

**A REVIEW OF OLD WORLD SPECIES OF *THYREUS*  
PANZER (= *CROCISA* JURINE)  
(Hym., Apoidea, Anthophoridae)**

**Part 4. Palearctic Species**

by

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With 38 text-figures and 4 plates

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A — GENERAL

Introduction

The present account is the fourth and last instalment<sup>1)</sup> of a partial revision of *Thyreus* Panzer, a melectine genus of parasitic anthophorid bees, geographically restricted to the Eastern Hemisphere.

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1) References to communications published earlier on the same subject are to be found in the writer's last review of the Indo-Australian fauna, which appeared in this journal (Lieftinck, 1962, *Zoologische Verhandelingen, Leiden* **53**: 1-212, 72 figs. & 3 plates).

The only existing publication dealing with the genus as a whole is Reinhold Meyer's "Gattung *Crocisa* Jur.", which appeared in 1921 (Archiv für Naturgeschichte **87** (A): 67-178). Disregarding all literature bearing upon the subject issued prior to Meyer's paper, it must be said that even after its appearance few students of the Old World bee fauna have occupied themselves with the genus or ventured to criticize this bold experiment which, though grossly superficial, is indispensable as a reference work. Except for some new locality records published in faunistic papers and keys given for species often insufficiently characterized, the taxonomy of the palearctic *Thyreus* has practically remained unstudied ever since. There is, however, one important exception which deserves special attention here. This is the article published in 1939 by J. de Beaumont, entitled "Les *Crocisa* de la faune française" (Ann. Soc. ent. France **108**: 161-171, 22 figs.), which has contributed much to our knowledge of the west European fauna. It clears up some dark points in the synonymy, gives the diagnoses of six species occurring in France, with brief notes on their distribution outside that country, and is accompanied by excellent illustrations inclusive of those rendering the male gonostyli.

It is the purpose of the present paper to extend our knowledge and bring it up to date. In previous reports I have included all species pertaining to the Oriental and Australian faunal regions, and also a limited number that have made their way into the northern temperate regions. As the title indicates, the geographic area surveyed on this occasion embraces the entire Palearctic Region, with the exception of present-day Japan. Although the great majority of forms treated are concentrated in the palearctic, here too we meet with transitional elements whose main centre of distribution lies outside the generally accepted limits of the region. Consequently, geographic boundaries are set rather arbitrarily, for in either case they had to be adjusted to the distribution pattern, so far known, of a somewhat heterogeneous assortment of species.

As stated above, a number of predominantly tropical species but occurring in Japan, Korea etc. as well, were described and tabulated already in my former account. These are therefore omitted from the key and subsequent discussions presently supplied. On the other hand, I have incorporated such species as are found also in peripheral parts of the region; that is to say (1) all species known to occur in Africa north of the Sahara (inclusive of the Canary Islands) and the whole of Egypt; (2) some Arabian forms extending as far north as the Egyptian coast; and (3) one or two Indian *Thyreus* ranging much farther west into parts of the eastern Mediterranean. The inclusion even of a few isolated non-regional bees is accidental and due

only to the availability of several additional types. This may prove advantageous to future workers dealing with the Ethiopian fauna which, though very rich, has not yet been critically revised (see p. 8).

Not counting 7 tropical species recorded in 1962, which have colonized to the north, we arrive at a total of about 40 species known to occur within our faunal limits. The list includes 8 species here recognised and described as new as well as an equal number of doubtful ones whose status I have been unable to ascertain. The investigation of many hundred specimens lodged in various museums enabled me to correct many mis-identifications and to redefine 32 types. The last mentioned ones comprise 19 holotypes, 11 lectotypes here selected as such, and 2 'cotypes'. Of these, 19 proved to be identical with previously described species, bearing specific names now relegated to synonymy, or else, were named as 'varieties', frequently of species with which they have nothing to do but necessitating without exception also their suppression as synonyms of others. Names of varieties are considered coordinate with specific names and have been treated accordingly.

For the bees occurring within the area outlined as above, the most important references are given as in my previous account, i.e. under the heading of each species. In many cases it was thought advisable to copy all locality and identification labels given to bees already examined by other authors because most, if not all, of these specimens have formed the basis of published records to be found in the literature cited. In this manner much could be learnt about the taxonomic history of each species. In the captions that follow the synonymy is explained, specific features are discussed and key characters, where necessary, supplemented.

The key for the separation of the species is designed for practical use. Since its dichotomies are based on mixed characters it reflects only occasionally the natural affinities of the taxa involved. It will be seen that of the 31 species included, 8 are known only from the males, 4 being based on the morphology of solitary females. It follows that the key had to be artificially constructed and has become rather lengthy to fit the characters of either sex. While attempting to avoid the disadvantage of employing unisexual characters, it contains nevertheless as many features shared by both sexes as possible.

To avoid repetition and tedious descriptions, the specific characterizations in the text have been condensed as much as possible, the essential parts of the work being the key, the accompanying line drawings and photographs, and the synonymy established.

The alphabetical catalogue at the end of this paper gives the names of all taxa presently discussed, with their synonymies, and including also the species *incertae sedis*, treated separately in an appendix.

Table I

Distribution of the Palearctic species of *Thyreus* Panzer, arranged geographically from west to east <sup>1)</sup>.

Species treated in this paper	West Europe	Central Europe	East Europe (incl. Russia)	Mediterranean (+ Canary Is. + Egypt)	Northeast Africa + Arabia (+ Socotra)	West Asia (incl. Asia Minor)	Central Asia (incl. North India)	China	Mongolia & Manchuria
1. <i>aberrans</i> *	.	.	.	.	.	+	.	.	.
2. <i>affinis</i>	+	+	+	+	.	+	+	.	.
3. <i>altaicus</i>	.	.	.	.	.	+	+	+	+
4. <i>bimaculatus</i>	.	.	.	.	.	.	.	+	.
5. <i>biseriatus</i> *	.	.	.	.	.	.	+	.	.
6. <i>dimidiatipuncta</i>	.	.	.	+	.	+	.	.	.
7. <i>dimid. bidentatus</i>	.	.	.	.	.	+	.	.	.
8. <i>elegans</i>	.	.	+	+	+	+	+	.	+
9. <i>fallibilis</i>	.	.	.	.	+	.	.	.	.
10. <i>hellenicus</i>	+	.	+	+	.	+	.	.	.
11. <i>hirtus</i>	+	+	+	+	.	+	.	.	.
12. <i>histrionicus</i>	+	+	+	+	+	+	+	+	.
13. <i>hyalinatus</i>	.	.	.	+	+	+	.	.	.
14. <i>illudens</i>	.	.	.	.	.	.	.	+	.
15. <i>impexus</i>	.	.	.	.	.	.	.	+	.
16. <i>incultus</i>	.	.	.	.	.	.	.	+	.
17. <i>intrudens</i> *	.	.	.	.	.	.	.	+	.
18. <i>laevicrus</i> *	.	.	.	.	.	.	+	+	.
19. <i>mauretaniensis</i>	.	.	.	+	.	.	.	.	.
20. <i>merviensis</i>	.	.	.	.	.	+	.	.	.
21. <i>nubicus</i>	.	.	.	+	+	.	.	.	.
22. <i>orbatus</i>	+	+	+	+	+	+	.	.	.
23. <i>parthenope</i>	.	.	.	+	+	.	.	.	.
24. <i>paucimaculosus</i>	.	.	.	.	.	+	.	.	.
25. <i>picaron</i>	+	.	+	.	.	+	.	.	.
26. <i>picea</i> *	.	.	.	+	.	.	.	.	.
27. <i>picicornis</i>	.	.	.	.	.	+	.	.	.
28. <i>plumata</i> *	.	+	.	.	.	.	.	.	.
29. <i>praevalens</i>	.	.	.	.	.	+	.	.	.
30. <i>priesneri</i>	.	.	.	+	.	.	.	.	.
31. <i>propinquus</i>	.	.	.	.	.	+	+	.	+
32. <i>ramosellus</i>	.	.	.	+	+	+	+	.	.
33. <i>ramosus</i>	+	+	+	+	+	+	+	+	.
34. <i>ruficornis</i> *	.	.	.	+	.	.	.	.	.
35. <i>scutellaris</i>	.	+	+	+	+	+	.	+	+
36. <i>sibiricus</i>	.	.	.	?	.	+	+	.	+
37. <i>tricuspis</i>	.	.	.	+	.	+	.	.	.
38. <i>truncatus</i>	+	+	+	+	+	+	.	.	.
39. <i>unicincta</i> *	.	.	.	.	.	.	.	+	.
40. <i>uniformis</i>	.	.	.	.	+	.	.	.	.
Total	8	8	10	19	11	23	10	11	5

<sup>1)</sup> Species incertae sedis are marked with an asterisk (\*)

### Distribution

A general picture of the geographical distribution of the regional *Thyreus* is given in the table. This records the occurrences in broadly outlined areas and should be compared with the one given for the Indo-Australian members of the genus (Lieftinck, 1962: 8-9).

### Comparison of different faunal regions

One of the most striking features of the Old World Melectini is, of course, the highly decorative body pattern of light and dark pubescent markings. I wish to draw attention to the difference in colour exhibited by the bees living in temperate regions and those inhabiting tropical countries. In the temperate zone — north of the tropic of Cancer — the light pubescence of the truly palearctic species is invariably white, whereas in the warmer countries nearly all *Thyreus* are coloured various shades of blue <sup>1)</sup>. Only three tropical Asiatic species centred in the Orient but ranging into the Palearctic Region north of 30° N. latitude (i.e. *T. albolateralis*, *ramosellus* and *takaonis* — all described by Cockerell) are white, the remaining 27, i.e. 90 per cent of the total, are blue. Six of the latter have developed similarly coloured geographical subspecies that have found their way northward into Eurasia, but these occur mostly in the higher mountains of south and central China <sup>2)</sup>. Here they meet a small contingent of white-haired palearctic forms with which they apparently share some habitations and may even occur together in places, but there is no indication whatsoever that both have the same hosts. Assuming this difference in colour to be primarily influenced by the climate it may, perhaps, indicate that there are two categories derived from different mainland stock whose ranges overlap in the transitional zone. This seems to be the case also with certain easily distinguished species-groups of the anthophorid genus *Amegilla* Friese, the hosts most frequented by *Thyreus*. Several instances, not yet substantiated, are now known from the Malay Archipelago and central Asia where two structurally different groups of *Amegilla* occur side by side with species of *Thyreus* which evidently also belong to different groups. It would be of great interest to find out what exactly are the relations between each of these groups of *Thyreus* and *Amegilla*, to compare their present distribution,

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1) In the absence of comparable studies of the Ethiopian fauna it is impossible to decide whether this applies to the African *Thyreus* as well.

2) Subspeciation — especially insular — is very well marked in a number of Oriental species throughout the Malay Archipelago, whereas, on passing from one region to another in north temperate Eurasia, no breaks in the appearance of the forms seem to occur.

and to establish the routes they have followed to meet as well as their possible centre of origin.

Morphologically, the oriental and palearctic faunal elements are very similar, males of the two 'cohortes' being equally diversified with regard to the accessory copulatory organs and genital apparatus. Also the venation and pubescent pattern have developed according to the same plan. Incidentally, it appears of interest to memorize that in respect of body maculation all of them differ markedly from their congeners of the Australian continent (Liefertinck, 1962). The same applies to the *Thyreus* fauna of the Ethiopian Region of which, however, little or nothing else can be said. In general appearance they are similar to the rest (Australia excepted), albeit that the African fauna has several species more handsomely coloured and of bigger size than anywhere else, comprising blue as well as white-spotted forms. Not counting the Mediterranean elements in the fauna of that great continent, I have listed no fewer than 90 names based on a multitude of inadequate descriptions and notes scattered all over the literature — and it may well be that I have overlooked a dozen or so more. These African *Thyreus* are probably equally diverse morphologically, but since not one of the described taxa has yet been investigated upon its genital structure, our knowledge of this medley is insignificant and the nomenclature still in a chaotic state.

Considering the above, I am afraid that any attempt to establish the natural affinities within the genus must wait until the African *Thyreus* have been analysed.

#### Host relationship and flower records

Although we may safely assume that all members of *Thyreus* are predator-inquilines in the nests of Anthophorini, there is little positive information in the literature on this matter. As far as the palearctic species are concerned I have been unable to find more than brief statements or cursory observations on the relations between host and parasite, several of these being obviously based on second-hand information. The fullest account is, perhaps, that given by Ferton (1920, see under *T. histrionicus* (Ill.)), who inspected the nesting place of a solitary female of *Amegilla quadrifasciata* (Vill.) near Djidjilli in Algeria. After the bee was caught the observer dug out a single cell which he found at the bottom of a 6 cm long tunnel excavated in an earthen wall. Instantly after this was done, a female *Thyreus histrionicus* came to investigate the exact spot and its disrupted surroundings, making vain efforts to discover the entrance hole. Ferton is probably right when assuming that the olfactory organs (i.e. the antennal

rhinaria) of *Thyreus* must have guided the latter to find the nesting site of *Amegilla*.

In temperate regions the majority of *Thyreus* are summer species, being on the wing when the flight season of the true *Anthophora*, with their vernal parasites of the genus *Melecta*, is over and other pollen-collecting anthophorines such as *Amegilla* and *Heliophila* are making their appearance. There is considerable evidence, however, that some species at least are not too fastidious as to the choice of their hosts, much apparently depending on the distribution pattern of the associates in a given area and the coincidence of their season of flight. Stoeckhert (1954, Abh. Bayer. Akad. Wiss., N. F. 65) for instance, mentions two aestival species of true *Anthophora* occurring simultaneously with *Thyreus orbatus* (Lep.) near Erlangen (Bavaria). The species whose nesting sites were infested are *A. quadrimaculata* (Panz.) and *A. borealis* Mor. Stoeckhert, who kept a colony of the latter under observation for several years in succession, remarks on the inquilinous *T. orbatus* that it became increasingly more abundant from year to year until it finally exterminated the colony of its host by overpopulation.

Other published records on the relations between pollen-collecting anthophorini and *Thyreus* are few in number and contained in the bibliographic reference of the species concerned; they have been mentioned also at the end of the discussions.

As to the various flowering plants frequented by *Thyreus*, many names can be found in the literature but in the present paper only unpublished flower records are given, most of these having been taken from labels of recently collected specimens.

#### Acknowledgements

During the preparation of this part of my work I have continued to receive the active support and co-operation of many hymenopterists interested in this survey. Curators in charge of institutional collections as well as private students of the bees have helped me locating type specimens, provided facilities for their examination, and loaned me out precious examples or whole collections of freshly accumulated material. I wish to express my deep gratitude not only to all scientists whose names are mentioned in the following list but also to others in this country and abroad who gave freedom of access to their collections of West European species not specified in the lists of material examined.

As in my paper dealing with the Indo-Australian *Thyreus* (1962), I have employed a series of symbols indicating the present location of the specimens

examined and these are bracketed after every locality record in the text. The symbols used refer to the following institutions and private collections:

- BLU — Bee Lab, Logan, Utah: Wild Bee Pollination Investigations, Utah State University, Logan, Utah (G. E. Bohart)
- BM — British Museum (Natural History), London (I. H. H. Yarrow)
- CBS — H. Bytinski-Salz collection, Tel Aviv University, Israel
- CDB — J. de Beaumont collection, Musée Zoologique, Lausanne
- CGS — A. Giordani-Soika collection, Venezia
- CL — W. Linsenmaier collection, Ebikon/Luzern
- CMS — Max. Schwarz collection, Linz
- CSA — F. J. Suárez collection, Instituto de Aclimación de Almería, Almería
- CV — P. F. M. Verhoeff collection, den Dolder
- CVS — F. Vergés Serra collection, Canet de Mar (Barcelona)
- DEI — Deutsches Entomologisches Institut, Berlin-Friedrichshagen (H. Fankhänel)
- FAG — Faculté des Sciences Agronomiques de l'Etat à Gembloux (M. Leclercq and C. Verstraeten)
- HP — H. Priesner collection, Linz
- IEM — Instituto Español de Entomología, Madrid (Gonzalo Ceballos)
- INER — Istituto Nazionale di Entomologia, Roma
- IRSN — Institut Royal des Sciences Naturelles de Belgique, Bruxelles (G. Demoulin)
- IZK — Instytut Zoologiczny Polska Akademia Nauk, Krakow (St. Bleszynski and Miss M. Dylewska)
- KU — Kyushu University Entomological Laboratory, Fukuoka (Y. Hirashima and K. Yasumatsu)
- MA — Zoologisch Museum, Amsterdam (G. Kruseman)
- MBUD — Magyar Nemzeti Múzeum, Budapest (Moczár László)
- MCG — Museo Civico di Storia Naturale, Genova (Sig<sup>a</sup>. Delfa Guiglia)
- MKB — Zoologisches Forschungsinstitut und Museum A. König, Bonn a/Rh. (B. Mannheims)
- ML — Rijksmuseum van Natuurlijke Historie, Leiden
- MP — Muséum National d'Histoire Naturelle, Paris (Melle S. Kelner-Pillault)
- MT — Museo di Zoologia della Università, Torino (L. Pardi)
- MZB — Museo de Zoologia, Instituto Municipal de Ciencias Naturales, Barcelona (F. Español)
- MZUC — Museu e Laboratorio Zoologico, Universidade de Coimbra, Portugal (Manuel de A. Diniz)
- NAMP — Narodni Museum V Praze, Praha (Z. Bouček and O. Šustera)
- NMB — Naturhistorisches Museum, Basel (Fred Keiser)
- NMW — Naturhistorisches Museum, Wien (Max Fischer)
- NRS — Naturhistoriska Riksmuseum, Stockholm (E. Kjellander and S. Erlandsson)
- OUM — Oxford University Museum, Hope Department of Entomology, Oxford (E. Taylor)
- SMF — Natur-Museum und Forschungsinstitut Senckenberg, Frankfurt a/Main (H. Schröder and R. zur Strassen)
- USNM — United States National Museum, Washington D.C. (K. V. Krombein)
- ZIL — Zoological Institute Acad. Sci. USSR, Leningrad († A. Ponomareva)
- ZMB — Institut für Spezielle Zoologie und Zoologisches Museum der Humboldt Universität, Berlin (E. Königsmann)
- ZSM — Zoologische Sammlung des Bayerischen Staates, München (F. Köhlhorn)

## B — SYSTEMATIC

## I. Taxonomic and group characters

As is well known, the variegated colour design of *Thyreus* in some cases is of little help in distinguishing between species, particularly solitary females being often difficult to place and easily confused, which accounts for the many names in synonymy. With respect to this, the descriptions and photographs have only to be consulted to see how often a similar black and white pattern is cropping up, and in how many species it undergoes the same amount of variation. A careful study of the venation has proved to be

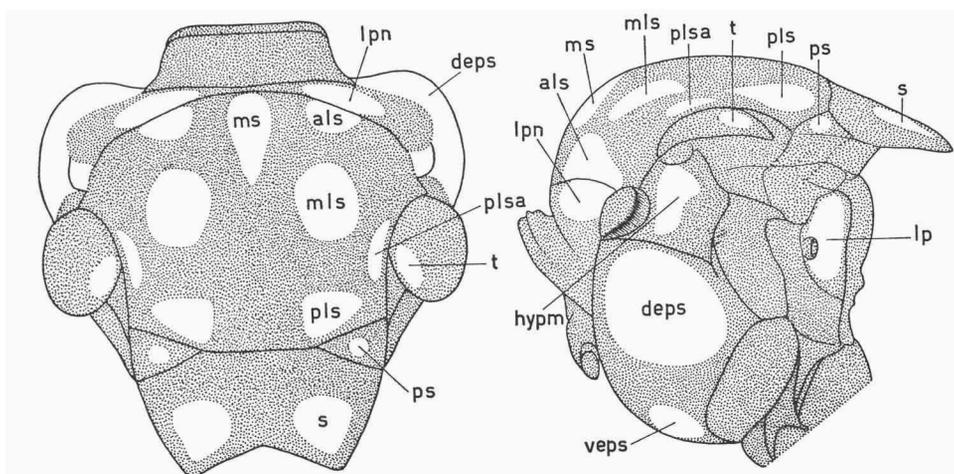


Fig. 1. Diagram of thoracic colour-pattern of *Thyreus nitidulus* (F.), dorsal and left lateral view. (After Lieftinck, 1962). For explanation of symbols see the same publication.

equally valueless because of its individual unstability. It became soon evident that increase in the complexity of a given character does not necessarily keep step with increase of specialization in other parts of the bee's organization. Thus characters exhibited by the constituents of a given group of similar species may be allotted differently and shared so unexpectedly that quite a number of regional species apparently fall outside any group.

As far as the males are concerned, in any particular habitat, there is usually little difficulty in separating similarly-looking individuals into their respective species, provided that the genitalia and accessory sternal plates are studied in conjunction with the leg structure. The most reliable specific characters applying to both sexes are the segmentation of the maxillary palpus and structure of the antenna; also the form and texture of the scutellum, and the nature of the pubescence.

One character which has not, perhaps, been investigated thoroughly enough in my survey of the Indo-Australian *Thyreus*, is the form and texture of the antennal flagellum. The length and breadth ratios of the separate segments, as well as the presence or absence of sense-organs (so-called rhinaria) on them, differ greatly among species and may ultimately provide a means of establishing groups, or even subgenera.

