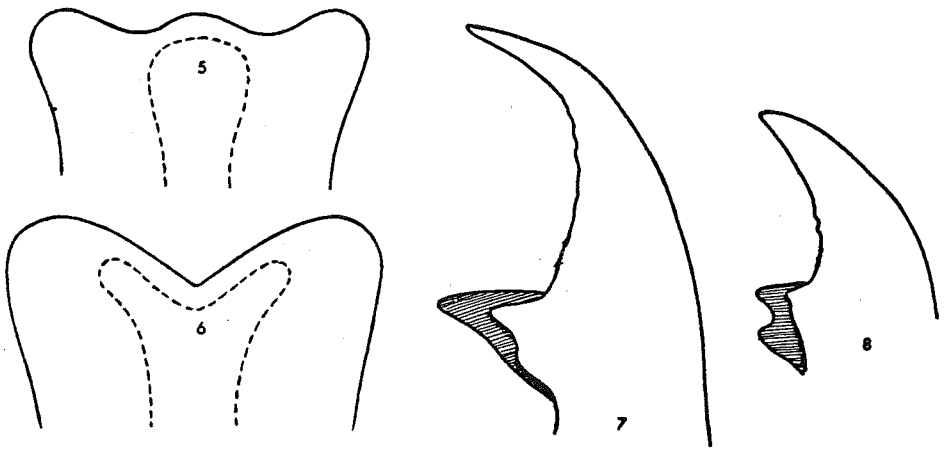

Fig. 5. C. (Procrustes) impressus ssp. hybridus. Ganglb. Labrum

Fig. 6. C. (Lamprostus) hemprichi ssp. sidonius Lap. Labrum.

Fig. 7. C. (Chaetomelas) praestigiator Moraw. Right mandible.

Fig. 8. C. (Lamprostus) hemprichi Dej. Right mandible.

A) Subg. Trachycarabus Seidl.

Key to the species:

1. Frontal grooves of the head deep and long. Punctation on head finer and denser. Lateral margin of pronotum more ampliated, strongly bent up before posterior angles. Posterior angles longer, flapformed, visibly pointed on tip. Disc of pronotum with very fine and dispersed punctation. Elytrae longer and slenderer, moderately rounded on tip, sculpture irregular, intervalls more elevated and minced. Shoulders angulate, strongly prominent ..... maurus ssp. osculati Osc.

Frontal grooves shallow and shortened. Punctation on head stronger and more dispersed. Lateral margin of pronotum narrowed, hardly bent up before posterior angles. Posterior angles, rounded, almost not extended beyond the base of pronotum. Elytrae shortened, broader, pointed at tip; sculpture very regular, intervalls more depressed but homogeneous. Shoulders more rounded, slightly prominent..... hermonensis n. sp.

According to Breuning (Mon. Carabus III., p. 517) C. maurus ssp. osculati Osc. has been recorded from Haifa. This record seems very doubtful, because the ssp. osculati Osc. has been described from Iran. Also the general distribution of C. maurus Ad. extends only to Northern and Central Lebanon. Specimens from the Lebanon, examined by the author, belong to another distinct subspecies of C. maurus Ad., which is quite different from the ssp. osculati Osc. Probably all dates mentioned by Breuning from Libanon and Israel are based on wrongly labelled material or are confounded with other forms.

C. (Trachycarabus) hermonensis n. sp.

Fig. 4,9; Plate I. fig. 1.

Holotype and Allotype: ♂♀ Mt. Hermon 2100 m. 16.V.69 leg. and coll. By.S.

Paratypes: 3 ♂ 3 ♀ same locality and date leg. and coll. By.S. and Sch.

Distribution: Mt. Hermon in higher altitudes, probably an endemic species.

Nearly related to C. (Tr.) maurus Ad., but differing by its shortened form, shallow and shortened grooves on the forehead, the form of pronotum whose disk is much stronger and denser punctate, rounded shoulders, in proportion to the length broader elytrae, which are visibly pointed on the tip, stronger punctation on the underside, shorter mental tooth and the different form of male genitalia. From the ssp. osculati Osc. differing especially by the much finer sculpture of elytrae, form, and punctation of the pronotum and all other details given for maurus.