Admitting that any standard can be applied with respect to the relative importance of taxonomic features, I believe in the present case to have rated certain combined characters at their true value. The fact is that sets of the above characters are sometimes present and shared alike in small fairly-defined sections. For instance, there is one compact little group in which the antennal structure seems to be correlated with a set of other characters. As it comprises also the type-species of *Thyreus*, I have segregated this from the rest as the *scutellaris* group, after the first described member and type of the genus, *T. scutellaris* (F.). Its main characters and appropriate members are the following:

#### Definition of the *T. scutellaris* group

Maxillary palpus nonexistent;

Antennal segment 3 longer than 4, flagellar segments 4-11 broader than long (♂), or squarish (♀); antennal rhinaria on 3-11 or 3-12 simple, circular or placed transversely (♂), or wanting (♀);

White pubescent markings at sides of gastral tergite 1 nearly always twofold (except *T. elegans*, in which the spotting is greatly increased, covering most of the surface);

Disk of ♂ gastral sternite 7 broad, apex plate-shaped, at most slightly excised, lacking numerous microsetae;

Gonostylus of ♂ genitalia short, about one-third to one-fifth length of genital capsule, its pubescence short and scanty.

Species included are, alphabetically:

*Thyreus affinis* (Mor.), *elegans* (Mor.), *paucimaculosus* (Alfken) (♂ unknown!), *propinquus* sp. n., *scutellaris* (F.), and *sibiricus* (Rad.).

I do not believe that any of the other known species fall in this particular category, although it leads over to the peculiar *Thyreus dimidiatipuncta* (Spin.) and immediate associates. This has many characters in common with the group just mentioned but in some respects is apparently more primitive than any other in Eurasia, showing in fact the nearest approach to *Melecta* and allies. Its distinctions are (1) the forward retraction of the posterior thoracic segments and (2) the shortening of the first gastral segment. Further particulars are given in the key and specific descriptions.

It is of interest to note that all species of *Thyreus* except those mentioned above have the first gastral segment markedly longer than the second and the scutellar plates produced backward, characters which serve to distinguish them from all other Melectini of the eastern hemisphere. In the latter the first segment is shorter than the second and the scutella are not at all produced posteriorly, only the median division being armed with a pair of tubercles or spine-like processes. As far as I am aware, the differences in the length ratios of the basal segments of the gaster have not before been mentioned in the literature and were apparently overlooked also by Popov (1955, Trudi Zool. Inst. Akad. Nauk USSR **21**: 321-334). In a forthcoming general treatment of the Old World Melectini I hope to deal more fully with the generic characters of the tribe<sup>1</sup>).

The remaining species discussed in the present article can be arranged in four of five 'subgroups', but I have not attempted to define them as their characters are mixed and the relations amongst each other not quite clear at present. The last and possibly most advanced members of the genus are loosely held together and may be called the *T. ramosus* assemblage, which comprises the largest number of species, some of which are common and widely spread.

Summarizing the above, I am of the opinion that no subgeneric taxa are required, the number of regional species being as yet so small that no convenience would be served by subdividing the genus.

As to the sequence of species in the text, I have started with the *T. dimidiatipuncta* (Spin.) section, which is to be followed by the group of *T. scutellaris* (F.).

## II. Key to the Palearctic species of *Thyreus* Panzer

N.B. -- Species incertae sedis and *Thyreus plurinotatus* (Meyer), a synonym of *T. macleayi* (Cockerell), are excluded. Species known only from the male are: *T. illudens* sp. n., *mauretaniensis* (Strand), *merviensis* (Rad.), *parthenope* sp. n., *picaron* sp. n., *picicornis* (Mor.) and *priesneri* sp. n. Species known only from the female are: *T. bimaculatus* (Rad.), *paucimaculosus* (Alfken) and *uniformis* (Kirby).

1) I agree with V. V. Popov (1955) that future inquiries into the morphology of the Melectini s.str. will confirm the view that *Thyreus* and *Melecta* have had an independent origin. The supposition of a polyphyletic development is based on certain striking resemblances in structural characters shared by the parasitic *Thyreus* and the non-parasitic *Amegilla* on the one hand and by the corresponding genera *Melecta* and *Anthophora* on the other. Whereas in the former the maxillary palpi are greatly reduced or wanting and tarsal arolia have disappeared, the latter possess elongated 5-segmented maxillary palpi and a fully developed arolia (empodium) between the tarsal claws. Taking these characters into account, *Thyreus* may be considered as a parasitic descendant of the ancestors of *Amegilla* while *Melecta* suggests a derivation from *Anthophora* (see also Grütte, 1935, Archiv f. Naturgeschichte N.F. **4** (4) : 481-488).

1. Gastral tergite 1 short, subequal in length to 2 or only a trifle longer; abdomen in both sexes rather strongly downcurved. Scutellum not definitely plate-shaped, shortened medially, swollen and convex above, its posterior surface almost vertical; angle between the surfaces approximately  $90^\circ$  or even obtuse at a point coincident with the longitudinal median axis, hence scutellum at middle not overhanging metanotum and propodeum; lateral angles protuberant, tooth- or spine-like, projecting well beyond vertical mesosomal elements (fig. 3). Body pubescence, including erect tomentum covering thoracic segments, short; white abdominal markings, when present, consisting of appressed hair; tergite 1 either wholly black or with a pair of anterior (basal) and posterior (apical) spots on either side, these spots only rarely fused together laterally. Clypeus of ♂ covered with dense decumbent snow-white pubescence entirely concealing surface, of ♀ also white but hair upon middle of disk blackish brown. Postocular lobes rather swollen and prominent posteriorly but interocellar and ocellorbital distances greater than ocelloccipital distance . . . . . 2
- Gastral tergite 1 longer, up to one and one-fourth as long as 2. Scutellum nearly always plate-shaped, with dorsal surface abruptly and angularly divided from forward-slanted or incurved posterior surface, angle between the surfaces (with few exceptions) acute, thin-edged, entirely overhanging metanotum and propodeum. (In some species having a deeply excised, strongly spinose and convex scutellum, this is less evident, but the body size then is much smaller). Pubescence, especially of head and thorax, generally longer; light markings variable . . . . . 4
2. Fore wing very dark brown to almost black with low metallic colour reflex, membrane often somewhat lighter in radial cell and behind vannal fold; scutellum short, surface very uneven but not markedly biconvex (fig. 3). Spine at apex of mid tibia short, not compressed. Abdominal markings variable, when present not very extensive, interspace separating white lateral spots on tergites 1-2 wider than the spots themselves. Antenna of ♂ thick, flagellar segments 4-12 broader than long, rhinaria deeply impressed, placed transversely; those of ♀ more slender, flagellar segments 4-12 longer than broad, lacking rhinaria; both sexes with antennal 3 longer than 4. Mid tibia of ♂ rather swollen, outer face with conspicuous oval patch of very dense felt-like pubescence (fig. 3). Tergite 7 of ♂ strongly narrowed, apex bidentate (fig. 3). Sternite 7 plate-shaped but apex deeply emarginate, bilobed (fig. 2). Genital capsule of large size, over 2 mm long; gonostylus small, finger-

like in dorsal aspect, its pubescence variable (figs. 2-3). Pygidial plate of ♀ broadly triangular, longitudinally carinate. Large species, body at least 14 mm long . . . . . 3

- Male only. Fore wing subhyaline, nervures dark brown, strongly contrasting; membrane beyond the venation obscured. Only a single ♂ known; head missing. Scutellum longer; disk biconvex, posteriorly with median concavity; hind margin deeply emarginate, apical angles strongly projecting as flattened acuminate plates (fig. 4). Thorax, legs and abdomen profusely maculated with white, as follows: outer faces of all tibiae and tarsal segments; anterior half of mesoscutum, with posterolateral extensions along tegulae widening to patches in front of parascutella; most of the pleurae; tufts behind wing bases; dorsal tuft in the excavation and long fringe projecting from beneath posterior border of scutellum. Broad < >-shaped marks on each side of tergite 1, the opposed branches longer than the interspace; thick L-shaped marks on 2-3 and transverse patches on each side of 4-6, all being longer than the distance separating them. Sternites 1-4 (5) also with white hair spots on either side. Apex of mid tibia with distinct, compressed, triangular posterior spine; hind tibia unarmed; hind basitarsus straight, inferior margin with very dense brush of brown hair. Apex of tergite 7 subtruncate, the lateral tubercles separated by a broad emargination (fig. 4). Apical sternal plates destroyed and genital capsule badly damaged; gonostylus shaped much as in next species but still smaller, with short and scanty pubescence. Length 14 mm approx. Female unknown . . . . . **merviensis**

3. Both sexes with sharply defined white pubescent spots on either side of tergites 1-4 or 1-5, distance separating spots on tergite 1 much greater than their own diameter. Both sexes also with long white hair at occiput and on upper part of genal area, the occipital fringe long but narrowly interrupted by black in the median line. Mesoscutum clothed with short grey-white down and small oblique *pls* spots (♂), or dorsum with series of sharply defined spots of depressed hair: plus variants having *plsa* confluent with large oblique *pls*, smallish *mls* and large *lpn-als*, only *ms* being absent (♀). Thoracic sides with conspicuous subcircular dot of white on mesopleuron. Outer face of all tibiae at least partly white-spotted; tarsi black. Whole ventral surface of body black . . . . . **d. dimidiatipuncta**

- Both sexes with abdomen almost wholly black: lateral spots of tergites 1-5 clearly discernible as patches of depressed pubescence but all white

hairs replaced by black, with sole exception of spots on either side of ♂ tergite 2, which show scanty admixture of white. Head and thorax of ♂ marked similarly to typical *dimidiatipuncta* but the white on tibiae partly also replaced by dark hairs; whole body of ♀ black-haired except tiny frontal spots of white on either side of antennae and at extreme base at outer face of tibiae . . . . . **d. bidentatus**

4. Face in front of antennae covered with dark hair or, if partly white-haired, then at least clypeus and paraclypeal areas with numerous dark hairs interspersed; this pubescence generally long, suberect and not entirely concealing surface <sup>1)</sup> . . . . . 5
- Face thickly clothed with light tomentum (rarely mixed black and white), the hairs either snowy-white, palest blue, or silvery grey; this pubescence variable, either long and thin, rather dowdy and not concealing surface, or very dense and felt-like, completely hiding surface in fresh specimens; females occasionally with scanty, suberect bristle-like dark hairs interspersed on disk of clypeus only . . . . . 11
5. Female only. Black species: body including legs without clearly defined white pubescent markings; occasionally traces of white on each side of mesoscutum (at inner angles of parascutella); median tuft projecting from beneath scutellum; small tuft on each side at apical border of tergite 1. Scutellum and parascutella almost flat: the former feebly convex basally, surface rather shiny, strongly but not coarsely punctate, short-haired; mesoscutum and scutella not inflected at their junction: sulcus fine, not deeply impressed (fig. 24). Antennal scape with short pubescence; 3 a trifle shorter than 4, about as long as its width at apex, 4-12 a little longer than broad; rhinaria deeply impressed, present on 4-11 as narrowly lanceolate grooves placed in the long axis. Pygidial plate broadly triangular, gradually narrowed posteriorly, sides straight; disk finely reticulate, basal two-thirds with few large punctures, median carina poorly indicated only towards apex, which is somewhat swollen and broadly rounded (fig. 24). Membrane of fore wing rather uniform dark brown. Body robust, compactly built. Length 11-12 mm. Male unknown . . . . . **uniformis**
- Both sexes at least with parts of the body spotted or banded with white or palest blue . . . . . 6
6. Large species, length 14-16 mm. Head broad and deep, ocelloccipital and

1) In the ♂ of *T. sibiricus* (a close ally of *T. paucimaculosus* and *propinquus*, see couplets 8-9 and descriptions), the clypeus is almost entirely white-haired.

interocellar distances subequal and even longer than ocellorbital distance; eyes not projecting beyond occipital lobes. Antennal scape short-haired; 3 almost twice longer than its apical width, slightly ( $\delta$ ) or distinctly ( $\varphi$ ) longer than 4, all flagellar segments longer than broad; rhinaria superficial, paired, oblique and converging ( $\delta$ ), or single, lanceolate, more deeply impressed and placed in the long axis ( $\varphi$ ). Scutellum very short and broad, surface anteriorly convex, posteriorly declivous, deeply coarsely punctate; hinder angles straight, slightly raised, produced and acutely pointed; emargination crescent-shaped ( $\delta$ , fig. 14), or -like with median incision inflected ( $\varphi$ ); hair-fringe projecting from beneath and all around scutellum broad between the spines but not reaching beyond these, unicoloured blackish brown ( $\delta$ ) or brown with narrow white median tuft ( $\varphi$ ). Thoracic pubescence rather long and even, grey-white and black but not at all contrasting ( $\delta$ ), or forming a distinct pattern of snowy-white and black ( $\varphi$ ). All tibiae largely white externally; hind tibia of  $\delta$  with short intero-apical tooth; hind basitarsus long and slender, straight and parallel-sided in both sexes. Membrane of fore wing strongly infuscated, with subhyaline spots. Tergites 1-5 with pair of large, widely interrupted, transverse lateral patches, those of 1 ( $\delta$ ) or 1-2 ( $\varphi$ ) with short forward extensions at the side margins. Sternites all black. Tergite 7 of  $\delta$  subrotundate (fig. 14); sternites 7-8 and genitalia as in fig. 14. Pygidial plate of  $\varphi$  shaped much as in *altaicus* (fig. 13) but narrower apically and with better developed median ridge . . . . . **praevalens**<sup>1)</sup>

- Size smaller, length not exceeding 12 mm. Head less broad, ocelloccipital distance consistently shorter than either ocellorbital and interocellar distances. Combined characters not as above . . . . . 7
7. Scutellum distinctly biconvex, posteriorly with deeply marked median sulcation; posterior margin strongly arched, often with additional tiny notch where most deeply sunk; hinder angles strongly produced, rather spine-like. Lateral marks of tergite 1 narrow, either rectangularly L-shaped with parallel-sided limbs, or made up of two or three spots on either side: a transverse, more or less constricted or interrupted apical streak and an isolated basal spot near side margin, the latter usually small and occasionally wanting; tergite 2 similar, or with one or two of the outermost spots lacking; white spot on either side of

1) Very similar superficially and probably closely allied to *T. altaicus* and *hellenicus* (continue couplet 17), but these have the clypeus predominantly white-haired.

3 undivided. Both sexes with antennal 3 distinctly longer than 4; flagellar segments a little broader than long, with distinct, deeply impressed, transversely placed rhinaria ( $\delta$ ), or approximately square without indication of rhinaria ( $\varphi$ ). Tergite 7 of  $\delta$  ending in a pair of well pronounced blunt tubercles, the bottom of the emargination almost straight (figs. 7 and 9). Size small, length not exceeding 11.5 mm . . . . . 8

— Scutellum not quite flat, surface even rather convex, but not caved in medioapically, posterior margin less deeply emarginate; hinder angles often prominent and acute but never definitely spine-like. Lateral marks of tergites 1 and 2 undivided, well defined, more or less L-shaped, i.e. both with distinct, though often short, forward extensions alongside. Thorax covered with rather long erect down, lacking clearly defined white spots of appressed pubescence. Both sexes with antennal 3 and 4 subequal in length; flagellar segments slightly or markedly longer than broad with distinct rhinaria, oblique and not deeply impressed ( $\delta$ ), or in the form of linear grooves ( $\varphi$ ). Apex of  $\delta$  tergite 7 truncated, hinder angles not markedly produced . . . . . 10

8. Head, thorax and legs distinctly spotted with white: clypeus clothed predominantly with longish white hair ( $\delta$ ), or mixed white and black ( $\varphi$ ); tufts behind antennae, long fringe at occiput, paired spots at base and apex of mesoscutum and patch on mesopleurae, long tufts behind wing bases;  $\varphi$  with indication of 5 spots in a transverse row between bases of fore wings; both sexes also with long white fringe projecting from beneath scutellum; at least traces of white at outer faces of tibiae. Tergite 1 with three white spots on each side, one basolateral point and two posterior transverse streaks, the innermost posterior spot largest; succeeding tergites 2-5 with a pair of transverse lateral marks, one on either side, successively smaller posteriorly and lacking forward extensions. Sternites all black. Both sexes with antennal scape covered with short pubescence. Outer face of  $\delta$  mid tibia with pad of white felt-like pubescence. Lower border of  $\delta$  hind basitarsus with conspicuous brush, the basal hairs of this longest. Rhinaria of  $\delta$  antennal 3 and 13 circular, those of 4-12 oval. Apex of  $\delta$  tergite 7 with slightly divergent, blunt lateral tubercles (fig. 7). Apex of  $\delta$  sternite 6 rounded, lacking median impressed area but with marginal tuft of short hair on each side of the middle; sternal plates 7 and 8 and genitalia as in fig. 7. Pygidial plate of  $\varphi$  rather broad, gradually narrowed but distal part parallel-sided with abruptly rounded apex;

surface slightly shiny, finely reticulate; median crest low, apparent only at extremity (fig. 7). Small species, 10-11 mm . . . **sibiricus**

- White markings on head, thorax and legs much reduced and less defined; sternites black or 2 and 3 with white lateral spots. Outer face of ♂ mid tibia with narrow pad of black felt-like pubescence. Lateral tubercles at apex of ♂ tergite 7 straight, more closely approximated (fig. 9). Pygidial plate of ♀ much narrower, surface smooth and shiny, carinate . . . . . 9
9. Sternites all black. Head, sides of thorax and legs almost entirely black. Antennal scape covered with short hair. Scutellum as in fig. 7. Tergites 1-4 only with pair of posterior transverse white streaks, those on each side of 1 constricted at middle, the interspaces much broader than the spots themselves. Pygidial plate narrow, gradually tapered distally (fig. 7). Male unknown. Small species, length 9 mm **paucimaculosus**
- Sternites 2-3 with white pubescent spots. Head, thorax and tibiae, the latter on their outer faces basally, with loose tufts of longish grey-white hair in the usual places, these tufts often reduced and replaced by black. Tergites 1-5 with transverse lateral bars of white, those of 1-2 with forward extensions alongside which are frequently obliterated: transverse bands of 1-2 parallel-sided, squarely cut off inwards and subequal in length to the interspace but often interrupted by black also before reaching the side margin. Antennal scape clothed with long erect pubescence. Scutellum as in fig. 9; sutures between mesoscutum and scutellum deeply sulcate and hind margin of scutellum with well marked median inflection. Brush of dark hair at lower border of ♂ hind basitarsus very dense but hairs of equal length throughout. Apical tergite, sternites and genitalia of ♂ as in fig. 9. Pygidial plate of ♀ very slender, sides at first converging, then parallel: median ridge long, obtuse (fig. 9). Size larger, length 10-11.5 mm . . . **propinquus**
10. Lateral mark of tergite 3 nearly always consisting of a small circular external spot and a much larger transverse bar placed more inward. Antennal scape with short appressed pubescence but many hairs on outer (concave) face longer and suberect. Apical margin of ♂ tergite 7 usually with slight median convexity, hinder angles a little produced and upturned, the dorsal surface rather smooth and shining on either side (fig. 11). Sternite 7 of ♂ plate-shaped, gradually narrowed, apex slightly notched carrying few bristles (fig. 11); sternite 8 and genitalia as in fig. 11; gonostylus with short and scanty pubescence. Pygidial

plate of ♀ narrowly triangular, sides strongly converging, disk smooth and shining, basal part with scattered punctures, apex strongly raised in the middle forming a broad rounded median ridge. Integument of gaster above with distinct oily reflections. Generally smaller; size variable, length 8.5-11 mm . . . . . **orbatus**

- Lateral mark of tergite 3 undivided, in the form of a transverse bar. Pubescence of antennal scape short and decumbent. Apical margin of ♂ tergite 7 subtruncate, hinder angles not upturned, surface dull (fig. 21). Apex of ♂ sternite 7 bilobate, the deep roundish cleft bearing bristle-like setae at bottom of emargination; lobes subrotundate, closely beset with microsetae (fig. 21); sternite 8 and genitalia as in fig. 21; gonostylus densely clothed with long hairs. Pygidial plate of ♀ more broadly triangular and closely punctate, surface dull, finely reticulate with low apical ridge. Integument of gaster above dull black, lacking distinct oily reflections. Generally larger; length variable, 10-12 mm . . . . . **hirtus**

11. Light pubescence covering anterior surface and top of head as well as whole thorax consisting of loose, thin and finely plumose hairs, silvery grey instead of pure white, not at all forming compact spots or bands, often erect and longer than usual; if these hairs are more or less decumbent on clypeus, concealing most of the surface, then the transverse whitish band covering gastral tergite 1 is entire (or almost so) and linear. Hair covering legs and abdomen partly decumbent, the whitish hairs more strongly branched and crowded together than the black ones. Antennal 3 and 4 subequal in length, flagellar segments from 4 onwards longer than broad. Membrane of fore wing strongly tinged with brown, especially towards apex beyond subhyaline areas bordering the cells. Apex of ♂ hind tibia with distinct inferior tooth. Brush along ventral border of ♂ hind basitarsus short and dense, hair much shorter than diameter of basitarsus . . . . . 12
- Light pubescence generally much shorter and denser, especially hair covering clypeus and dorsum of thorax not unusually long and thin, distinctly decumbent in front of antennae. Abdominal markings appearing as well defined spots or bands of appressed tomentum, their shape variable . . . . . 15
12. Scutellum quite flat, greatest width less than two times its median length; surface smooth and shining, superficially, not densely punctate; emargination obtuse-angulate, its sides almost straight; hinder angles

not markedly produced; a distinct fringe of white projects from beneath middle portion of posterior border (fig. 19). Suture between mesoscutum and scutellum not impressed. Male only. Antennal scape with short appressed pubescence; 3 about as long as its apical width, equal in length to 4; all flagellar segments markedly longer than broad; rhinaria paired, in the form of rather superficial, short and narrow streaks, the inner series oblique, the outer row placed in the long axis of antenna. Metacoxa acutely carinate, not produced. Posterior longitudinal carina at hind femur acute on distal two-fifths. Curved interior spine at apex of hind tibia distinct (fig. 19); hind basitarsus almost straight and parallel-sided, outer surface not hollowed out. White posterior hair bands of tergites 2-5 only little narrower than in *mauretaniensis*, the one on 1 very narrowly, the remainder more broadly interrupted in the middle; no forward extensions laterally but traces of white also at the side edges near base of tergite 1. Sides of sternites 2-4 with loose patches of white hair. White tomentum at outer faces of all tibiae and basitarsal ridges rather dense, thin and decumbent, not quite reaching apex of hind tibia. Apex of tergite 7 truncated (fig. 19). Sternal plates 7 and 8 as in fig. 19. Genitalia not studied (lost). Female unknown. Small species, length 11 mm . . . . . **illudens**

- Surface of scutellum uneven, strongly and coarsely punctate, the plate at least twice as broad as its median length. Suture between mesoscutum and scutellum deeply sulcate. At least the external face of antennal scape with long erect hairs. Outer face of ♂ hind basitarsus concave 13
13. Disk of scutellum evenly convex, broadly and rather deeply sulcate at extreme apex in depth of emargination, general shape much as in *impexus*; surface covered with loose longish hair and fringed all around with feathery pubescence projecting from beneath hind border: long and white between the spines, shorter and black laterally (fig. 16). Metacoxa with sharply compressed carina ending in a broadly triangular thin plate. Posterior longitudinal ridge of hind femur subacute only on distal half. Hind tibia less strongly broadened apically than in next species, the apex squarely cut off with small, little curved inferior tooth. Hind basitarsus normal, straight, outer face but slightly concave. Antennal 3 in frontal view equal in length to 4; rhinaria present on 3-13 but weakly impressed, single and oval on 3, paired and rather hoof-shaped on succeeding segments. Pubescence covering clypeus dowdy, exceptionally long and erect. Marks at sides of tergites 1-5 regular, widely inter-

rupted middorsally, becoming only slightly smaller posteriorly; similar in shape and angulated with complete laterobasal extensions on 1-2, almost completely interrupted near lateral border on 3-4; only a single transverse oval spot on either side of 5. Tiny white patches also at sides of sternites 2-4. Apex of tergite 7 truncated with rounded edges (fig. 16). Sternal plates 7-8 and genitalia as in fig. 16. Female unknown. Larger species of normal appearance, length 11.5 mm **mauretaniensis**

- Disk of scutellum biconvex, sloping down and caved in apically towards middle of emargination, not very hairy above; a dense fringe of loose grey-white hairs projects from beneath scutellum all along its border. Metacoxa carinate but not toothed apically. Posterior longitudinal ridge of hind femur acute on distal three-fifths (♂) or one-third (♀). Hind tibia of ♂ narrow at extreme base, strongly inflated towards the end, the apex oblique, ending in a robust incurved tooth. Hind basitarsus of ♂ widest before middle, slightly curved and twisted with outer face distinctly hollowed out. Antennal 3 in frontal view slightly shorter than 4; rhinaria wanting or practically invisible (♂), or in the form of well defined elongate-oval impressions placed in the long axis (♀). Pubescence on clypeus shorter, partly decumbent. White marks of tergites 1-5 less defined, the transverse one of 1 linear, entire or almost so. Small, narrow-bodied species with pointed abdomen, length 9-11.5 mm . . . 14

14. Scutellum with hinder angles strongly produced into slightly divergent spine-like processes (fig. 17). Mesonotum without impunctate median area in front of scutellar furrow. Hind tibia of ♂ strongly inflated towards the end, the inferior tooth robust and more incurved (fig. 17). Plate-shaped 7th sternite of ♂ gradually narrowed towards apex; 8th sternite bluntly rounded (fig. 17); genitalia as in fig. 17. Pygidial plate of ♀ gradually tapered towards the bluntly rounded apex (fig. 17) . . . **impexus**

- Scutellum with hinder angles acute-angulate but not spine-like (fig. 18). Mesonotum with smoothly shining impunctate median area immediately in front of scutellar furrow. Hind tibia of ♂ less markedly inflated towards the end, the interior tooth relatively shorter and less curved (fig. 18). Plate-shaped 7th sternite of ♂ subquadrangular; 8th sternite excised apically (fig. 18); genitalia as in fig. 18. Pygidial plate of ♀ more rapidly tapered towards the truncated apex (fig. 18) **incultus**

15. Besides a pair of thick, rectangular, L-shaped lateral marks, tergite 1 bears a much smaller triangular spot placed at middle of extreme base. Scutellum at least two times broader than long, surface uneven, almost biconvex, posteriorly with deeply marked median sulcation, coarsely and densely punctate; posterior border strongly arched, with or without tiny median emargination, hinder angles strongly produced, acuminate; two well-separated tufts of dense snowy-white hair project from beneath hind border of scutellar lobes (see pl. 4 fig. 21). Suture between mesoscutum and scutellum deeply sulcate. Antennal 3 and 4 subequal in length; flagellar segments squarish ( $\delta$ ) or a trifle longer than broad ( $\varphi$ ); rhinaria distinct in  $\delta$ , nonapparent in  $\varphi$ . Sides of tergites 1-5 with sharply defined transverse bands, those of 3 and 4 interrupted by black laterally; sternites 2 and 3 frequently also spotted with white laterally. Apex of  $\delta$  tergite 7 truncated (fig. 28) or irregularly trituberculate; sternal plates 7-8 and genitalia of  $\delta$  as in fig. 28. Pygidial plate of  $\varphi$  very broad at base, strongly tapered apically with slightly concave sides, apex bluntly rounded; surface dull, almost flat, impunctate, microscopically tessellate. Size variable, length 10-14 mm . **tricuspis**

— No additional triangular white spot in the middle at base of tergite 1 and no two-fold tuft of white pubescence projecting from beneath hind margin of scutellum. Remaining characters combined not as described . . . . . 16

16. Tergite 1 with a pair of opposed L-shaped spots, the transverse limbs of each extending well inward; forward extensions alongside, though frequently reaching base of segment, never expand or curve inwards so as to become transverse and band-like along base as well. [If, however, the scutellum at the same time is flat, rather shining and covered with small punctures, in which case antennal segments 3 and 4 are subequal in length, then continue couplet 29]. Scutellum dull, strongly, rather deeply punctate, punctures little smaller than interspaces. Outer face of  $\delta$  hind basitarsus slightly concave. Sternite 6 of  $\delta$  with oval median impressed area. Apex of  $\delta$  tergite 7 truncated, the side-edges obtuse-angulate or rounded . . . . . 17

— Tergite 1 with a pair of opposed U-shaped lateral marks lying on their side, variously incised from within and frequently even constricted or broken up into two at the side margin; or the two arms of the U are of unequal length with the anterior branch either abbreviated, only

little broadened or (more rarely) non-existent. Occasionally most of the tergal surface of all segments, including 1, is white-haired 19

17. Small species, length 8.5-12 mm. Apex of ♂ hind tibia slightly surpassing base of anterior spur but not toothed interiorly. Sternite 7 of ♂ deeply arcuately emarginate with rounded lobes which are densely clothed with microsetae; 7th-8th sternites and genitalia as in figs. 25-27. Antennal 3 slightly longer than 4, flagellar segments squarish; rhinaria paired, moderately deep, oval and subparallel (♂), or wanting (♀). Scutellum short and broad, surface almost flat; postero-lateral sides markedly converging and convex, hinder angles at most rectangulate, usually obtuse or even rounded (figs. 25-27); dorsum occasionally clothed with longish dark (or grey-white) hairs. Pygidial plate of ♀ rather broad, strongly tapered, the sides straight with rounded apex; surface flat, basal portion with triangular median area distinctly striato-punctate, side-portions finely tessellate, somewhat shining, apex with short, low median ridge . . . . . **truncatus**
- Average size larger, length 11-14.5 mm. Apex of ♂ hind tibia with distinct, slightly curved, interior tooth (fig. 12). Sternite 7 of ♂ broad and plate-shaped, apex at most slightly incised; no microsetae. Antenna slightly more slender: 3 a little longer than 4, all flagellar segments somewhat longer than broad; rhinaria poorly indicated, placed obliquely as a series of short superficial impressions (♂), or replaced by a series of low ridges placed in the long axis (♀). Scutellum longer, surface of basal portion somewhat convex, sides less converging and hinder angles more pronounced . . . . . 18
18. Postero-lateral sides of scutellum a little convex, hinder angles more rounded; whole dorsal surface of body including scutellum densely punctate, the punctures on scutellum relatively smaller, more numerous and less deep than in next species; sides of emargination straighter, median incision obsolete (fig. 13). Carina of hind coxa acute. Hind basitarsus of ♂ long and slender, subparallel-sided, almost four times longer than broad; hair-fringe at ventral (inferior) border consisting of short, not very strong hairs (fig. 12). Terminalia of ♂ as in fig. 13. Pygidial plate of ♀ broad, apex subtruncate; surface flat, slightly shining, microscopically tessellate, median carina very low, apparent only at extreme apex; colour chestnut brown with margins and apex obscured (fig. 13) . . . . . **altaicus**

- Postero-lateral sides of scutellum straight, hinder angles longer, acute-angulate though not spine-like; whole dorsal surface of body including scutellum less closely punctate but punctures larger and those of scutellum deeper and pit-like; sides of emargination more undulated, the median incision somewhat impressed and deeper (fig. 15). Carina of hind coxa obtuse. Hind basitarsus of ♂ broader, sides slightly and gradually converging from near base to apex, scarcely three times longer than broad; hair-fringe along ventral (inferior) border longer, made up of stronger hairs (fig. 12). Terminalia of ♂ as in fig. 15. Pygidial plate of ♀ much slenderer and more narrowly rounded apically; surface finely reticulate on either side between the rather elevated side-margins and a strongly raised, long and broad median ridge, which terminates in a swollen apex . . . . . **hellenicus**
19. Scutellum with a pair of well defined white oval hair-spots, one each side, placed little beyond halfway length; parascutella also with white hair patch occupying most of the surface. All scutellar elements quite flat, finely superficially punctate, punctures smaller than interspaces; sutures between mesocutum and scutella fine, not impressed. Tergite 1 with branches of U-shaped lateral spots well developed, subequal in length. Body profusely marked with white, lateral mesoscutal spots *als*, *plsa* and *pls* fused together. Antennal segment 3 at least as long as 4, all flagellar segments longer than broad. Fore wing membrane semitransparent, greyish brown . . . . . 20
- Scutellum usually black but, when partly covered with white hair, then marked differently . . . . . 21
20. Female only. Large species, length 15.5 mm. White hair-fringe projecting from beneath emargination of scutellum long, confined to middle of border and surpassing the hinder angles (fig. 30). Flagellar segments of antenna feebly carinate but rhinaria wanting. All tibiae and tarsi white externally. White lateral marks of tergites 1-5 large, transverse, distance separating them equal to their own width, becoming successively smaller posteriorly; marking of 1 with anterior and posterior arms subinterrupted laterally, that of 2 with broad forward extension reaching base of segment, those of 3-5 simple; sternites 2-3 also with traces of white on either side. Pygidial plate flat with rounded apex, as in fig. 30; surface dull, finely tessellate, margins slightly raised, median ridge low, highest towards the swollen apex. Male unknown. Hab. China . . . . . **bimaculatus**

- Male only. Size variable, length 9.5-14.5 mm. White hair-fringe projecting from beneath emargination of scutellum short and broad, extending along full length of border, not surpassing hinder angles (fig. 30). Antennal 3 and 4 subequal in length; rhinaria on flagellar segments 3-12 distinct and of large size, elongate-oval and single on 3, more broadly oval and paired on 4-12. Hind coxa acutely carinate; hind femur with inferior longitudinal carina simple; hind tibia squarely cut off apically, lacking dense comb of longish hair externally. A dense fringe of short white hair on outer face at apex of middle femur; brush at lower border of hind basitarsus rather long and dense, all hairs of equal length. Body markings white, sharply defined; all exposed gastral tergites (1-6) as well as the sides of sternites 2-4 conspicuously maculated; basal arm of U-shaped mark of tergite 1 narrower than posterior but often extending farther inward and almost meeting its fellow from the opposite side. Sternite 6 with not very deep, oval, median impressed area. Terminalia as in figs. 30-31. Female unknown
- parthenope**

21. Body copiously marked with pure white, often predominantly so on abdomen; pubescence rather long and thick, all appressed white hairs multibranchiate. Integument rufous to dark reddish brown. Tergites, including first, with all white bands fused together laterally, the basal band of 1 only rarely interrupted medially, white hairs on succeeding segments occupying most of the exposed surface. Sternites also profusely white-spotted. Hinder angles of scutellum drawn out into conspicuous spine-like processes, those of parascutella also long and sharply acute (fig. 10). Metacoxa with strong, laterally compressed, intero-apical spine, longer than its own width at base. Brush at lower border of ♂ hind basitarsus dense, the basal hairs longest. Antennal 3 longer than wide and longer than 4, which is squarish (♂) or a trifle longer than broad (♀), the succeeding flagellar segments scarcely broader than long (♂) or slightly longer than broad (♀); rhinaria in single row on 3-12, deeply impressed, oval on 3, subcircular on 4-12 (♂), or nonexistent (♀). Legs short, femora partly and all tibiae and tarsi entirely, white externally; pubescence covering legs and sides of abdomen interspersed with many much longer erect white hairs, especially in ♀. Membrane of fore wing subhyaline, distal part not markedly obscured. Sternite 6 of ♂ lacking conspicuous median impressed area; terminalia as in fig. 10. Exposed part of pygidial plate of ♀ very broad,

parallel-sided with abruptly rounded apex; surface concave, rather shining, margins raised except apically; colour chestnut with black tip. Size variable, length 8-11 mm . . . . . **elegans**

- Body less profusely marked, maculations (with rare exceptions) more restricted and sharply defined. Hinder angles of scutellum often acute but not quite so long. Metacoxa unarmed or at most with short spine or denticle, which is longer than its own width at base . . . . . 22
  
- 22. Tergite 1 with two broad transverse white spots or bands on either side, one anterior (basal) and one posterior (apical), these bands parallel and usually about equally long, often rather expanded but only rarely fused together laterally (e.g. some large-sized ♀). Posterior longitudinal carina of ♂ hind femur weakly developed or nonapparent. Mid tibia of ♂ rather swollen, with conspicuous felt-like pad of dense white pubescence on outer face. Antenna short and thick, 3 longer than its apical width and markedly longer than 4; flagellar segments distinctly (♂) or only little (♀) broader than long; rhinaria in single row on 3-12, transverse and deeply impressed from 4 onwards (♂), or wanting (♀). Brush at lower border of ♂ hind basitarsus long and very dense, its fine multibranchiate hairs longest basally and almost or quite as long as diameter of basitarsus. Membrane of fore wing much obscured, especially at apex. Sternites either all black, or 2-4 with white lateral spots; sternite 6 of ♂ lacking a deeply impressed median area. Dorsal surface of ♀ thorax with complete set of isolated white spots, those at base of tegulae present or absent; parascutella unmarked (see, however, under *affinis*) . . . . . 23
  
- Tergite 1 with single white patch on either side, excavated on the inner face and usually longer and broader posteriorly than anteriorly; or the spots are regularly U-shaped, facing each other. Antenna longer, 3 mostly a little shorter than 4 (♂) or they are subequal in length (♂ and ♀); flagellar segments squarish or slightly longer than broad; rhinaria of ♂, if present, not placed transversely . . . . . 24
  
- 23. Scutellum relatively long, postero-lateral sides usually somewhat outbent towards a pair of prominent more or less spine-like apical angles; surface shining, biconvex, sloping down distally towards posterior border at middle of emargination; texture variable but always with large and deep roundish punctures which are little or not spaced; emargination

wide and deep, with tuft of strongly branched hairs forming a reversed V in white above incision and a very long white fringe projecting from beneath between the spines (not shown in fig. 5). Antenna relatively long, 3 when seen from behind almost twice the length of 4 (♂) or a little less (♀). White dorsal thoracic spots of ♀ consisting of long and strongly feathered hairs. Terminalia of ♂ as in fig. 5. Pygidial plate of ♀ slender, at first rather broad with converging sides, then narrow, almost parallel-sided, with rounded apex; surface somewhat shining with scattered punctures on basal half, for the rest finely tessellate, the apex somewhat raised and swollen but lacking a median carina; colour chestnut, the tip obscured. Size variable, length 8.5-12.5 mm . . . . . **scutellaris**

- Scutellum shorter and markedly smaller, postero-lateral sides either straight or distinctly convex and more converging, the apical angles often acute but not at all drawn out into spines; surface usually dullish, evenly and but slightly convex, not noticeably caved in or sunk at middle of emargination; puncturation of disk as in *scutellaris* but frequently more coarsely reticulate-punctate, leaving no interspaces; emargination wide and rather shallow with large triangular tuft of very finely branched white hairs above incision and a rather short white fringe between hinder angles projecting from beneath posterior margin (fig. 6). Legs short, felt-like pad at outer face of ♂ mid tibia conspicuously swollen. Antenna still shorter, 3 about 1½ times (♂) or slightly less (i.e. about 1¼, ♀) the length of 4 when seen from behind. White dorsal thoracic spots of ♀ consisting of shorter, more numerous hairs, which are much more finely branched. [Rare varieties resemble *C. elegans* by having white pubescent spots on mesothorax considerably enlarged and coalescent, extensive white patches upon scutellar plates, and more closely approximated abdominal bands.] Terminalia of ♂ as in fig. 6. Pygidial plate of ♀ not differing from *T. scutellaris*. Size variable, length 7.5-11 mm . . . . . **affinis**

24. Large, conspicuous species, length 13-17 mm. Membrane of fore wing uniform blackish brown with distinct purplish blue reflex; most of the area posterior to vannal fold as far as *Cu*<sub>2</sub>, a fine line along costa, and diffuse points bordering third submarginal, subhyaline; marginal cell almost four times length of pterostigma; hind wing clear with dark anterior streak in radial cell. Markings pure white, sharply defined, present on tergites 1-6 (♂) or 1-5 (♀). Mesoscutum with complete set of spots, but *pls* greatly enlarged, broadly fused together with *plsa*,

which is widest anteriorly, extending all along tegula, the spots together forming a conspicuous, gently curved band on each side; *mls* reduced to mere circular points. Upper half of thoracic sides white, lower boundary rectilinear and abruptly contrasting. Antenna long, rather thick; 3 slightly longer than broad, subequal in length to 4, all flagellar segments a little longer than broad; rhinaria well-developed on 3-13, oval on 3, twofold (rather hoof-shaped) on succeeding segments ( $\delta$ ), or wanting ( $\varphi$ ). Scutellum with margin W-like, the incision deep, sides straight, forming an angle little greater than a right angle; surface flat, shining, finely superficially punctate, punctures much smaller than interspaces; a distinct longitudinal median groove (fig. 29). Legs unmodified, basal portion of all tibiae with exterior patch of white, for the rest legs are black; hair fringe at  $\delta$  hind basitarsus normal. All exposed tergites transversely marked with white on either side, the band on 1 thick, with crescentic incision on inner face, anterior branch short and pointed, less than half as broad as posterior part; the one on 2 hardly produced anteriorly at sides; sternites black, 2-3 at most with vestigial white lateral spots. Terminalia of  $\delta$  as in fig. 29. Pygidial plate of  $\varphi$  broad, tongue-shaped, quite flat but with side margins raised before apex; disk dull, finely tessellate between a number of low longitudinal ridges . . .