Compared to maurus and his subspecies, general form shorter and broader. Head as in maurus, but the eyes less prominent. Grooves on the forehead moderately impressed, short, reaching only the anterior margin of the clypeus (in maurus s.l. these grooves are much deeper, ending near the anterior margin of eyes). Forehead irregularly, strongly and scatterly punctate, rather strongly wrinkled beside the eyes and to the base. Antennae shorter than in maurus, surpassing slightly the shoulders (in maurus s.l. the antennae are longer, more slender, reaching the end of the anterior third of elytra). Mental tooth similar to that of maurus, but shorter and broader, triangular, extremely sharp-pointed, shorter than the lateral lobes (in maurus as long as the lateral lobes of mentum). Last joint of the maxillary palpi in both sexes more slender than in maurus.

Pronotum transverse, more than one and a half times wider than long in the median line (as 20:32), widest approximately in the middle, attenuating moderately, rounded anteriorly and posteriorly. Base of pronotum as wide as the distance between the anterior angles. Lateral margin as in maurus s.l. fairly narrow, hardly bent before the posterior angles. Posterior angles extremely shortened, broadly rounded flap-formed, hardly extending over the base of the pronotum (in maurus s.l. the posterior angles are longer, flap-formed, visibly pointed, moderately extending over the base of pronotum). Anterior angles broadly rounded, almost not extending the slight concave anterior margin, which is thickened in the middle. Surface somewhat depressed; median line slightly dash-formed, visible along the whole length. Basal Foveae similar to maurus, rounded, fairly shallow. Disk essentially stronger and more densely punctate than in maurus, interspaces in part vermiculate; in the posterior part of pronotum and laterally the sculpture becomes coarse as the points conflue partially to a strong rugulosity. Lateral margin with two setae, one on the base and one in the middle.

Elytrae comparing with maurus s.l. more shortened and broader, inverted egg-shaped, less than two times longer than wide (as 70:40), widest point slightly after the middle, attenuating nearly in a straight line towards the base, strongly and more rounded towards the tip. Lateral margin broader and more strongly bent up. Shoulders visibly depressed, rounded, moderately prominent. Sculpture medium fine, intervalls regularly ribformed, moderately elevated, interrupted by points in short and rounded tubercles; primary intervalls interrupted by small shallow pits in short and regular links which elevate hardly over the others; first intervall separated visibly from suture-line; lateral of the third primary intervall four intervalls distinctly visible. Interspaces with fine and distinct punctation. The whole sculpture transformed into very small, shining granules towards the tip. In maurus the sculpture of the elytrae is much more rough and very irregular, the tubercles of intervalls are pointed and primary pits absent.

Metaepisternae comparing with maurus more slender, roughly and densely punctate. Lateral sides of sternites rougher and more dispersed punctate than in maurus. Ventral furrows well developed. Hind femurs also in the female more clubbed and shorter than in maurus.

Male genitalia: The penis (fig. 9 a, b) is similar to that of maurus (Fig. 10 a, b) but more arcuate and obtusely pointed at the tip.

♂ length: 17-19 mm

Width (Elytrae): 8-9 mm.

♀ length: 15.5-20 mm

Width (Elytrae): 7.5-10 mm.

Body unicolorous black shining, lateral margin of elytrae with indistinct bluish reflexes.

B. Subg. Tomocarabus Reitt.

C. (Tomocarabus) mendelssohni n. sp.

Fig. 3.11; Plate I. Fig. 3

Holotype and Allotype: ♂♀ Mt. Hermon 2100 m. 16.V.69 leg. and coll. By. S.

Paratypes: 3 ♂ 3 ♀ same locality and date leg. By. S. in coll. By. S. and Sch.

Distribution: Recorded till now only from the higher altitudes of Mt. Hermon, here presumably an endemic element.