. . . . . **nubicus**

- Smaller, length not exceeding 12 mm. Membrane of fore wing never so uniformly dark, fore and hind wing less contrastingly coloured. Remaining characters combined not as above . . . . . 25
25. Parascutella white-spotted. Wing membrane at least semitransparent, not markedly coloured except along some main veins, frequently almost entirely hyaline. Both sexes with dorsal mesonotal spots well developed, though often not sharply outlined in  $\delta$ , but *pls* and *plsa* united and *plsa* often fused together also with *als* and *ms*. Antennal segment 3 not longer than broad and slightly shorter than 4 ( $\delta$ ), or a trifle longer than broad and equal in length to 4 ( $\varphi$ ); flagellar segments a little longer than broad in both sexes; rhinaria superficial, oval and single on 3, paired, elongate-oval and nearly parallel on succeeding segments ( $\delta$ ), or wanting ( $\varphi$ ). Scutellum flat, shaped as in fig. 35; surface shining, rather superficially, moderately densely punctate, punctures smaller than interspaces; usually a small triangular tuft of white above incision and broad white fringe projecting from beneath between hinder angles, these hairs of equal length, hardly or not sur-

passing scutellar angles. Posterior border of ♀ fore and middle femora with conspicuous fringe of white hairs which are longer than diameter of femur. All tibiae entirely or predominantly white externally; tarsi mainly dark. Posterior carina of ♂ hind femur acute, entire and not angulated; apex of ♂ hind tibia with conspicuous exterior comb of long finely plumose dark or white hairs; hind basitarsus widest near base, outer face rather concave and shining. Apex of ♂ sternite 6 with deeply impressed, oval, median area. Terminalia of ♂ as in fig. 35. Pygidial plate of ♀ gradually, not strongly narrowed posteriorly, apex broadly rounded, almost truncated; surface flat with raised margins, rather shining, finely reticulate and with sharply indicated longitudinal ridge extending from near base to the slightly swollen apex. Length 8-11 mm . . . . . **hyalinatus**

— Parascutella black, unmarked. Wing membrane darker . . . 26

26. Light body markings white faintly tinged with pale blue. Both sexes with all light marks on thorax and abdomen sharply defined: *ms*, *mls* and *pls* isolated; *plsa* long, linear, connected or almost so with *als* and *pls* at either end; tegulae and axillae also spotted. Antenna slender, segment 3 longer than its own width at apex, subequal in length to 4; all flagellar segments longer than broad; rhinaria distinct in both sexes, those of ♂ single and oval on 3, twofold, slightly converging (rather hoof-shaped) on succeeding segments, those of ♀ single and linear, placed in the long axis. Scutellum normal, postero-lateral sides slightly but distinctly convex, hinder angles acute or rectangulate, apices not prominent; emargination regular, sides straight or slightly concave, meeting at an obtuse angle; surface quite flat, shining, sparsely superficially punctate; pubescence black, often with some light hairs above incision; fringe projecting from beneath posterior border slightly surpassing hinder angles, restricted to inner three-fourths or less of apical width (fig. 23). Membrane of fore wing rather dark, uniform brown with diffuse subhyaline spots bordering the cells outwardly and transparent also beyond vannal fold. Tibiae and tarsi predominantly palest blue externally, middle tibia of ♂ almost pure white. Tergites 1-6 (♂) or 1-5 (♀) with the usual lateral spots sharply defined, wider than interspaces, the one on 1 with posterior branch slightly longer than anterior, and incision on inner face acute-angulate; mark on 2 with small blunt forward projection laterally; side-marks of sternites 2-4 conspicuous. Posterior carina of ♂ hind femur acute but not angulated, apex of ♂

hind tibia normal, lacking external comb of long hairs; brush fringing lower border of hind basitarsus normal. Apex of ♂ sternite 6 only slightly impressed medially. Terminalia of ♂ as in fig. 23. Pygidial plate of ♀ with raised margins, median carina blunt, distinct only towards apex; surface somewhat shining, finely scaled, basal portion with few deep punctures (fig. 23). Length 8.5-11 mm . . . **fallibilis**

- Light body markings pure white; ♂ with anterior dorsal thoracic spots *l<sub>pn</sub>*, *als*, *ms*, *mls* and *plsa* not all of them well defined but even then they usually form patches of longish, finely branched, semierect hairs; in ♀ these spots always stand out more clearly and may be partly fused together. Combined characters of ♂ and ♀ not as above . . . 27

27. Male only. Disk of scutellum markedly convex, except posteriorly, the strongly protuberant hinder angles being flat, slightly convergent and pointed; postero-lateral sides strongly converging; emargination deep; surface smooth and shining, covered all over with large pit-like punctures smaller than interspaces; length of hair fringe projecting from beneath hind border following curve of emargination, white in the centre, black on either side between hinder angles (fig. 36). Antennal segment 3 not longer than its apical width, subequal in length to 4, all flagellar segments about as long as broad; rhinaria superficial though distinct, broadly oval, placed in two almost parallel rows on all segments. White hairs on anterior portion of mesoscutum suberect, finely plumose, not forming spots, only *pls* larger, spot-like, consisting of more strongly branched decumbent hairs. Hind femur with complete, acute, posterior longitudinal carina; apex of hind tibia lacking conspicuous external comb of long hairs; dense brush of dark hair along inferior border of hind basitarsus much as in *ramosus*. All tibiae and tarsi predominantly white externally. Membrane of fore wing subhyaline with dark brown streaks bordering veins, most of the area beyond cells much obscured. White abdominal marks present on tergites 1-6 and sternites 2-3, all slightly larger and less defined than in *ramosus*. Apex of sternite 6 with shallow, oval, median impressed area. Terminalia as in fig. 36. Length 9.5 mm. Female unknown . . . . . **priesneri**

- Scutellum shaped otherwise, disk not markedly convex, the hinder angles less protuberant . . . . . 28

28. Male only (female unknown). Hind femur with simple, acute, posterior carina extending about distal five-seventh from base; apex of hind tibia lacking conspicuous external comb of long hairs; dense brush along inferior border of hind basitarsus as described for *priesneri* (see also couplet 30) . . . . . 29
- Male and female . . . . . 30
29. Apical lobes of sternite 7 closely approximated, simply rounded, the median emargination small, narrower than each of the lobes; lateral apodemal processes normal (fig. 34). Dorsobasal process of gonostylus very narrow, its termination obtuse-angulate, with long marginal fringe of strong unbranched bristles; ventrobasal process narrow, crescent-shaped, with fringe of short marginal hairs; bristles at apex of gonostylus thin, few in number and shorter than diameter of same (fig. 34). White fringe projecting from beneath hind margin of scutellum short and broad, surpassing hinder angles only slightly (fig. 34). Median impressed area of sternite 6 shallow, oval in outline, covered with hair. Antenna slender, segments 5-13 slightly but distinctly longer than broad. Hind basitarsus short and straight, not hollowed out externally, length ratio of hind tibia and basitarsus as 17 : 10. Facies and pubescent pattern closely similar to *T. ramosus*. Length 9 mm approx. Female unknown . . . . . **picicornis**
- Apical lobes of sternite 7 outcurved, rather foot-shaped and widely separated from each other by a deep roundish emargination, the lobes densely clothed with microsetae; lateral apodemal processes exceptionally large, almost pointed (fig. 22). Dorsobasal process of gonostylus well developed, detached from hind margin of gonobase, projecting inward as a curved slender setigerous process carrying numerous finely branched bristles; ventrobasal process larger, broadly oval, margin naked; bristles at apex of gonostylus numerous, strong, beard-like and finely plumose, longer than diameter of gonostylus (fig. 22). White fringe projecting from beneath hind margin of scutellum longer and narrower, confined to median part of emargination (fig. 22). Median impressed area of sternite 6 narrower and deeper, almost bare. Antenna thicker, segments 5-13 scarcely longer than broad. Hind basitarsus longer and more slender, slightly outcurved and somewhat concave externally, length ratio of hind tibia and basitarsus as 14 : 10. Facies and pubescent pattern closely similar to *T. histrionicus*. Size variable, length 7.5-11.5 mm. Female unknown . . . . . **picaron**

30. Male . . . . . 31  
 — Female . . . . . 33
31. Ventral longitudinal carina of hind femur incomplete, angulated about halfway length in lateral view; apex of hind tibia with dense external comb of long finely plumose hair; hind basitarsus little narrowed toward apex, outer face slightly concave, integument shining through pubescence. White pubescent marks on mesocutum fairly well defined, the lateral spots extensive, *plsa* linear, bordering tegula along full length and often fused together with *pls* and *als* at either end. Apical lobes of sternite 7 short, subtruncate or bluntly rounded, slightly divergent and sparsely clothed with microsetae towards margin only (figs. 37-38). Upper margin of gonostylus gradually curved, coinciding with intero-apical angle of gonocoxite without forming a dorso-basal process, the margin basally with thin fringe of widely spaced long hairs; apex more or less bilobed, densely clothed with beard-like hairs, which are longer than diameter of gonostylus (fig. 38). Antennal rhinaria on 3-12, single and oval on 3, paired on succeeding segments, the outer row short and oblique, the inner row twice as long as outer and placed in the long axis, together forming hoof-shaped impressions. Shape of scutellum as well as that of emargination variable, usually with triangular patch of white above median incision; a median fringe of white projects from beneath posterior border. Tergites 1-6 with transverse lateral marks, anterior branch of spot on 1 barely indicated; sternal spots 2-4 distinct. Size variable, length 8.5-12.5 mm . . . . . **ramosellus**
- Ventral longitudinal carina on hind femur entire, straight-lined or slightly convex in lateral view; apex of hind tibia lacking external comb of long hairs. Anterior white pubescent marks on mesoscutum not clearly outlined. Antennal rhinaria on 3-12, as described for *ramosellus*, but paired ones on 4-12 of equal size and more distinctly converging apically. Remaining characters combined not as described . . . . . 32
32. Outer face of hind basitarsus not hollowed out, its pubescence dense, covering entire surface. Tergite 6 nearly always spotted with white on either side. Emargination of scutellum very variable but usually crescent-shaped or obtuse-angulate (figs. 32-33). Apex of tergite 7 with trapezoidal or crescentic notch, lateral tubercles prominent. Sternite 7 deeply triangularly incised forming pair of similarly shaped, narrowly rounded,

triangular lobes which are either bare or beset with few scattered setae varying in length and arrangement (figs. 32-33). Gonostylus similar to *ramosellus* but with dense fringe of very long and strong incurved bristle-like hairs all along dorsal margin; apex inflated, outline subtriangular when viewed laterally, sparsely clothed with thin pubescence all over, the hairs much shorter than diameter of gonostylus (fig. 33). Size very variable but generally smaller, length 6.5-12.5 mm **ramosus**

- Outer face of hind basitarsus slightly concave, integument partly shining through pubescence. Tergite 6 unspotted. Emargination of scutellum variable but usually  like with tiny median crescent at depth of emargination (fig. 20). Apex of tergite 7 subtruncate, margin usually convex between a pair of more widely distant and smaller tubercles (fig. 20). Apical lobes of sternite 7 conspicuous, closely approximated, oval or subcircular, median cleft deep and narrow, whole surface densely clothed with microsetae (fig. 20). Gonostylus with well developed dorso-basal process carrying numerous strong, curly, marginal bristles; apex broadly rounded, widest and almost truncated in lateral view, densely clothed with curly, beard-like hairs, which are much longer than diameter of gonostylus (fig. 20). Size equally variable but averages much larger, length 8.2-13.0 mm . . . . . **histrionicus**
  
- 33. White pubescent marks on mesoscutum generally small, the anterior spots not sharply defined, consisting of finely plumose semierect hairs, *pls* more compact but invariably widely distant from the smallish and isolated *plsa*; distance separating pair of *pls* greater than their own diameter. Scutellar emargination  like, the double curve strong, usually with tiny additional notch in the centre. Anterior branch of tergal spot 1 small, little or not expanded or incurved basad. Fore wing membrane rather dark. Rhinaria on segments 4-11 of antenna placed in a single longitudinal row of narrow, deeply impressed grooves. Size small to medium . . . . . **histrionicus**
  
- White pubescent marks on mesoscutum usually larger and more sharply outlined, the anterior spots standing out clearly, made up of decumbent plumose hairs; *plsa* bordering tegula much longer, linear, nearly always connected with or closely approximated to *pls*, the latter being of large size, more or less angular, the distance separating them equal to or less than their own diameter. Scutellar emargination deeper and usually shaped differently, with straighter sides and lacking a tiny

median indentation (figs. 32-33 and 37-38). Anterior branch of tergal spot I very variable (obsolete, so as to become nearly L-shaped, in typical *ramosellus*), but usually distinctly incurved in *ramosus* and western *ramosellus*. Fore wing membrane dark in *ramosus* and Indian *ramosellus*, much lighter in western *ramosellus*. Antennal rhinaria similar to *histrionicus* in *ramosus*, distinctly more superficial in *ramosellus*. Size generally smaller . . . . . **ramosus** and **ramosellus**

### III. Group of *Thyreus dimidiatipuncta* (Spinola)

#### **Thyreus dimidiatipuncta** (Spinola) (pl. I figs. 1-2; and figs. 2-3)

1838. Spinola, Ann. Soc. Ent. France **7**: 536-537. — ♀ ♂ Egypte (*Crocisa dimidiatipuncta* [sic] N. Sp., ♂ ♀).
1906. Schulz, Spolia Hym. Paderborn: 257 (*C. dimidiatipunctata* nom. emend.)
1921. Meyer, Archiv f. Naturgesch. **87A**: 77-78 (key ♀ ♂), 90. — ♂ ♀ Ägypten (*C. gibba* n. spec.) **Syn. nov.**
1934. Alfken, Bull. Soc. R. Ent. d'Egypte **18** (1-2): 165, 167 (key ♀ ♂, *dimidiatipuncta* + *gibba*), 171-172 (notes, *dimid.* + *gibba*). — ♂ ♀ Egypt; „auch in der Cyrenaika“) (*C. dimidiatipuncta* Spin. + *gibba* R. Meyer).
1959. Lieftinck, Tijdschr. v. Ent. **102**: 33 (note).

Type material. — E g y p t: ♀, lectotype by present designation, and ♂, allotype, each of them bearing a small squarish pin-label correctly indicating the sex and both specimens placed side by side over a large dark green drawer-label: "*Crocisa dimidiatopunctata* m. [sic] Ann. Soc. ent. D. Walzl — Egypte" (MT). — ♀, lectotype *Crocisa gibba* R.M., Aegypt (written), *Crocisa histrio* F. var., det. H. Friese, and *C. gibba* R. Meyer, J. D. Alfken's writing; *gibba* R. Meyer Typus, J. D. Alfken's writing (ZMB). ♂, (dissected), Aegypt (written) *Crocisa* ? *histrion* F. ♂, det. H. Friese 1911, *gibba* R. Meyer Allotypus, det. J. D. Alfken, Allotypus (red) (ZMB). "Diese Tiere waren von R. Meyer nicht bezettelt, müssen aber die typischen Stücke der *gibba* sein. Das ♀ stammt aus der Museumssammlung und gehört zu Kat. Nr. 707" (Alfken).

Further material. — E g y p t: 2 ♂ (one diss.), Dachour, 8.5.14 (written), Coll. Alfieri Egypt (print); one with *Crocisa gibba* R. Meyer, det. J. D. Alfken 1933, the other with *C. dimidiatipuncta* M. Spin., det. J. D. Alfken 1939, and *C. nubica* Lep., det. J. D. Alfken (1939) (ZMB). ♂ (diss.), Egypt, Min. Agric. W. El Garawi, 6.vi.1927, Coll. Farag, *C. dimidiatipuncta* Spin., det. J. D. Alfken 1933 (ML); ♂ ♀, Egypt, same label, Kafr Hakim, 8.v.1926 (♂) and Kerdasa, 11.iv.1926 (♀), coll. R. Mabrouk (ZMB, ML). ♀, XV (on green label), 707 Aegypt (written), *Melecta fuscipennis* Mor., det. H. Friese 1896 | *dimidiatipunctata* Spin. (= *gibba* Meyer), det. H. Bischoff (ZMB). ♀, Sinai, 7.v.1930 (print), Min. Agric. Egypt, Coll. Zouhi-

ry (print), *Crocisa gibba* R. M., det. J. D. Alfken 1933 (ZMB). ♀, Egitto, Gebel Asfar, leg. A. Mochi, 27.v.1937 (CGS). — Tripolitania: ♀, Cyrenaica, R. U. Agrario, 20.v.26/11018/Geo C. Krüger, *C. gibba* R. Meyer, det. J. D. Alfken 1933 (ZMB). — Iraq: ♀, Bagdad *Scutella* (?) (very old writing), legit. Olivier (unknown hand) (MP).

The above synonymy is based upon an examination of Spinola's types of "*C. dimiatipuncta*", the misspelled name in the original description being obviously due to a printer's error. Following Alfken rather than Schulz's emendation, I believe the name is best corrected into *dimidiatipuncta*.

The supposed types of *Crocisa gibba* R. Meyer in the Friese collection (ZMB), male and female from Egypt (ex coll. Ehrenberg), were examined by Bischoff and Alfken (Alfken, 1934), who discussed their relationship. These authors considered both sexes as different species — undoubtedly an erroneous conclusion, based on the observation that the female differed from the male by its larger size, smaller abdominal white spots and by having the metepisternal tuft of long hairs black instead of white: all of them characters which vary greatly in either sex. To safeguard *gibba*, Alfken wrongly declared the female as the type of that species, at the same time correctly assigning the male to *dimidiatipuncta* Spinola. As Meyer only gave a description of the male, referring to the female merely by adding "Segment 6 schwarz", it is the male, not the female, that ought to be selected as the lectotype of *gibba*. The original couple of "*Crocisa dimiatipuncta*" first characterized by Spinola now prove to differ from each other in exactly the same way as do the two sexes of *gibba* just mentioned. Moreover, the male of Meyer's *gibba* agrees in every respect with that of Spinola's bee, so that there can be no doubt but that the two are conspecific, the name *gibba* thus becoming a synonym of *dimidiatipuncta* Spinola.

*Crocisa dimidiatipunctata* sensu Meyer (1921: 100-101), from Aden, evidently belongs to a different species. This bee, a male labelled "Lakej-Aden, 12.2.95 coll. Bingham" (ZMB) was redescribed by Alfken (1934), who thought it to be the undescribed male of *C. histrio* (F.). As I have shown in an earlier paper (1959: 33), this is, however, a totally different insect which comes nearest, perhaps, to *T. surniculus* Lieft., 1959. Yet another bee, which Alfken mistook for *dimidiatipuncta* Spin., is *C. histrionicus* (Ill.), male and female from Cyrenaica, treated by Alfken (1927) under the old name *major* Morawitz (see under *T. histrionicus* in the present paper).

Summarizing the above, it will be seen that no description exists of *T. dimidiatipuncta* other than Spinola's brief diagnosis, so that a fuller characteriza-

tion of the type specimens would not seem to be out of place. This is, therefore, given asunder and will be followed by comparative notes on other specimens.

Male (allotype, pl. 1 fig. 2). — Mouth-parts retracted, mandibles closed (see female). Antenna cylindrical, 3 almost twice as long as 4, each of the segments 4-13 in lateral view a little broader than long, more distinctly so when seen from behind, subequal in length to one another; rhinaria on 3-12 distinct, oval, placed near base of segments. Interocellar distance (1) longer than ocellorbital distance (2) and this again longer than ocelloccipital distance (3), the ratios (in allotype and five other males measured) somewhat variable, e.g. 1 : 2 : 3 = 10 : 6.2-7.63 : 5.8-6.2. Mesoscutum and scutellum strongly, not very densely, punctate, punctures larger and less numerous than in such species as *histrionicus* but, as in that insect, smaller than the interspaces; only basal portion of tegulae punctate, the rest with few superficial punctures. Scutellum and parascutellar lobes of characteristic shape (fig. 3); sulcus between mesoscutum, parascutella and scutellum deep; surface of scutellum distinctly convex but distal portion downcurved, feebly longitudinally sulcate and gradually more deeply impressed, the median incision situated on a lower level than the side lobes, which are straight and even a little upcurved, acutely triangularly pointed.

Legs robust, mid and hind femora and tibiae moderately swollen, mid tibia relatively somewhat broader, its outer surface flattened and clothed with patch of dense felt-like hairs (fig. 3); hind tibia rather clubbed but apex truncated, its spurs of unequal length, curved and both minutely serrated exteriorly.

Membrane of fore wing uniform brown, except a longitudinal subhyaline area extending  $\frac{2}{3}$  from base into radial space, a similar posterior streak in  $1Cu$  and  $2Cu$  and most of the vannal lobe; no clear spots about outer cells. Hind wing subhyaline, apex slightly smoky.

Gaster elongate; all tergites strongly, not very densely, punctate; surface smooth, rather shiny, except where covered with white pubescence; apical margin of 1 narrowly impunctate but those of next tergites successively more broadly so, these smooth areas naked, widest and somewhat prolonged forward medially, on 3-6 occupying from  $\frac{1}{4}$  to  $\frac{1}{3}$  of exposed surface. Tergite 7 strongly tapered, its whole surface punctate; apex depressed, slightly concave, strongly bifid and covered with bristle-like hair on each side of a feebly pronounced furrow (fig. 3). Sternites with impunctate areas wider, especially on middle; raised median carina of 1 strong, extending full length; apex of 6 slightly produced medially, rounded. Sternites 7 and 8 shaped as in fig. 2, the bristles strong, especially those of 7. Genital capsule

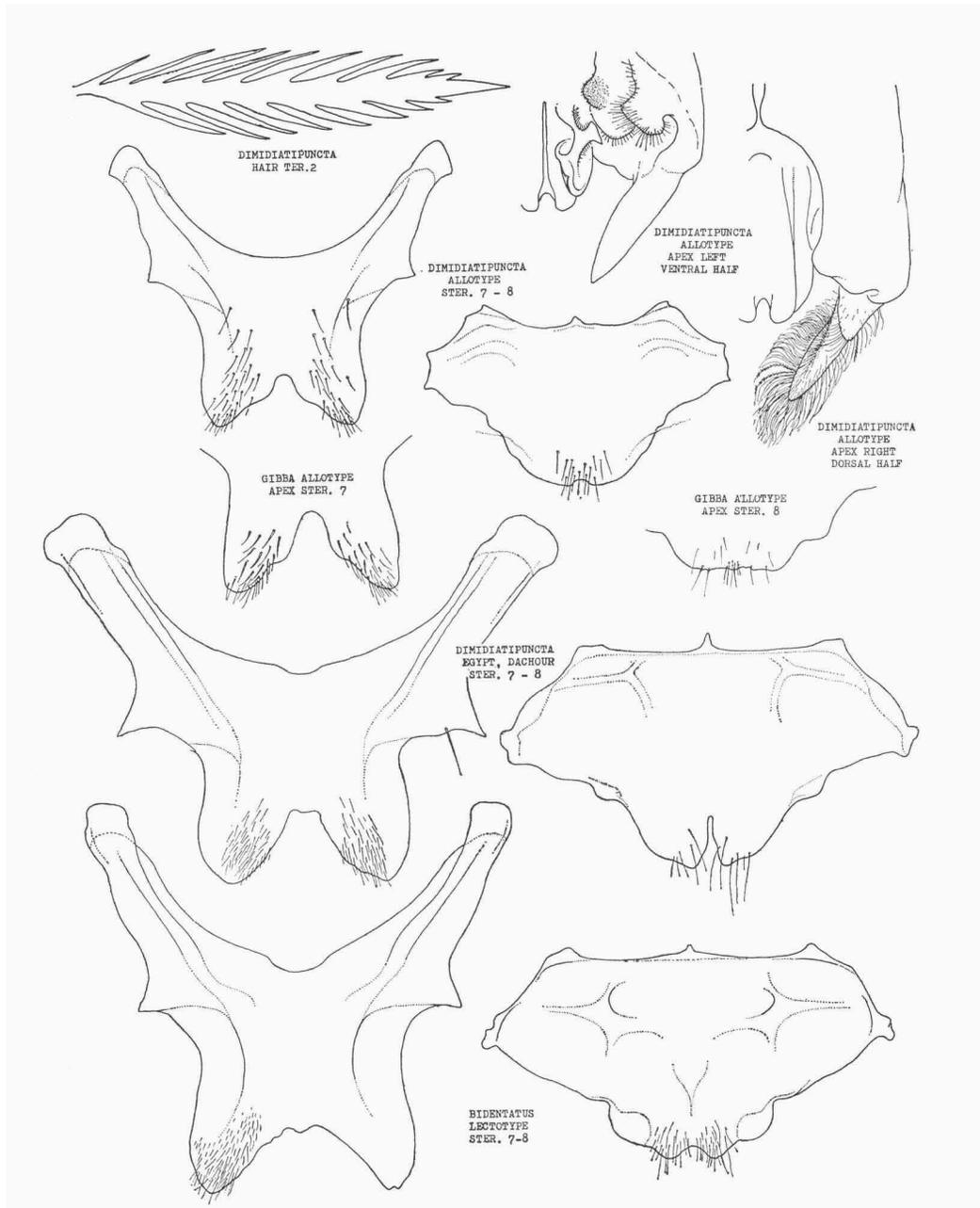


Fig. 2. *Thyreus d. dimidiatipuncta* (Spinola), ♂ from Egypt and *T. d. bidentatus* (Kirby), ♂ from Afghanistan. Pinnate hair of 2nd gastral tergite, apical sternal plates of gaster and details of genitalia.

of large size, 2.3 mm, the gonostylus slender, densely clothed with long, soft, plumose hairs (fig. 2).

Pubescence. Strong, bristle-like, suberect, dark brown or black on lower parts of head and labrum; very dense, decumbent, multibranchiate and snowy-white on entire anterior surface; white also on vertex and temples but longer, erect and finely plumose; scanty, decumbent and white on antennal scape; long, suberect, white without forming a definite pattern, on anterior part of mesoscutum, there being no *ms*, *als* and *mls* spots, the ramifications of these hairs more numerous, though shorter, than in species like *histrionicus*; white *plsa* band well developed and connected along tegula with *pls*; white and decumbent on entire basal half of tegula. Pubescence of scutellum scanty and blackish but parascutella with erect white basal tuft; no long fringe beneath apical margin of scutellum. Large oval patch of white covers most of thoracic pleurae, only a narrow anterior area and all the rest posterior to mesepisternum remaining black. Conspicuous long white tuft on either side of metanotal area but hairs surrounding and below it black.

Legs mainly black, white pubescence on entire outer face of fore tibia and from near base almost to apex on mid tibia, where it is extremely dense and felt-like; basal  $\frac{3}{7}$  of hind tibia likewise white externally.

Pubescence on disk of gaster scanty, black; 1-5 with pair of large, sharply defined, transverse, subrectangular, white lateral patches placed along distal margin and covering only little less than half of exposed surface; these marks extend laterad to a point where tergites are widest but underneath do not reach tergal margins; in addition to the rectangular apical spot, 1 bears a slightly smaller subtriangular patch on either side at base. Spots on 1 separated across dorsum by a distance slightly less than twice their own diameter, those on 2-3 by about  $1\frac{1}{4}$  and those on 4-5 by a space about equal to their own width. Sternites 1-5 almost bare and wholly black.

Female (lectotype, pl. 1 fig. 1). — A much worn specimen with most of the clypeal and mesonotal pubescence rubbed off. Morphology of mouth-parts similar to the genotype, *C. scutellaris* (F.) and allied species but maxillary palpus, though vestigial, consisting of two minute subequal segments. Two apical segments of labial palpus very short, about equally long. Inner orbital margin further removed from lateral ocellus than in male: interocellar and ocellorbital distances more nearly equal, the ratios of 1 : 2 : 3 (in lectotype and four other females measured) varying between 10 : 9.0-10.0 : 6.2-7.0. Antenna slender, 3 fully  $1\frac{1}{2}$  times longer than 4, this as well as each of the following segments a little longer than broad. Pubescence of head as in male but median area of clypeus with many depressed black hairs intermixed. Scutellum still shorter than in male, with lateral edges slightly incurved

and less acutely pointed (fig. 3). Mesoscutum with pubescent patches *lpn* and *als* quite distinct, consisting of long, decumbent, multibranchiate hairs; pleural pubescence mostly black, only a subcircular central patch, considerably smaller than in male, remaining white; longish tufts on metanotal area and propodeum all black. Wings as in male.

Legs black; shape and armature as in male but mid tibia not broadened or flattened. Pubescence black; white are: outer face of fore tibia almost for its basal half, of mid tibia for about  $\frac{1}{3}$ , and of hind tibia for about  $\frac{2}{5}$  length from base.

Abdomen cylindrical, tergites more strongly arched ("wasp-like") than in male, but relative lengths of 1 and 2 the same in both sexes, as described earlier; median carina of 1 strongly raised and sharply acute. Hair scanty, except where forming white patches; spots on 1-4 considerably smaller than in male, all from  $\frac{1}{3}$  to  $\frac{1}{4}$  the size they have in male, basal spot of 1 and single one of 4 in the form of circular points, the remainder larger and more or less oval, arranged as 5 spots in a row on each side, the surrounding black remaining just visible laterally when viewed from above; white dots of 3 placed partly on the punctate basal area and partly on the smooth apical area but on 4 the hairs are all of them implanted on the impunctate apical part of the tergite, these two areas on 3-5 being demarcated by a row of strong, semi-erect black bristles (also present in male). Tergites 5, pygidial segment and all sternites black. Exposed part of pygidial plate triangular, with strong median carina from base to apex, surface on both sides of crest deeply concave, the whole structure dull, finely tessellate. Sternite 6 densely punctate, finely longitudinally carinate, apex narrowly rounded, its sides apically with dense fringe of long bristles projecting well beyond pygidial plate so as to simulate a pair of denticles.

Variation: ♂. — As to the extent of white pubescent markings, two (from Kafr Hakim and Wadi El Garawi) are practically identical with the allotype described above; in two others (allotype *gibba* and one from Dachour, both dissected), all white spots are reduced in size, the thoracic *pls* and *deps* as well as the abdominal spots being a good deal smaller; lastly, in the second ♂ from Dachour it is just the reverse: the dowdy white hairs on mesoscutum and thoracic pleurae occupy considerably more of the surface, the hind tibia is almost wholly white externally, while the basal and distal marks on each side of tergite 1 are broadly confluent, the basal limb of the spot extending far inward as an acute streak almost meeting its fellow from the opposite side. The colour of the long metepisternal tuft also varies: in all males most hairs are white but in the darkest specimen from Dachour the whole tuft is black, as in the great majority of females.

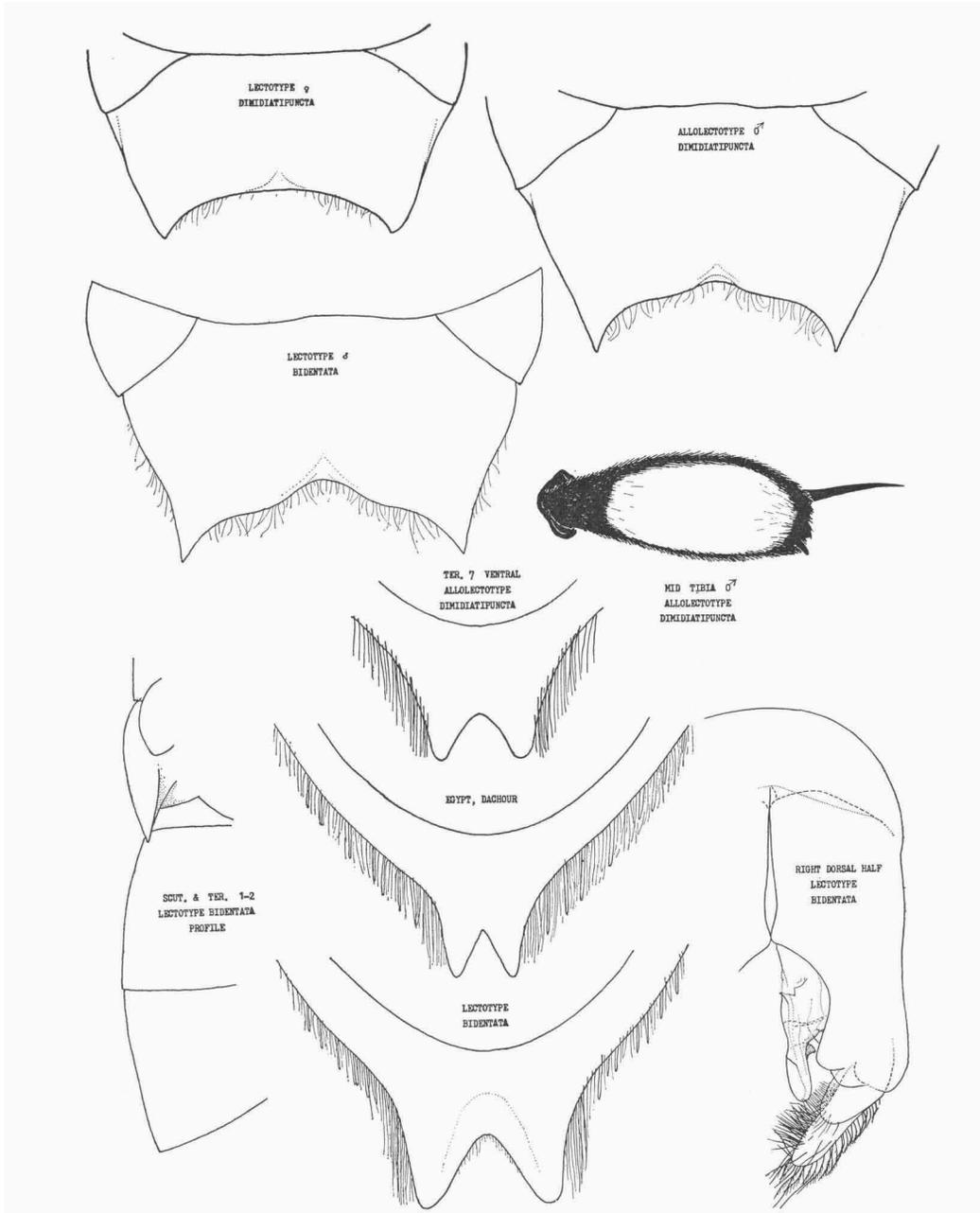


Fig. 3. *Thyreus d. dimidiatipuncta* (Spinola), ♂ and ♀ from Egypt and *T. d. bidentatus* (Kirby), ♂ from Afghanistan. Scutella, outer face of right mid tibia showing pubescence, right lateral view of scutellum and first two gastral segments, and ♂ terminalia.

Variation: ♀. — Disk of clypeus at least partly, and a broad area connecting the eyes on top of head almost entirely, clothed with short black hair; thoracic *lpn-als*, *pls* and *pls* clearly defined, all more or less confluent alongside mesoscutum, *pls* being large and axe-shaped; *mls* vestigial or absent. Abdominal spots variable in size, those at sides of 1 paired in five out of eight females, fused together at lateral margin in the others. All specimens, save the lectotype and an equally dark female from Cyrenaica, bear a small lateral spot also on tergite 5; in the former the outer faces of the tibiae are likewise more extensively spotted.

Measurements: ♂ body 14.0 mm, fore wing 10.5 mm (allotype), remaining examples 14.0-16.5 mm and 10.5-12.0 mm, respectively; ♀ body 14.0 mm approx., fore wing 10.0 mm (lectotype), remaining examples 14.0-18.0 mm and 10.2-12.5 mm, respectively.

N.B. — There would be some grounds for treating the present species and its immediate ally *T. merviensis* as forming a separate subgenus on the basis of the peculiar shape of the gaster, c.q. the shortness of the first segment, the retention of the scutellum and the velvety nature of the abdominal vestiture. These characters are suggestive of those shown by the allied genera *Pseudomelecta* Rad. (type-species *Melecta diacantha* Eversm.) and *Paracrocisa* Alfken (type-species *P. sinaitica* Alfken), though not nearly so well pronounced as in these. Yet we may look upon *T. dimidiatipuncta* as a somewhat less specialised member of *Thyreus* leading over *via* the above genera to *Melecta* and *Eupavlovskia*, which are morphologically the least differentiated among the Old World melectines. (See Popov, 1955, Trudi Zool. Inst. Akad. Nauk USSR **21**: 321-334).

Distribution. — South Mediterranean, from Tripolitania to Iraq.

***Thyreus dimidiatipuncta* subsp. *bidentatus*** (Kirby) new status (pl. 1 fig 3; and figs. 2-3)

1889. Kirby, Trans. Linn. Soc. London (2) **5**: 136, pl. 14 fig. 19 (insect). — ♂ Hari-rud valley [Afghanistan] (*Crocisa bidentata*, sp. n.).  
 1895. Morawitz, Horae Soc. Ent. Ross. **29**: 43-44. — ♀ Pul-i-Chatun (*Crocisa valida* nov. sp.). **Syn. nov.**  
 1913. Meade-Waldo, Ann. Mag. Nat. Hist. (8) **12**: 93 (addit. note) (*C. bidentata* K.).  
 1921. Meyer, Archiv f. Naturgesch. **87** A: 78 (key ♂), 79-80 (orig. descr. quoted; not seen) (*C. bidentata* K.).  
 1921. Meyer, Ibid.: 77 (key ♀), 79 (orig. descr. quoted; not seen) (*C. valida* Mor.).

Type material. — A f g h a n i s t a n: ♂ (dissected), lectotype *C. bidentata* Kirby, Hari-rud valley, with label: *Crocisa bidentata* K. Type, G. Meade-Waldo 6.xi.12 Hari-rud, Afghanistan (BM, no. 437); ♀, in general coll. BM, has a written label 3/Hari-rud V, allotype by present designation (BM).

The morphological characters of this form agree so closely with those of Spinola's *dimidiatipuncta* that I can but consider it a subspecies. Both sexes are quite similar in general appearance and size to the nominotype, except for the reduction of white pubescent markings. A portrait of the lectotype (pl. 1 fig. 3) and outline sketches of its most significant characters (fig. 2 and 3) may serve to the recognition of this bee. The present male and female differ somewhat from each other in the placement of the ocelli, the ratio between interocellar and ocellorbital distances in the male being as 10 : 6.6, in the female as 10 : 8.6. This sexual difference is in accordance with observations on other species, but I have found these ratios to vary also in individuals of the same sex.

The female agrees in every detail with the original description of *Crocisa valida* Mor., which is here quoted in full:

“**valida** nov. sp. Nigra, nitida, crasse denseque punctata, atropilosa, facie utrinque striga e pilis niveis composita ornata; mandibulis longissimis; antennis articulis cylindraceis, tertio quarto paulo longiore, intermediis latitudine vix longioribus; scutello apice utrinque spinis longis armato; alis nigro-fuscis violaceo-micantibus; abdominis segmentis margine postico laevi, ultimo dorsali longitudinaliter, carinato; tibiis omnibus basi externe pilis paucis albidis signatis. ♀ 16 mm.

Zu den grössten Arten gehörend, zeichnet sich dieses Weibchen durch die fast universelle schwarze Behaarung aus, indem nur an den Schienen in der Nähe der Basis aussen einige weisse Haare den dunkeln beigemischt sind und beiderseits auf dem Gesichte ein aus schneeweissen Haaren zusammengesetzter Streifen zu sehen ist. Die sehr langen Mandibeln sind vor der Spitze dunkel gelbbraun geringelt. Der Clypeus ist etwas breiter als hoch. Dorsulum und Schildchen sind gleichmässig stark punktirt; letzteres ist am Endrande stumpfwinkelig ausgeschnitten mit weit vorspringenden scharf zugespitzten Seitenecken. Die Mésopleuren sind sehr dicht punktirt-gerunzelt, die Brust sparsam und grob punktirt; die Metapleuren glänzend, fast überall glatt, Tegulae pechbraun, vorn punktirt und schwarz behaart. Die schwarzbraunen Flügel schimmern violett. Die Dorsalplatten des Abdomens sind ebenso wie das Schildchen punktirt, die Endränder mehr oder weniger glatt und lebhaft glänzend, die letzte mit einem stark entwickelten Längskiele versehen. Die Ventralplatten sind beiderseits am Grunde und an den Seiten punktirt, sonst glatt. An der Spitze der Mittelschienen bemerkt man aussen einen langen rothbraunen, nach aufwärts gekrümmten Dorn.

Bei Pul-i-Chatun von Glasunow gesammelt.”

I have not seen the type which I believe is the same species as *bidentatus*. In both of them the curved, finger-like process at the apex of the mid tibia (more or less developed in all females of *Thyreus*) is quite conspicuous, longer and slenderer than usual.

The type-locality of *C. valida*, Pul-i-Chatun (Pol-e-Khatun or Pole-Khatum in other spellings) is situated E of Askhabad, south of Thardjou and Bukhara, in Turkmenia.

Distribution. — Afghanistan and Turkmenia.

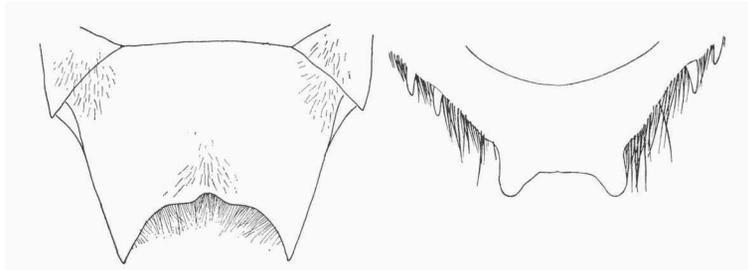


Fig. 4. *Thyreus merviensis* (Rad.), ♂ holotype from Turkmenia. Scutellum and ventral aspect of 7th gastral tergite.

***Thyreus merviensis*** (Radoszkowski) (pl. I fig. 4; and fig. 4)

1893. Radoszkowski, Bull. Soc. Imp. Nat. Moscou, n.s. 7: 166—167, pl. 4 fig. 5a-c (♂ genit.), 50 (7th tergite), 5s (scutellum). — ♂ Merv (*Crocisa merviensis* n. sp.)  
 1921. Meyer, Archiv f. Naturgesch. 87A: 78 (key ♂), 80, 89—90 (addit. note on holotype (*C. merviensis* Rad.)  
 1967. Popov, Trudy Zool. Inst. Moscou 38: 102, remarks in Russian; ♀, no description.

Type material. — U S S R: ♂ (headless), labelled: TRANSCASPIA (print on yellow), Coll. Radosz (print) *Merviensis* Rad. (Radoszkowski's writing), *merviensis* (unknown hand). The specimen, with parts of the genitalia dissected out and mounted by Radoszkowski, is the holotype (ZMB).

A large and very distinct species; general aspect and markings as shown in pl. I fig. 4. Scutellum and parascutella with tufts of white feathery hairs above, the fringe projecting from beneath emargination narrow though rather dense, the hairs likewise feathery. First and second gastral segments about equally long, the dorsal surface of the first is subangularly rounded into the anterior surface but more gently so than in the more advanced members of the genus. Gastral tergite 7 intact, the whole plate strongly narrowed apically, the well developed nipple-shaped tubercles only 0.28 mm apart (fig. 4). Apical sternal plates wanting. Genital capsule damaged and incomplete; gonostylus very small, narrowly triangular with almost pointed

tip, its outer face carrying few erect setae which are scarcely longer than the diameter of gonostylus about halfway its length.

Female unknown.

Distribution. — The locality Merv (= Mary) is in Turkmenia, on the railroad about half-way between Ashkhabad and Chardzhou (Thardjou).

#### IV. Group of *Thyreus scutellaris* (Fabricius)

***Thyreus scutellaris*** (Fabricius) pl. 1 fig. 5; and fig. 5)

1781. Fabricius, Spec. Ins. 1: 487. — Sex not stated [rect. ♂], Siberia (*Nomada scutellaris* nov.)
1890. Morawitz, Horae Soc. Ent. Ross. 24: 369—371. — ♂ Mongolia mer.: Schuan-Dshin (*Crocisa crassicornis* sp.n.) **Syn. nov.**
1921. Meyer, Archiv f. Naturgesch. 87A: 72, 77—78 (key ♀ ♂), 81—83. — ♂ ♀ various locs. (*C. crassicornis* Mor.)
1921. Meyer, Ibid.: 77—78 (key ♀ ♂), 84 (locs. & notes, probably all referring to *scutellaris*) (*C. aberrans* Mor.)
1936. Alfken, Arkiv f. Zool. 27A: 5 (no descr.). — ♂ S. Kansu (*C. crassicornis* Mor.)
1947. Yasumatsu, Mushi 18: 33 (no descr.). — ♂ Inner Mongolia (*C. crassicornis* Mor.).
1959. Lieftinck, Tijdschr. v. Ent. 102: 20—25 (incl. references and comp. notes with *crassicornis* Mor.), pl. 2 fig. 1 (photo ♂ W. Siberia), fig. 3—4 (♂ structures). — ♂ type, plesiotype and addit. material redescribed and figured; ♂ Persia; ♂ Israel.