Related to C. (Tomoc.) rumelicus Chaud. Differing by smaller size, broader oval form of body, shape of pronotum, sculpture of elytrae, and different form of male genitalia. From C. (Tomoc.) microderus Chaud. differing especially by the much longer posterior angles of pronotum, sculpture of elytrae and form of male genitalia.

Unicolorous black, little shining, lateral margin of elytrae with bluish reflexes. Head of normal size, eyes much prominent. Frontal grooves on the clypeus moderately impressed and acute, posteriorely more shallow but reaching the anterior margin of the eyes. Clypeus well separated. The whole forehead with medium fine and relatively dense punctation more or less roughly wrinkled beside the eyes and on the base. Antennae of normal length, reaching the end of the anterior third of the elytrae, in the male segments 3 and 4 very indistinctly knotted. Mental tooth triangular, sharply pointed, as long as lateral lobes (in rumelicus visibly shorter than lateral lobes).

Pronotum transverse, more than one and half times wider than long in median line (as 20:35), widest in the middle, rounded anteriorely but nearly in a straight line posteriorely. Base of pronotum as wide as the distance between the anterior angles, straight. Lateral margin narrow, posteriorely somewhat widened and imperceptibly bent up, just before the posterior angles. Anterior angles rounded, not protruding from the narrowly bordered and weakly curved anterior margin. Posterior angles moderately shortened , acute-

angled and pointed, slightly bent down. Disc slightly vaulted, finely and coriaceously rugose and distinctly, finely punctate. Median line extremely fine, hardly visible, shortened towards the base and tip of the pronotum. Basal foveae very shallow, scarcely visible. Lateral margin with two setae, one on the base and one before the middle. In rumelicus the lateral sides of pronotum are more uniformly rounded, weakly heart-shaped emarginate just before the posterior angles, which are visibly shorter and broader. The disc of pronotum is in rumelicus moderately vaulted and finely reticulate.

Elytrae oval, about one and half times longer than wide (♂ as 70 : 45, ♀ as 75 : 50), widest just after the middle, slightly vaulted, apically moderately decreasing, sharply pointed at the tips. Lateral sides moderately restricted in a nearly straight line anteriorad, but strongly in a well rounded arc posteriorad, margin somewhat shorter than in rumelicus. Shoulders weakly marked, rounded. Sculpture fine and nearly completely depressed, primary, secundary and tertiary intervals well visible and regular in part. Primary intervals scarcely more elevated than the others, interrupted by middlefine and shallow punctures in indistinct, strongly flattened chaims, every puncture in its posterior part with a very small rasp-formed, shining granule. All other intervals partially disappearing in small rasp-formed granules, which are visibly rougher apically. Interspaces with a fine and distinct punctation, punctures notched the intervals partially. Quartenary intervals almost indistinctly indicated. In rumelicus the whole sculpture of elytrae is much rougher and more regular.

Metaepisternae as long as wide, punctation very rough and dense. Epipleurae of pronotum impunctate, smooth and shining. Lateral sides of sternites medium finely and medium densely punctate, ventral furrows well developed. Fore legs also in the male with indistinct clubbed femurs. Mental tooth triangularly pointed, invisibly shorter than lateral lobes.

Male genitalia: The penis (fig. 11) is in lateral view tolerably widened in the middle but strongly narrowed to apex and base. The hook-formed obtusely pointed apex is strongly bending ventrally. In dorsal view the apex is visibly distorted.

♂ : Length 17-17.5 mm

Width (Elytrae) 7.5-8.5 mm

♀ : Length 27-19 mm

Width (Elytrae) 8-9 mm

I dedicate this new species to Prof. Dr. H. Mendelssohn in honour of his merits as chairman of the Committee of the Fauna Palaestinae.