The type is an incomplete male from Siberia in Fabricius' collection at Kiel. The species was redescribed after two males in the Leiden Museum from western Siberia, one of which I selected as the plesiotype of *T. scutellaris* (F.), here photographed in pl. 1 fig. 5. Since last dealing with this insect I have examined several more specimens, including the female, from various localities. These can now be enumerated as follows, tracing the localities roughly from east to west.

Additional material. — China: ♂ (diss.), Kina/S. Kansu, Sven Hedin's Exped. Centr. Asien, Dr. A. Hummel, *C. crassicornis* F. Mor., det. J. D. Alfken 1935 (NRS). — Afghanistan: ♀, Afghanistan, Darufulun b. Kabul, 1800 m, 9.6.53, J. Klapperich (MBUD). — Iran: ♀, Persien, Elburs, Chehar Dach, 31.iii, 2000 m, G. Heinrich, *C. crassicornis* F. Mor., det. J. D. Alfken (ZMB). — USSR: 2 ♀, Turkestan, and Turkestan, Sarachs, 22.6.1890, *C. levicrus* Mor., det. R. Meyer (ZMB); ♂ (diss.), Turkestan, Djarkent, Burchan, Anfang Juni 1911, *C. laevicrus* F. Mor., det. J. D. Alfken 1936 (ZMB). ♀, Ber-Tschogur, Mugodjar-Geb., N. Androsow, *C. affinis* Mor., det. Wollmann, *C. crassicornis* Mor., det. J. D. Alfken 1936 (ZMB). 2 ♂ (diss.), ♀, Südl. Uralgebiet, Kargala b. Orenburg, 1915-17, H. Grothe S.V., *C. crassicornis* Mor., det. R. Meyer, the ♀ in

addition with label *scutellaris* sec. Mor. 1873 (det.?) (ZMB). ♂, Astrachan (print, dark purple label), coll. Radosz. (print), *aberrans* Mor. (Radoszkowski's writing) (ZMB). ♀, SE Russia, Bashkir ASSR, Ufa, 18.vii.1959

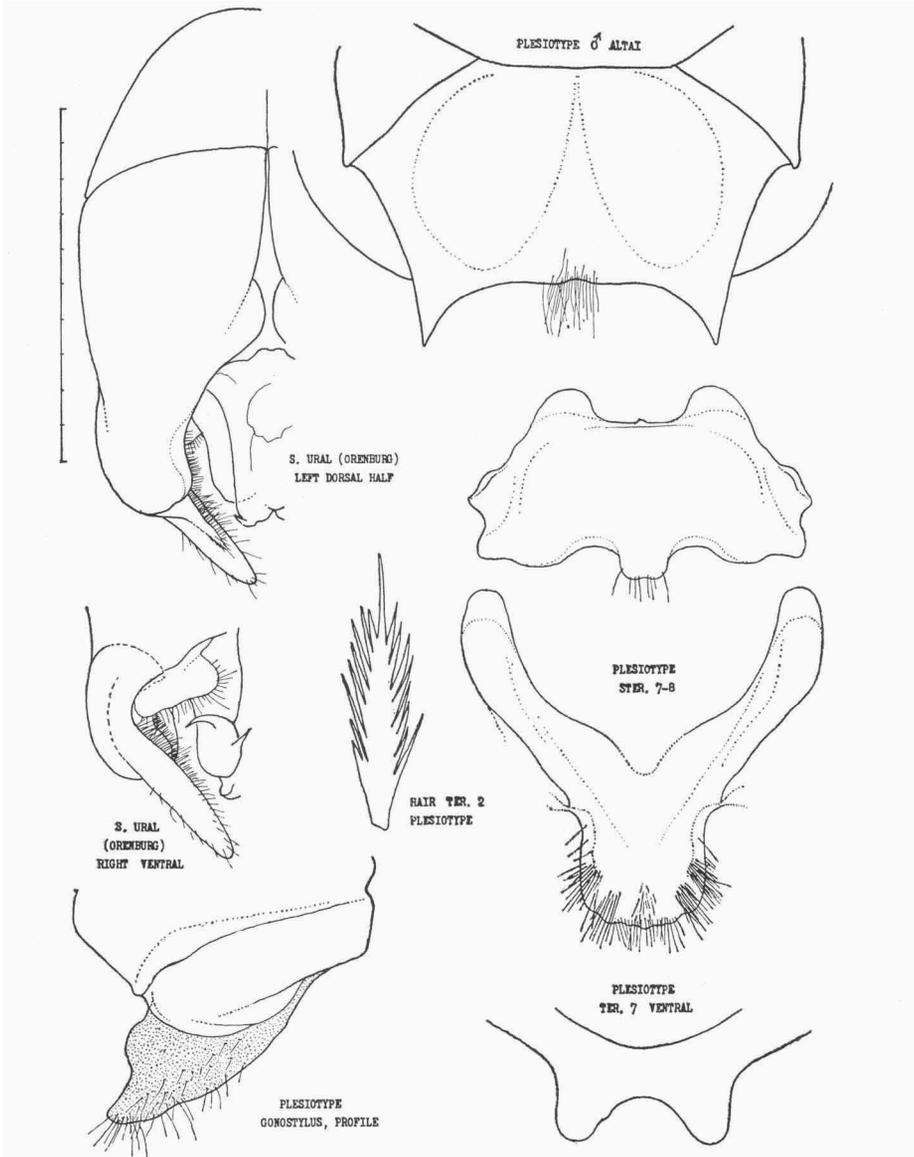


Fig. 5. *Thyreus scutellaris* (F.), ♂ plesiotype from W. Siberia. Scutellum (long fringe of white feathery hairs projecting from beneath apical border omitted; median tuft shown consists of white hairs); white hair-scale from spot on 2nd gastral tergite; and terminalia. Scale-line = 1 mm.

(transl. from Russian), *C. scutellaris* F., det. D. B. Baker 1959 (ML). ♀, Russ. Armenia, Kulp, 1901, leg. Korb, *C. levicrus* Mor., det. R. Meyer (ZMB). — Asia Minor (Turkey): ♂ (diss.), Asia min. 1890, *C. aberrans*, det. H. Friese 1900 (ZMB). — Syria: ♂ (diss.), Syria 1899, *C. ? aberrans*, det. H. Friese 1900 (ZMB). — Africa: ♂, Ehrenberg S/969, *C. crassicornis* Mor., det. R. Meyer (ZMB). — Egypt: ♂ (diss.), Egypt, Dep. Agric. Egypt, Meadi, 8.iv.1912, coll. L.H.G., *C. crassicornis* F. Mor., det. J. D. Alfken (ZMB); ♀, Egypten, Helouan, April 1897, Schmiedeknecht, *C. affinis* Mor., det. Schmiedeknecht, *C. crassicornis* F. Mor., det. R. Meyer (ZMB). — Arabia: ♀, Arabien, Ehrenberg S., *C. crassicornis* Mor., det. R. Meyer (ZMB). — Jugoslavia: ♀, Fiume (= Rijeka), 31.6.86, H. Friese, *C. aberrans* Mor., det. Friese (ZMB) 1).

Structure of head and position of ocelli as described for *T. affinis*. Averages larger in size than that species but small females of *scutellaris* may have an identical pubescent pattern and can be distinguished only by the very different shape of the scutellum, the deeply impressed suture separating the latter from the mesoscutum, the more strongly contrasting fore wing membrane and the slightly more shining dorsal surface of the thoracic segments, the punctures of which are a little more spaced than in *affinis*. Two stoutly built females of large size (body 11 mm, fore wing 9.3 mm), from Fiume<sup>1</sup>) and Darufulun (Afghanistan) respectively, have quite similar markings and are identical in structure but differ from the rest in that almost the entire fore wing membrane is of a uniform grey brown tint, only the basis and two spots bordering the closed cells remaining subhyaline.

Distribution. — Probably throughout Central and West Asia (terr. typ. Siberia) and occurring in the eastern Mediterranean as far west as Jugoslavia.

**Thyreus affinis** (F. Morawitz) (pl. 1 figs. 6-8; and fig. 6)

1874. Morawitz, Horae Soc. ent. Ross. **10**: 183—185 (55—57 sep.). — ♀ ♂ "Derbent. Bacu", Daghestan (*Crocisa affinis* nov. sp.)  
 1875. Morawitz, in Fedtschenko, Reise Turk. Mellif. 1, Mem. Imp. Anthrop. & Ethnogr. 19:141 (addit. notes). — Caucasus; Astrakan dist. (*C. affinis* Mor.)  
 1893. Radoszkowski, Bull. Suc. Imp. Nat. Moscou, n.s. **7**: 165—166, pl. 4 fig. 3 (♀ ♂ *C. transcaspica* n. sp., Transcaspie), 166, pl. 4 fig. 4 (♀ ♂ *C. portchinski* n. sp. Caucase)

1) Labelled by H. Friese and collected by him almost simultaneously with a quite typical ♀ of *T. affinis* (Mor.) bearing a similar label. See under that species.

1895. Friese, Bienen Europa's **1**: 172—173 (key ♀ ♂), 178—180. — Südrussland; Ungarn; Dalmatien; Sicilien; u. Archipel (*C. affinis* Mor.)
1895. Pérez, Esp. nouv. Mellif. de Barbarie, Bordeaux: 26—27. — ♀ sine patria (*C. tunensis* J. Pér. nov.) **Syn. nov.**
1905. Dusmet, Bol. Real Soc. esp. Hist. nat.: 156-157 (key ♀ ♂), 158. — ♀ ♂ Barcelona, notes (*C. affinis* Mor.)
1915. Dusmet, Bol. Real Soc. esp. Hist. nat. **15**: 258 (note). — ♂ ♀ Morocco (*C. affinis* Mor.)
1921. Meyer, Archiv f. Naturgesch. **87** A: 77-78 (key ♀ ♂), 87-88. — ♂ ♀ Spanien; Castilien; Sizilien; Fiume; Sarepta; Siebenburgen (Rumenien); Kleinasien; Chin. Turkestan (*C. affinis* Mor. + var. *villosa* n. var. from Ashabad). **Syn. nov.**
1922. Meyer, Ann. Mus. Nat. Hung. **19**: 182. — ♂ Ungarn (*C. affinis* Mor.)
1922. Maidl, Ann. Naturhist. Mus. Wien **35**: 92. — Montenegro & Albania; also reported from Dalmatia, Greece, Hungary, Sicilia, Spain, S. Russia and Caucasus (*C. affinis* F. Mor.)
1930. Schmiedeknecht, Hym. Nord- u. Mitteleuropas: 831-832. — ♂ ♀ "Südeuropa bis Ungarn" (*C. affinis* Mor.)
1934. Alfken, Bull. Soc. R. Ent. d'Egypte **18**: 165, 168 (key ♀ ♂), 173 (note: not in Egypt) (*C. affinis* Mor.)
1939. de Beaumont, Ann. Soc. ent. France **108**: 163 (key ♂ ♀), 170-171, fig. 14 and 18 (♀ ♂ structures). — Europe mérid., Afrique du Nord & Asie occid. (*C. affinis* Mor.)
1957. Moczár, Apidae in Fauna Hung. **19**: 1334-1335. — Hungary (*C. affinis* Mor.)
1958. Moczár, Rovart. Közlem. (Fol. Ent. Hung.) n.s. **11** (24): 416. — Hungaria, various locs. (*C. affinis* Mor.)
1958. Iuga, Anthophorinae in Faun. Rep. Pop. Rom. **9** (3): 215, 216-217. — Rumania, various locs. (*C. affinis* Mor.)
1965. Leclercq, Bull. Inst. agron. et Stat. Rech. Gembloux **33**: 115. — ♂ ♀ S. France.
1967. Popov, Trudy Zool. Inst. Moscou **38**: 101-102, 301-302 (flower records).
1967. Vergés, Miscelánea Zoológica, Barcelona **2** (2): 102 (key ♀ ♂), 106-107, fig. 14. — Spain.

Type material. — ♀, lectotype *C. transcaspica* Radosz., labelled: Coll. Radosz (print), TRANS-CASPIA (print on yellow), Transcaspica Rad. (Radoszkowski's writing) (ZMB). ♀, lectotype *C. portchinski* Rad., labelled: Coll. Radosz (print), CAUCAS PORTZ (print on light blue), Rungvlyad (? illegible), Portchinsk Rad. (Radoszkowski's writing) (ZMB). ♀, holotype *C. tunensis* J. Pérez, labelled: Feriana/Tunisie, *Tunensis* JP (Pérez' writing) (MP). ♂, holotype *C. affinis* var. *villosa* Meyer, TYPE (orange), ASHABAD (print on yellow), Coll. Radosz (print), var. *affinis* Mor. (Radoszkowski's writing), var. *villosa* R. Meyer (Meyer's writing) (ZMB).

Further material. — F r a n c e : ♀, Port de Bouc (B.d. Rhône) (MP). — S p a i n : ♂ ♀, Cuenca, Castilien, 189/6K (ZMB); ♂ ♀, Hispania, ♀ with *C. truncata* Per., det. R. Meyer (ZMB); ♂, Estepona, 27.vii.1959, S. Erlandsson (NRS); 2 ♀, Prov. Cadiz, Guadiaro, S. Diego, vii.1959, S. Erlandsson (NRS). — P o r t u g a l : ♀, Carcanelos, 18.vii.1955, N. F. d'Andrade; ♀, Portimao, 17.viii.1951, N. F. d'Andrade; ♀, Sines, 15.viii.1956, N. F. d'Andrade (all MZUC); 5 ♂ (diss.), ♀, Praia de Rocha, vii. 1950,

P. M. F. Verhoeff (CV). — Italy: ♀, Emilia, Castel d'Aiano, viii. 1928 (ML); ♀, Pied. Piemont, O. Sichel 1867 (MP); ♀, Italie, coll. Passerini (IRSN). — Sicily: ♂, Sicilien 1877, *C. affinis* Mor., det. H. Friese (ZMB); ♂, Sizilien 1858, coll. Mann, *C. affinis* Mor., det. H. Friese (ZMB); ♀, Sicilia or., Lentini, Fiume Reina, 30 m, 15.vii.1949, coll. Hartig (INER). — Hungary: series ♂♀, various locs.: Kethalom; Sarwada; Félegyháza; Dálja; Valencei-tó; Sukoro; Gellerth. allot.; Simontornya (♀ on *Lavaterum*) (MBUD, ML); 2 ♂ 2 ♀, Hung. occ., Simontornya, vii-viii. 1931 and viii. 1933, leg. Pillich (♀ on *Euphorbia*, ♂ on *Salvia*), *C. affinis* Mor., det. J. D. Alfken 1932 & 1933 (ZMB). — Yugoslavia: ♀, Istrien, Umgao, vii. 1931, leg. R. Schmidt, *C. ? crassicornis* Mor., det. J. D. Alfken (ZMB); ♀, Fiume [=Rijeka] 29.6.86, H. Friese (ZMB); ♂, Dalmatie, leg. Germar (MP); ♂, Macedonia, Izvor, 17 km SSW of Titov Veles, 22.vii.1965 (MA); ♂, Sucurak (?), D. Novak, 16.viii.1924, *C. affinis* Mor., det. ? (ZSM). — Rumania: 3 ♂, Siebenburgen, Hg. Arad (print) (ZMB). — Albania: ♀, Albania or., Ionian Is., Sir S. Saunders (BM). — Greece: ♂ (diss.), Corfou, vii-viii.1954, P. M. F. Verhoeff (CV); ♂, Corfou, O. Sichel 1867 (MP); ♀, Grèce, Salonique (IRSN); ♀, Pyrgos (Peloponn.), 14.vi.1961, W. Linsenmaier (CL); 3 ♂, Peloponnesus, Alt-Korinth, 24.v & 1.vi.1964, Max Schwarz (CMS); ♀, Cyclades, Insel Andiparos (Kyklade), Oliaros, 3.ix.1925, coll. A. Schulz (ZMB). — USSR: ♀, Sarepta, 1893, leg. Becker (ZMB); ♀, Ukraine, Cherson Arn, 28.vi.1943, leg. W. Grünwaldt, *C. affinis* Mor., det. J. D. Alfken (ZMB); ♀, Kaukas [us], Leder/b7b.105/ *C. elegans-aberrans* Mor. ? det. H. Friese 1893 (MBUD). Turkestan: ♂, Turkestan (print) Mongolia (written by H. Friese) (ZMB); ♂♀, Kirghiz, coll. J. Pérez 1915 (MP); ♀, Turkestan, Golodnaja Steppe [Kazakhstan], vii.1901, *C. elegans* Mor., det. H. Friese 1900 (ZMB). ♀, Kazakhstan, Inderskischer Salzsee, M. Bartel leg. (NMW). — Asia Minor (Turkey): ♂ (diss.), Anatolien, Ak-Chehir, 1900, leg. Korb, *C. ?spec.*, det. H. Friese and E. Clément (ZSM); 4 ♀, Tekirdag, Halikoy nr. Malkara, 200 m, vii.1962, and Ankara, Elma Dagi, 1000 m, vi.1962, K. M. Guichard & D. H. Harvey (BM); 2 ♂, Lycie, coll. E. Bourjeau, 97-60 (MP); ♂♀, Türkei, Mut, 13.vi.1965, Max Schwarz (CMS). — Rhodos: ♂, Faleraki, 22.vii.1963, S. Erlandsson (NRS). — Cyprus: ♀, Cipro, O. Sichel 1867 (MP); ♂♀, various locs. on Cyprus: Limassol, Erdhima, Cherkes, vi-ix.1938-56, G. Mavromoustakis (CM). — Egypt: ♀, Mersa Matruh, 22-29.viii.1954, H. Priesner (HP). — Morocco: ♀, Middle Atlas, Timhadite, 5000 ft., ix.1935 (BM); ♀, Middle Atlas, Azrou, 1200 m, 20.vii.1963, W. Linsenmaier (CL). — Algeria: ♀, Algier, *C. affinis* Mor., det. R. Meyer (ZMB). — Iran: ♀,

Hamadon, Iran, 10.viii.1964, coll. Basil (ZMB). — West Pakistan: ♀, Quetta, vi.1903, leg. Chas. G. Nurse, ded. 1921, G. A. J. Rothney (OUM). — U S S R: ♂, Siberia, Fabr. Ind. or.? (on dark blue label), Var. *M. scutellaris* F. (unknown handwriting) (ZMB).

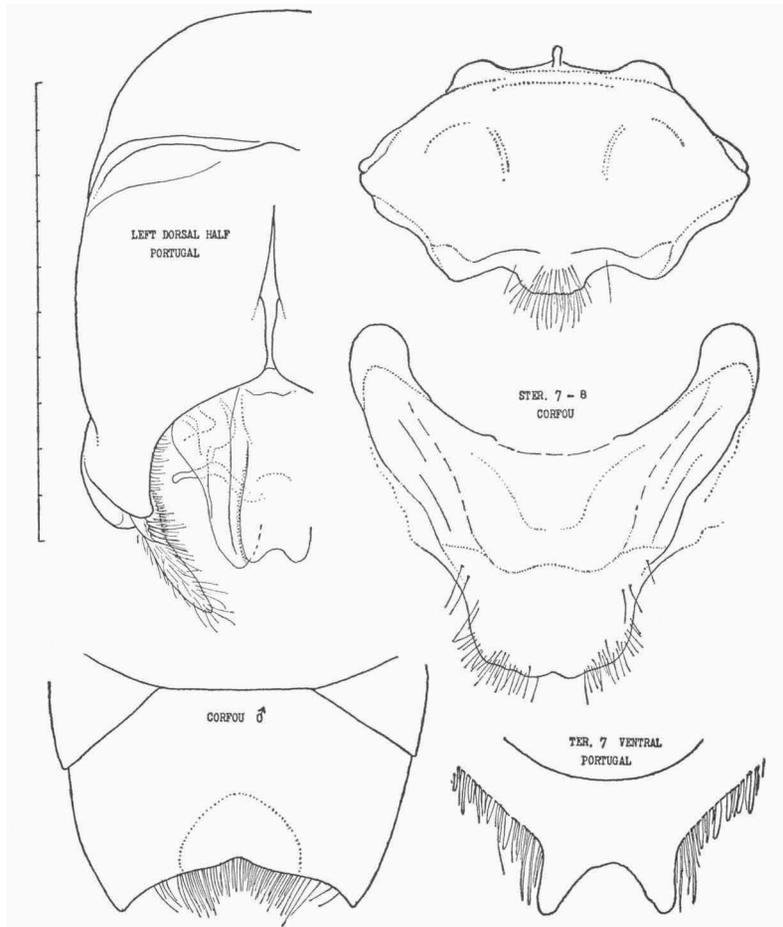


Fig. 6. *Thyreus affinis* (Mor.), ♂ from Corfou and Portugal. Scutellum and terminalia. Scale-line = 1 mm.