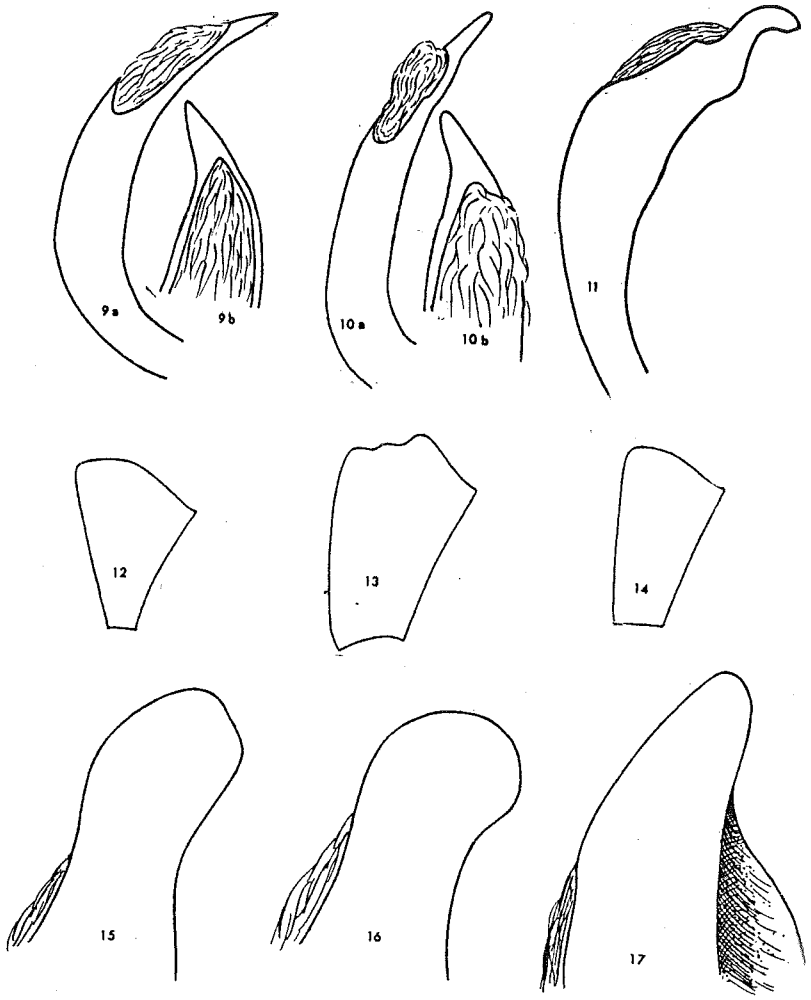

Fig. 9. C. (Trachycarabus) hermonensis n. sp. Penis. a) lateral, b) apex dorsal.
Fig. 10. C. (Trachycarabus) maurus Ad. (Persia). Penis. a) lateral, b) apex dorsal.
Fig. 11. C. (Tomocarabus) mendelssohni n. sp. Penis lateral.
Fig. 12. C. (Chaetomelas) praestigiator Moraw. (Lebanon). Termianl joint of left maxillary palpus.
Fig. 13. C. (Chaetomelas) bytinskii n. sp. Terminal joint of left maxillary palpus.
Fig. 14. C. (Chaetomelas) piochardi Geh. (Syria). Terminal joint of left maxillary palpus.
Fig. 15. C (Chaetomelas) praestigiator Mor. (Lebanon). Penis apex.
Fig. 16. C. (Chaetomelas) bytinskii n. sp. Penis apex.
Fig. 17. C. (Chaetomelas) piochardi Geh. (Syria). Penis apex.

C) Subg. PROCERUS Dej.

C. (Procerus) syriacus ssp. galilaeus nov.

Plate I. Fig. 2

Holotype: ♂ Elon II. 1944 leg et coll. By. S. Allotype: ♀ Elon e. IV. 44 leg. et coll. By. S. Paratypes: ♀ Chanita 8. IV. 46 leg. By. S. ♂ Elon IV. 61 in coll. ZTA. ♀ Elon IV. 43 leg. J. Teich in coll. Sch.; ♀ Adamit 1. V. 65, leg. Kugler in coll. ZTA; ♂ Hermon IV. 49 leg. Kushnir coll. Sch. ♂ Hermon 2000 m 23. IV. 69 leg. Ch. Sandler coll. By. S. Also 2 specimens without locality in Dept. Entomology, Hebrew University, Jerusalem.