A compactly built, short-legged species. Head comparatively large and deep, more swollen than usual; summit of vertex markedly convex, the occipital area bulging. Interocellar and ocellorbital distances in the ratio of 10:9 or about 10:10, the ocelloccipital distance being at least half as long as these. Maxillary palpus invariably wanting. In typical specimens the

white tergal hair bands of the abdomen are separated medially by a distance approximately equal to their own length but in certain individuals they are broader and extend much further inward, occupying even more of the surface than in the type of *transcaspica* (pl. 1 fig. 8). The female from Mersa Matruh (Egypt) is also profusely marked but at the same time rather puzzling on account of the shorter ocellorbital space, the interocellar and ocellorbital distances being in the ratio of 10:7, as in most regional species of *Thyreus*.

*T. affinis*, excellently described by Morawitz and well characterized also by de Beaumont (1939), is undoubtedly a near relative of *T. scutellaris* (F.). Some differences between the two were already pointed out by Morawitz (1874-75), who obviously had the true *scutellaris* before him. As will be seen from the figures, the male terminalia of these bees are built according to the same ground plan (cf. figs. 5 and 6). Other allies are *T. elegans* (Mor.) and, more remotely so, *T. sibiricus* (Rad.) with its immediate associates.

Meyer (1921), having examined the types, correctly synonymized *C. transcaspica* Rad. (pl. 1 fig. 8) and *portchinski* Rad. (pl. 1 fig. 7). He was wrong, however, in assigning *C. rufa* Rad. to the present species: this being a discoloured or immature example of *T. ramosus* (Lep.). The type of *C. tunensis* J. P. is a perfectly fresh female of *affinis*, answering Morawitz' description in every respect and agreeing with the majority of other specimens. It has very broad white hair bands on either side of the first gastral tergite, which are narrowly coalescent at the side edges. Like the type of the var. *villosa* Meyer, from Ashkhabad, the female from the Golodnaja Steppe in Turkmenia (ZMB) differs most strikingly from the rest by a maximum extent of white body tomentum. This covers the entire head, most of the thoracic dorsum — only the *mls* spots remaining isolated — as well as the entire distal half of the scutellum; the abdominal bands are very broad and only narrowly interrupted middorsally, simulating the pattern of *T. elegans* (Mor.), shown in pl. 2 figs. 9—11.

Host. — *Amegilla salviae* (Mor.), sec. Iuga, 1958.

Distribution. — Whole Mediterranean region and West Asia (terr. typ. Daghestan).

**Thyreus paucimaculosus** (Alfken, 1930) (pl. 2 fig. 14; and fig. 7)

1930. Alfken, Mitt. Zool. Mus. Berlin 16: 831-832. — ♀ Alai-Pamir (*Crocisa paucimaculosa* spec. nov.)

Type material. — U S S R: ♀, Tadzhikistan, labelled: West Pamir, Maz, 3580 m, 15.8.1928, leg. Reinig, *Crocisa paucimaculosa* Alf., det. J. D. Alfken 1930. Holotype, with red type label (ZMB).

## Original description:

“♀. 9 mm lang. Schwarz, nur das Pronotum an den Seiten, die Mesopleuren unter den Flügelschuppen und die Seiten des Mittelsegments abstehend weiss behaart. 1. Rückenplatte des Hinterleibes am Grunde vor dem Stutz mit 2 sehr schmalen, seitlich am Hinterrande mit je einem breiteren, vorn eingebuchteten, anliegenden, weissen Haarfleck. 2. Platte seitlich am Hinterrande mit einem grossen, den Seitenrand erreichenden, die 3. mit einem

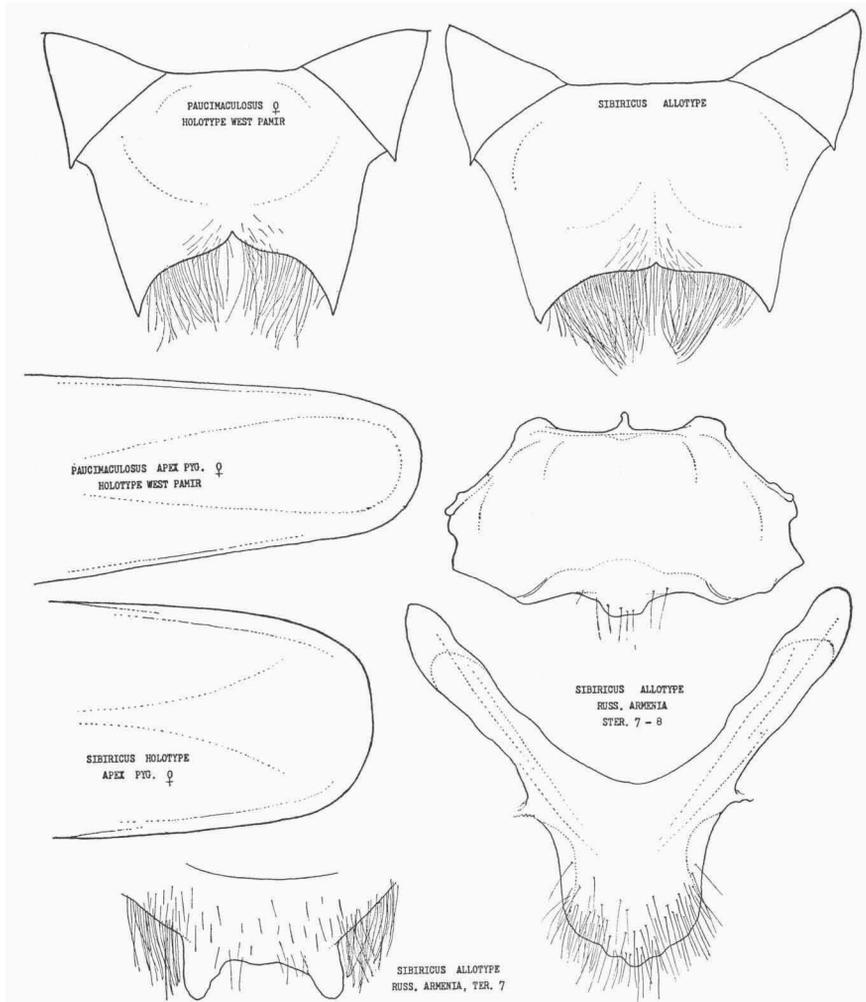


Fig. 7. *Thyreus paucimaculosus* (Alfken), ♀ holotype from West Pamir. Scutellum and pygidial plate (left). — *T. sibiricus* (Rad.), ♂ allotype from Russian Armenia. Scutellum and apical sternal plates (right), ventral view of ♂ 7th gastral tergite (left), and pygidial plate of ♀ holotype from Minusinsk (left). Corresponding figures drawn on the same scale.

kurzen, länglichen, den Seitenrand nicht erreichenden und die 4. mit einem kleinen, runden, weissen Haarfleck. Oberlippe wie bei allen mir bekannten *Crocisa*-Arten zweihöckerig. Kopfschild vorstehend, dicht runzelig-punktiert, vorn mit feinen Längsrünzeln. Stirn dicht und ziemlich fein punktiert, zwischen den Fühlern scharf gekielt. Scheitel seitlich von den Nebenaugen zerstreut punktiert. 2. Geisselglied der Fühler etwa  $1\frac{1}{2}$  mal so lang wie das 3. — Mesonotum, besonders vorn, kurz abstehend schwarz behaart, dicht und fein runzelig punktiert. Schildchen dünn schwarz behaart, verschwommen, zerstreut und ziemlich stark runzelig punktiert, mit feiner Längsrille in der Mitte, seitlich in 2 lange, scharfe Spitzen ausgezogen, länger als bei allen mir bekannten Arten, in der Mitte des Hinterrandes mit einem kleinen Einschnitt. Seitenlappen des Schildchens ebenfalls scharf zugespitzt und über den Seitenrand des Schildchens hinausragend. — Hinterleib schwach glänzend. 1. Rückenplatte dicht und fein runzelig-, hier und da nadelrissig-punktiert, nur ein schmaler Hinterrand glatt und punktlos. Auf den Platten 2-5 wird die Punktierung von Platte zu Platte geringer und das glatte Ende immer breiter, sodass die 5. Platte am Grunde nur wenige Punkte aufweist und fast ganz glatt ist. 6. Platte sehr schmal, scharf gerandet, mit starkem Mittelkiel. Bauchplatten stark glänzend, die 1. fast ganz, die 2. an den Seiten dicht und ziemlich fein punktiert; die 3. und 4. glatt und punktlos; die 5. am Grunde dicht punktiert, in der Mitte vor dem Hinterrande kielartig erhöht; 6. Platte ebenfalls kielartig, an der Spitze mit 2 Haarzipfeln. — Beine schwarz, ohne weisse Befilzung. Flügel getrübt, mit der üblichen Aufhellung. Schüppchen schwarz, mikroskopisch fein gekörnt und ausserdem zerstreut und fein punktiert.

Eine durch die dunkle Färbung und die scharf zugespitzten Schildchen-Hinterecken ausgezeichnete Art; auch die 6. Rückenplatte (Analplatte) des Hinterleibes ist für sie kennzeichnend.

Maz (westl. Täler, 47), 3580 m. 15. VIII., 1 ♀".

Evidently a very distinct species, the male of which unfortunately remains to be discovered. The female type is the only specimen known (pl. 2 fig. 14).

The above description needs some slight correction and amplification, as follows.

Interocellar and ocellorbital distances equal in length. Frons on either side behind the antennal sockets with long white hairs sparsely intermixed, all remaining pubescence of head black. Body deep black; punctuation coarse but all punctures a little smaller, closer and less deep than in the more robustly built *T. propinquus*, its nearest ally. Apex of scutellum less deeply caved in medially than in the last species, the black fringe projecting from beneath

posterior border narrow, confined to middle of emargination, the individual branched hairs considerably longer, projecting well beyond scutellar spines (fig. 7). Gastral tergite 1 with no indication of antero-lateral white hair spots (the "2 sehr schmalen weissen Haarflecken am Grunde der 1. Rückenplatte" are pale grains of fine sand).

The legs are longer and more slender than in either *propinquus* and *sibiricus* but the spines covering the distal portion of mid and hind tibiae are more numerous and even stronger than in these bees. The tarsal claws are conspicuously orange-yellow, not brownish black or black, as they are in the aforementioned species. The wings are rather uniformly tinged grey-brown, instead of obscurely brown with clearly defined hyaline basal streaks and spots bordering the closed cells outwardly. Pygidial plate slenderer and more narrowly rounded than in *T. sibiricus* but broader than in *propinquus*; side margins slightly raised and carinate to a little before the apex; middorsal ridge blunt, widening distad, the apex somewhat swollen; surface rather shining, basally with few scattered punctures, for the rest finely tessellate (fig. 7).

Distribution. — Tadzhikistan.

**Thyreus sibiricus** (Radoszkowski, 1893) (pl. 2 fig. 13; and figs. 7-8)

1893. Radoszkowski, Bull. Soc. Imp. Nat. Moscou, Année 1893, new ser. 7: 174-175, pl. 5 fig. 19 (scutellum). — ♀ Minusinsk (*Crocisa sibirica* n. sp.)

1921. Meyer, Archiv f. Naturgesch. 87 A: 77 (key ♀), 80-81. — ♀ orig. descr.; ♀ Tunis, descr. (identity doubtful) (*Crocisa sibirica* Rad.)

Type material. — U S S R: ♀, S Siberia [upper Jenisei], labelled: Sibérie occid. (print), Coll. Radosz. (print), Minusnt (written), *sibirica* (written in pencil). Holotype (ZMB)

Further material. — U S S R: Armenia, ♂ (diss.), labelled: Russ. Armen. Kulp, 1901, Korb (print), *Crocisa scutellaris* ♂, det. H. Friese 1911, *Crocisa* sp.? nahe *affinis*, det. E. Clément (ZSM). This male is here selected as the allotype of *T. sibiricus* (Rad.). ♀, labelled: Angara [near Irkutsk] and 71/46 on either side of white disk, and *Pseudomelecta* Eversm. Faun. Volg. Ural. Bull. des Nat. de Mosc. 1852, p. 103 (unknown hand), *Pseudomelecta diacantha?* Eversm. Amoor (Siberia) on old drawer label, *Crocisa sibirica* Rad. ♀, D. B. Baker det. 1950 (NMW). — Manchuria: ♀, Manchuria, Djalantun, vii.1939, R. (print) (KU).

A little known species, probably confounded with allied ones by several authors including Popov, who mistook the undescribed *T. propinquus* sp. n. for it. This is not surprising as the two are much alike and undoubtedly

nearly related. Both species were also mistaken for *T. scutellaris* (F.), as appears from the identification labels attached to specimens determined by Friese and Gussakovsky. In fact, the general appearance and texture of these three bees are so much alike that careful examination of the finer structures will be necessary to hold them apart.

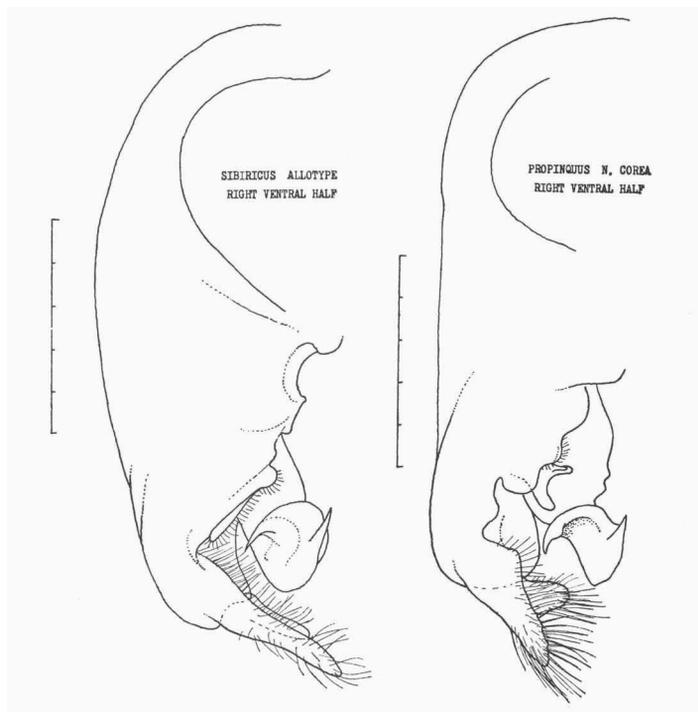


Fig. 8. *Thyreus sibiricus* (Rad.), ♂ allotype from Russian Armenia and *T. propinquus* sp. n., from Korea. Details of genitalia. Scale-line = 0.5 mm.

Male (allotype). — Agrees with the female type in all essential points so that I believe to have associated the sexes correctly. The features distinguishing this sex from that of *scutellaris* are best appreciated by comparing the outline sketches and descriptions of the apical sternites and genital capsule (figs. 7 and 8) and by consulting the key. The most striking secondary characters are found in the pubescence, *sibiricus* having the white hair spots on the gastral tergites noticeably smaller than in *scutellaris*.

Basal and apical marks at sides of 1 reduced to a pair of tiny dots separated by a distance twice their own diameter, the innermost spot (present in the female) being absent. Transverse streak on either side of 2 complete, as in the female, the marks on 3-5 being about half as long and smaller than in the other sex. Ventral surface of abdomen wholly black, lacking white

sternal spots. Sternal plate 6 very wide, similar to that of *scutellaris*: free margin evenly and very broadly rounded; surface covered with short hair, disk lacking a median impressed area but carrying a pair of tiny marginal hair spots, one on each side of the middle. Sternites 7-8 as in fig. 7. Genitalia similar in principle to those of *scutellaris* and *propinquus*, the gonostylus longer and more slender than in the latter, carrying only few short and fine hairs; dorsobasal process vestigial but fringed along margin with numerous short thick bristles; ventrobasal process ridge-like (fig. 8).

Female. — The photograph of the type (pl. 2 fig. 13) clearly shows all white markings to be considerably reduced in size as compared with the pattern of *T. scutellaris* (pl. 1 fig. 5), and in all specimens the posterior mark on gastral 1 is twofold. Pygidial plate shaped as described in the key; it is broader and more bluntly rounded apically than in the allied species (fig. 7).

Meyer (loc. cit.) describes a female in the Berlin Museum labelled "Tunis, Oasis Hafsa". According to Bischoff and Meyer it agrees with the type in every respect. I have not seen this specimen.

Distribution. — West and Central Asia, and Manchuria; ?Tunisia.

N.B. — *Melecta diacantha* Eversm., the type of which is now before me, is a very similarly-looking bee; the resemblance is, however, only superficial. It is a *Pseudomelecta*, agreeing in size and pubescent markings with some members of the *T. scutellaris* group but immediately distinguished therefrom, among other characters, by the 5-segmented maxillary palpus, the different structure of the antenna and thoracic segments, and also by the presence of a well developed arolium (pulvillus) between the tarsal claws.

### **Thyreus propinquus** sp. nov. (pl. 2 fig. 12; and figs. 8-9)

Material. — K o r e a: 5 ♂ (1 dissected), North Korea, Enjômen, Mozangun (Kankyôhoku-dô), 22 & 27.vii.1939, T. Hirao (KU, ML); ♀, Korea, Mt. Kongô, 17.viii.1940, T. Shirôzu (KU). — M a n c h u r i a: ♂, E. Manchuria, Hungchun near Wladiwostok, border along Posht Bay, 14.vii.1943, ded. S. Asahina (KU); ♀, Manchuria, Djalantun, vii.1939, R. (print) (KU); ♀, Harbin, 10-20.vii.1935, W. Alin S. (ZMB). — U S S R: ♂, Wladiwostok, Sedanka, 9. viii.1930, R. Malaise, *Cr. scutellaris* F., det. V. Gussakovsky (NRS); ♂ (diss.), Süd-Ussuri, *Cr. diacantha* Ev., det. H. Friese 1908 (MBUD); ♀, Sibérie orient. (print), *Pseudomelecta diacantha* Rad., det. & ex coll. Radoszkowski, and *Crocisa sibirica* Rad., rev. V. Popov 1959, ex coll. Radoszkowski, Inst. Zool. Krakov, 25/57 (IZK); 3 ♀, Turkestan mérid., Capus, Bonvalot 1881 (print) (MP). — Holotype ♂, North

Korea, Enjômen, Mozangun, 22.vii.1939, T. Hirao (KU); allotype ♀, Korea, Mt. Kongô, 17.vii.1940, T. Shirôzu (KU).

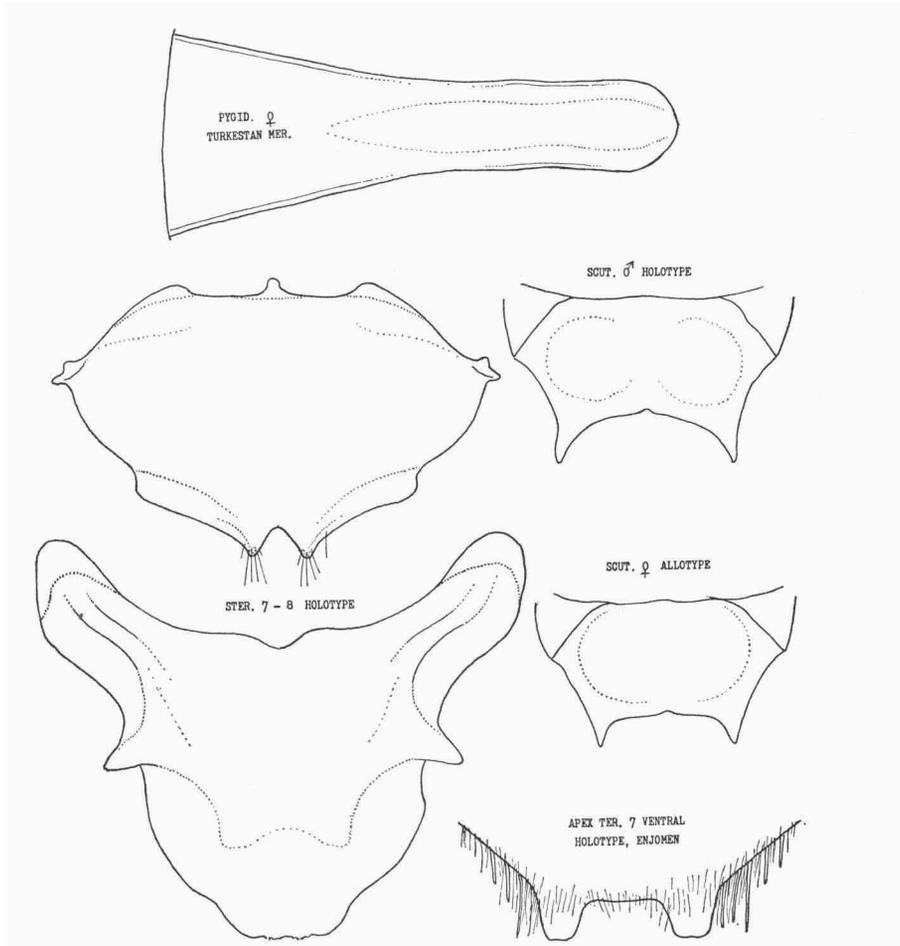


Fig. 9. *Thyreus propinquus* sp.n., from Korea and Turkestan. Scutella of ♂ and ♀ types and apical tergal and sternal plates of ♂ holotype from Korea, and pygidial plate of ♀ from Turkestan.

A homogeneous series of a species showing little variation. Body pubescence generally longer than in the allied forms, all hairs more erect and finely branched giving the insect a more downy appearance.