Distribution: Upper Galilee, very local. According to Breuning (Mon. Carabus VI. p. 1330) also recorded from Haifa (leg. ??) and Mt. Tabor (leg. Sahlberg), dates which seem very doutful to me. The ssp. syriacus syriacus Kol. is recorded from Syria, Libanon and Antilibanon. In the Amanus Mountains and Southeastern Taurus probably another subspecies is occurring.

Differing from the nominate form by smaller size, slenderer habitus and the weakly arched widened elytrae. Head moderately widened, forehead between eyes broader, frontal grooves somewhat more impressed. Lateral sides of pronotum attenuating strongly, rounded posteriorad, so that the base of pronotum becomes as wide as the distance between its anterior angles (in syriacus s. str. the base of pronotum is essentially wider than the distance between the anterior angles); posterior angles broadly rounded (in syriacus s. str. the posterior angles are shortly flap-formed, rounded at tip, always producing the basal margin), basal foveae almost unrecognizable. Elytrae more slender, surface slightly depressed, pointed at tip, lateral sides and shoulders less rounded, lateral margin more ampliate, sculpture finer than in the nominate form with 13 more or less regular series of tubercles. Sculpture of underside somewhat rougher and denser.

♂ : Length 37.0-40 mm

Width (Elytrae) 16 -18 mm

♀ : Length 42-44 mm

Width (Elytrae) 18-19 mm.

D) Subg. Chaetomelae Thoms.

Key to the species:

1. Head more narrow and slender. Elytrae shorter, convex, lateral sides distinctly rounded, also at the end. Form more compact. Sculpture of elytrae coarser, intervals more or less, but always visibly elevated. Terminal joints of maxillary palpi in male strongly widened (Fig. 12). ..... praestigiator Mor.

-- Head notably broader. Elytra more slender, lateral sides more parallel-sided or rounded in a very flat arc, pointed at the end. Form more slender and more elongate. Sculpture of elytrae essentially finer, intervals depressed. Terminal joints of maxillary palpi in male more slender. (Fig. 13, 14) ..... 2.

2. On the average greater (32 - 35 mm). Body shape more elongate and very slender. Forehead finely and regularly punctate. Pronotum broader, widest in the middle, lateral sides slightly semicircularly rounded, basal foveae shallow and nearly impunctate. Elytrae very slender, nearly parallel - sided in first two thirds, then strongly restricted in terminally third, sharply pointed at the tip. Sculpture of elytrae with fine and partially also irregularly punctate striae, wich are changed terminally into a fine granulation. Lateral sides of sternites medium coarse punctate. Terminal joint of maxillary palpi in male broader. (Fig. 13). Mental tooth spike-formed, sharply pointed. ..... bytinskii n. sp.

-- On the average smaller (25-28 mm). Body shape visibly shorter. Forehead only beside the frontal grooves with sparse, very fine punctation. Pronotum more slender, widest before the middle, lateral sides more straight, only weakly widened, basal foveae well marked with medium fine punctation. Elytra shorter, less attenuating in the terminally third but also pointed at the end. Sculpture of elytra coarser, with distinct regular punctate striae, which are changing terminally into a medium rough granulation. Lateral sides of sternites very finely punctate. Terminal joint of maxillary palpi in male very slender (Fig. 14). Mental tooth much broader ..... (piochardi Geh.)

C. (Chaetomelas) praestigiator Moraw.

(1832 ehrenbergi Klug: Symb. phys. Ins. III. T. XXIII fig. 7.)

(Homonym to C. (Eucarabus) maeander ssp. ehrenbergi Fischer v. Waldheim 1829, (Type loc.: Kamtschatka)).

1886 praestigiator Morawitz: Mem. Ac. St. Petersb. (7) XXXIV No. 9 p. 8.