Male and female. — Markings similar in both sexes. Clypeus and top of head black haired, tufts of long white hairs all around antennae and fringing occipital margin. Most specimens with white hairs also anteriorly on middle of mesoscutum, in front and behind tegulae, a narrow band at

thoracic sides and a long thin tuft behind wing bases; in some examples the white on dorsum of thorax is almost everywhere replaced by black. Legs predominantly black haired, at most the tibiae externally marked with spots or streaks of white at the bases only. Fore wing membrane dark brown, darkest at the tips beyond distinct subhyaline areas under pterostigma and bordering the cells outwardly. White abdominal markings as described in the key and as shown in pl. 2 fig. 12. Transverse posterior bands of 1 and 2 either entire or (more frequently) interrupted and broken up into two spots of unequal size, those on 3-5 (♂ and ♀) or 3-4 (some ♀) usually undivided. Sternites 2-3 invariably white-spotted.

Male genitalia much as in *T. scutellaris* and *sibiricus*. Gonostylus very short and finger-like in dorsal and ventral aspect, apex provided with few strong bristles which are about equal in length to the basal diameter of gonostylus; dorsobasal process very large, strongly incurved, its margin fringed with rather long stout bristles; ventrobasal process small and deeply excised (fig. 8).

Pygidial plate of female extremely slender, apex narrow and parallel-sided; basal portion with raised margins, its surface with few scattered punctures; distal portion with well developed median ridge (fig. 9).

Distribution. — Turkestan and northeast Asia.

### **Thyreus elegans** (Morawitz) (pl. 2 figs. 9-11; and fig. 10)

1877. Morawitz, Horae Soc. ent. Ross. **14** (1): 101-103. — ♀ Kurgulutschaiskaja, Caucasus (*Crocisa elegans* n.sp.)  
 1895. Friese, Bienen Europa's **1**: 173 (key ♀), 180-181 (orig. descr. ♀ quoted; not seen) (*C. elegans* F. Mor.)  
 1908. Saunders, Trans. Ent. Soc. London, pt. **2**: 266-267. — ♂ Algeria: Biskra (*C. quadridentata*, n.sp.) **Syn. nov.**  
 1921. Meyer, Archiv f. Naturgesch. **87** A: 77-78 (key ♀ ♂), 84-87. — ♀ Turkestan; ♂ Ashabad; ♂ Mongolei (*C. elegans* Mor.)  
 1922. Meyer, Ann. Mus. Nat. Hung. **19**: 182 (notes, incl. *C. quadridentata* Saund.). — ♂ Eritrea (*C. elegans* Mor.)  
 1933. Guiglia, Ann. Mus. civ. Genova **56**: 140-142, fig. II<sup>1</sup> (♀ scutellum). — ♀ Cyrenaica (*C. Brezzii* sp. n.) **Syn. nov.**  
 1934. Alfken, Bull. Soc. R. Ent. d'Egypte **18** (1-2): 165, 168 (key ♀ ♂), 173. — Egypt; "auch Cyrenaika" (*C. elegans* F. Mor.)  
 1967. Popov, Trudy Zool. Inst. Moscou **38**: 101 (flower record)

Type material. — Algeria: ♂, holotype *C. quadridentata* Saunders, Algeria, Biskra, 13.v.1897, Saunders BM 1910-200, no. 435 type coll. (BM).

Further material. — USSR and Central Asia: ♂, Turkestan: labelled: Ashabad, Komarov and *C. elegans* ♂ F. Mor. (two labels, probably Morawitz' writing), Turkestan 189 (print), *C. elegans* Mor. Cauc.

(probably H. Friese's writing), Typus (red cadre) (ZMB). ♂♀, Caucasus, Murut (print), *C. elegans* Mor., det. H. Friese 1912 (ZMB). ♀, Coll. Radosz (print), TR-CAS SARAKS (print on yellow), *C. elegans*, det. H. Friese 1908 (ZMB). ♂ (diss.) ♀, [Kirgizia], Bugas near Khami, SW of Tian Shan, Rob. & Kozlov, 2.ix and 28.viii.1895 [transl. from Russian] (ex Mus. Leningrad, ML). ♂, Pul-i Chatun, *elegans* ♂ Moraw (possibly Morawitz' writing), 855 (print) (MBUD). ♂, Mongolei, Tippeti (print), *C. elegans* Mor., det. H. Friese 1912 (ZMB). Long series, ♂♀, W. Pakistan, Quetta, vi-viii.1903 and ♂, Karachi, v.1909 (BM). ♀, Central Asia (BM). — Asia Minor (Turkey): ♂♀, Turkey, Kars Iğdir, Peyhamil, 2400 ft., 3.ix.1960, K. M. Guichard & D. H. Harvey (BM). ♀, Turkey, Mut, 11.vi.1965, M. Schwarz (CMS). — Cyprus: 2 ♂ (diss.), ♀, Cyprus, Akrotiri Bay, vii.1934 & 30.vi.1938, Mavromoustakis, 1 ♂♀ with *C. laevicrus* Mor., det. J. D. Alfken 1932, 1936 (ZMB). — Egypt: ♀, Egypt, Fayed, H. Priesner (ML). ♂♀, Fayoum, L. Karun, ix.1945, R. L. Coe (BM). ♂, Assiut, 2.iv.1917, coll. Storey, and ♀, Meadi, 10.v.1912, coll. L.H.G., ex coll. Dept. Agric. Egypt, *C. elegans*, det. J. D. Alfken 1932 and 1933 (ZMB). ♂, Egypt, Fym. [Fayum?], Kom Oshim, 21.iii.1965, K. V. Krombein (USNM). ♂, Egypt, Gebel Asfar, iv.1937, A. Mochi (BM). ♂, S.W. Sinai, leg. Kneucker (ZMB). — Sudan: ♀, Sudan, Gebel Oweinat, Wadi Ain el Brins, 9-12.iv.1967, K. V. Krombein (USNM). — Arabia: ♀, Saudi Arabia, Hail distr., Nedj, v.1944, J. Shammar (BM); ♀, E. Saudi Arabia, Summan Plateau, v.1945, D. V. Fitzgerald (BM). — Central Sahara: ♂, Tibesti, Enneri Meche, 21.iii.1953, K. M. Guichard (BM). — Tripolitania: ♀, Cyrenaica, R. V. Agrario, 11182, leg. Geo C. Krüger, 12.vii.1926, *C. elegans*, det. J. D. Alfken 1933 (ZMB). — Tunisia: ♀, Tunisie, Tozeur, 17.v.1921, C. Dumont 1921 (MP). — Algeria: ♂, Hoggar, 15-30.iv.1950, A. Giordani-Soika (ML).

According to Morawitz' itinerary of his Caucasus expedition preceding the original description of *C. elegans*, the typical locality is situated in Transcaucasus, south of Nucha (Nukha) in Azerbeidzhan, the type having been taken on 6 June, 1876.

A very decorative little species, easily distinguished from its congeners by the almost hyaline wings and the abundance of snowy-white spots and bands covering the greater part of the body and legs. The extent of these white markings is very variable. The darkest individuals (comprising those taken in Cyprus and Asia Minor) show an approach toward profusely white-marked individuals of *T. affinis* (var. *villosa* Rad., pl. 1 fig. 6), whereas others before me (e.g. from Tripolitania, Egypt and Turkmenia)

exhibit a maximum development of white pubescence. Examples of these extremes are shown in pl. 2 figs. 9-10 and 11. Morawitz' description is very full and need not be amended or amplified. The colour design is very

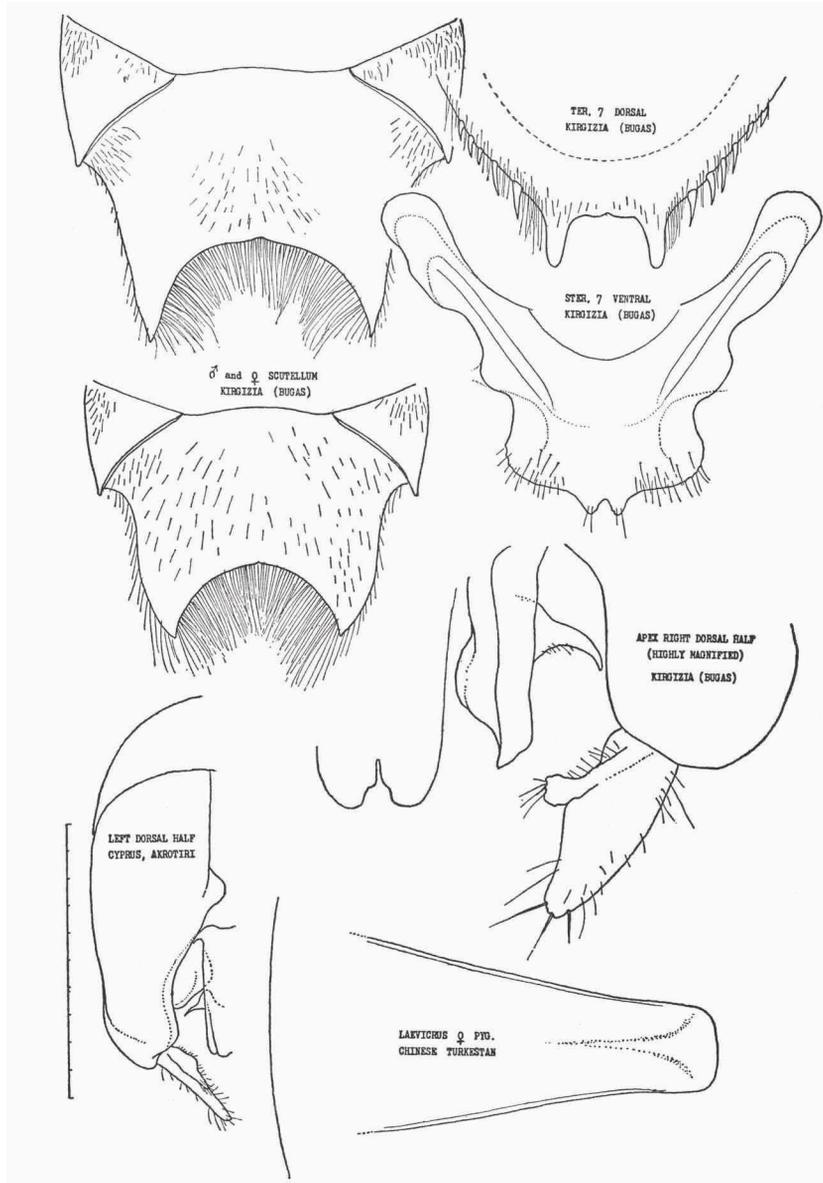


Fig. 10. *Thyreus elegans* (Mor.), from Kirgizia and Cyprus. Scutella of ♂ and ♀ and ♂ terminalia (two specimens). — *T. laevicrus* (Mor.), from Chinese Turkestan, ♀ pygidial plate (lowermost figure).

similar in the two sexes and equally variable. The type of *Crocisa quadridentata* Saunders is exactly similar to a specimen from Tozeur (Tunisia) and also agrees with the somewhat less profusely marked bees from Cyprus. The excellent description and figure of the unique type of *Crocisa brezzii* Guiglia (a badly worn example), amply suffice to prove that this bee is another typical specimen of *T. elegans*. I am much indebted to Dott. Guiglia, who sent me a good photograph of it.

Male and female. — Maxillary palpus nonexistent. Ratio between interocellar and ocellorbital distances as 10 : 6 to almost 10 : 7. The scutellar plates and male terminalia are exemplified by fig. 10. Sternite 8 (not figured) is much shorter and broader than in *T. affinis*, its length measuring only one-third of the width, but the hind margin is shaped similarly in the two species. Gonostylus of male genitalia exceptionally small, a little over one-fourth length of capsule; there is no dorsobasal process but instead the gonostylus bears a small blunt lobe, varying in shape, arising from the dorsal ridge about halfway its length (fig. 10). Ventrobasal process short and broad, shaped much as in *T. scutellaris*.

In none of our females the pygidial plate is fully exposed; its form does not seem to differ much from that of the nearly related (or conspecific) *T. laevicrus* (Mor.), which is here figured (fig. 10). See also under "Species incertae sedis", p. 129.

Distribution. — South Mediterranean and northeast Africa, through West and Central Asia as far east as Mongolia. Apparently a rare species in SE. Europe.

#### V. Other species of *Thyreus* Panzer

##### **Thyreus orbatus** (Lepeletier, 1841) (fig. 11)

###### Selected references:

1841. Lepeletier, Hist. nat. Ins. Hym. 2: 452. — ♀ ♂ France et Afrique sept. (*Crocisa orbata*, nov.)  
 1883. Pérez, Act. Soc. Linn. Bordeaux 37: 308-309 (pars) (*C. orbata* Lep.)  
 1895. Friese, Bienen Europa's 1: 171-175 (incl. key, ♀ ♂). — Europa; Marokko (*C. scutellaris* F.)  
 1898. Dücke, Entom. Nachr. 24: 142 (note & flower records) (*C. scutellaris* F.)  
 1905. Dusmet, Bol. Real Soc. esp. Hist. nat.: 156-157 (key ♀ ♂), 157. — Spain, various locs. (*C. orbata* Lep.)  
 1915. Dusmet, Mem. Real Soc. esp. Hist. nat. 8: 333. — ♂ ♀ Morocco (*C. scutellaris* F.)  
 1915. Dusmet, Bol. Real Soc. esp. Hist. nat. 15: 257. — Morocco (*C. scutellaris* F.)  
 1926. Alfken, Senckenbergiana 8: 102 (note: bona spec.). — Egypt (*C. orbata* Lep.)  
 1927. Bischoff, Biologie Hym. Berlin: 399 (host record) (*C. scutellaris* F.)  
 1930. Schmiedeknecht, Hym. Nord- u. Mitteleuropas: 831. — ♂ ♀ "Süd- u. Mitteleuropa" (*C. scutellaris* F.)

1934. Alfken, Bull. Soc. R. Ent. d'Egypte **18**: 166, 169 (key ♀ ♂), 174 ("noch nicht in Aegypten gefunden") (*C. orbata* Lep.)
1937. Maréchal, Bull. & Ann. Soc. ent. Belg. **77**: 400-403 (comp. notes), fig. 2, 4, 7 and 8 (struct. ♂ ♀). — Belgique (*C. scutellaris* F.)
1939. de Beaumont, Ann. Soc. ent. France **108**: 163 (key ♂ ♀), 168-169, fig. 6 (genit. ♂) and 12 (abd. ♀). — Europe, Afrique du Nord (*C. orbata* Lep.)
1954. Stoeckert, Abh. Bayer. Akad. Wiss. N.F. **65**: 64. — Germany, Austria.
1957. Moczár, Apidae in Fauna Hung. 19: 1333, 1335. — Hungary (*C. orbata* Lep.)
1958. Moczár, Rovart. Közlem (Fol. Ent. Hung.) n.s. **11** (24): 415. — Hungary, various locs. (*C. orbata* Lep.)
1958. Iuga, Anthophorinae in Faun. Rep. Pop. Rom. 9 (3): 215, 219-220, fig. 83 (♂ struct.) — Rumania, various locs. (*C. scutellaris* F.)
1965. Leclercq, Bull. Inst. agron. et Stat. Rech. Gembloux **33**: 116. — Belgium; flower record.
1967. Vergés, Miscelánea Zoológica, Barcelona **2** (2): 102 (key ♀ ♂), 107-108, fig. 5 and 15. — Spain, N. Africa.

Material. — About four hundred specimens, from all over West and Central Europe could be examined. As detailed collection records were mostly wanting the following is a mere list of all localities taken from the labels of the material studied, dates and further particulars being omitted. The arrangement follows the political boundaries, the sequence of countries and provinces being roughly from north to south.

N e t h e r l a n d s: Limburg (Eygelshoven; Rimburg; Mechelen; Brunsum; Terwinselen; and Echt). — B e l g i u m: Liège (Comblain-la-Tour; Martinrive; Wéris). — L u x e m b o u r g (Arlon; Botassart; Torgny). — F r a n c e: Meuse (Verdun). Environs of Paris. Aube (Champfleuri). Savoye (Moutiers). Var (Callian). Tarn (Forêt de Nore, nr. Maramet). Basses-Alpes (Entrevaux). Hte-Garonne (Toulouse). Htes-Pyrén. (Luchon). Pyrén. or. (Vernet-les-Bains). — G e r m a n y: Westfalen (Lippstadt). Rheinpfaltz (Lorelei; Ober-Lahnstein; Nassau). Hessen (Darmstadt). Brandenburg (Grochow nr. Spandau; Bellinchen a. Oder; Niemegek). Thüringen (Jena). Sachsen (Dresden). Franken (Aschaffenburg; Erlangen-Dechsendorf; Nürnberg and Laufamholz nr. Nürnberg). Schwaben (Weissbach; Göggingen). Bayern (Fürth; env. of München, Kornenburg). — P o l a n d: Wroclaw; Pustynia Bledowska; Schlesien (Warta; Gnadenfeld.) — C z e c h o s l o v a k i a: Bohemia (Carlsbad; Odrau; Kolin; Susice; Pelhřimov; Rečice, nr. Kard). Moravia (Brno-Hády; Vzetin; Hluk; Hradiste; Mikovice). Various locs. in Slovakia. — S w i t z e r l a n d: St. Gallen (Ebenalp, 1600 m, nr. Weissbad). Valais (Enseigne; Sierre; Betten, and various other locs.). Bern (Bern). Graubünden (Langwies; Grono, Val Mesocco). — A u s t r i a: Tirol (Innsbruck; Huben, 850-1000 m). Ober-Österr. (env. of Linz). Nieder-Österr. (Wien; Türkenschanze; Guntramsdorf; Stammersdorf; Berg, Kittsee; Neusiedl and Neusiedlersee; env. of

Hof, Niederes Gesenke; Krumbach). Burgenland (Buckliche Welt). Kärnten (Griffen). — Hungary: Many locs., a.o. Obuda, Desakna and Simon-tornya. — Yugoslavia: Macedonia (Egri Palanka; Ochrida, 800 m; Stip). Croatia. — Greece: Corfu: ♂, Corfou (MP). — Bulgaria: Simitli; Sitnjakowo; Rila-Kloster. — Spain: Pontevedra (Pontevedra, Galicia). Léon (Villablino, Cordill. Cantabrica, 1000 m). Prov.? (Modivir, leg. Dusmet). Avila (Navalparal). Murcia (Sierra de Espuña). Salamanca (Sequeros). Huesca (Valle de Ordesa, 1300 m). Cataluña (Setcasas). Madrid (Escorial; Castilia). Malaga (Jimena di Silva). Granada, various locs. — Portugal: Beira (Vouzela). Douro (Rezende). — Ibiza I.: Sta. Eulalia. — Italy: Piemonte (Valgrisanche and St. Martin, nr. Aosta). Trentino (Val di Ledro, Ponale-Strasse; Val di Gardena, Ortisei, 1236 m; Bolzano; Merano). Campania (Portici).

The remaining material, from North Africa and Asia Minor, may be further specified as follows. Morocco: 2♂, Marruecos, Mogador (IEM); ♂, Midelt, P. Pallery 1919 (MP). ♀, Haut Atlas, 75 km S of Marrakech, v.1961, J. Dorgelo (MA). Several ♂♀, Maroc-Sud, Sidi-Ifni, leg. Morales, 1948 (MP). 4 ♂, Ifni, Sidi-Ifni, iii-iv.1935, leg. Ferrer-Bravo (MZB). — Algeria: Algérie & West Algeria, Djebel Murdjadjo, Forêt de Msila, leg. E. Schmidt (IRSN). Mascara and Oran (ZMB). ♀, Orléansville, coll. J. de Gaulle, sub *C. tricuspis* (MP). ♂♀, Oran, J. Vachal 1911 and Sa-Cruz Oran (MP). — Tunisia: Tunis (DEI). — Tripolitania: 2 ♂, ♀, Leptis Magna, iii.1954, and 15.i.1955, K. M. Guichard (BM). — Asia Minor (Turkey): Anatolien, Ak-Chehir (ZSM).

Until de Beaumont (1939) expounded the proper status of this little species and redefined it, *T. orbatus* commonly figured in the literature as *scutellaris*, a species with which it has little to do. Runs out in de Beaumont's and my own key (p. 20) to near *T. hirtus* de B. Though some resemblance exists in general appearance, markings and dark clypeal pubescence, the two are, however, not at all closely related. As will be seen from the other key characters and present illustrations of the male terminalia, *orbatus* is best placed in a species group comprising also the larger *T. altaicus* and allies, the maxillary palpus in all of these having two or more segments. The male approaches the aforementioned species also in that the apex of the hind tibia is produced interiorly in a short curved tooth.

Unlike most other regional species the sexes are almost alike and there exists little variation in the pubescent body pattern. The thorax design of the female resembles that of the male, consisting mainly of erect grey-white

and black hairs, the pattern thus being less contrasting than usual in this sex. *T. orbatus* has been well characterized also by Maréchal (1937). Additional features can be briefly summarised as follows.

Maxillary palpus 0.22-0.24 mm, three-segmented, the first segment short and globular, second and third elongate and subequal in length. Interocellar and ocellorbital distances in the ratio varying from 10:7.5 to almost 10:8.5. Rhinaria of male antenna shallowly impressed, those of segments 3 and 13 subcircular, the remainder oval, paired and converging toward apex of segments; those of female present on 4-11, linear and deeply sulcate, placed in the long axis of antenna. Mesoscutum and scutellum densely punctate, the

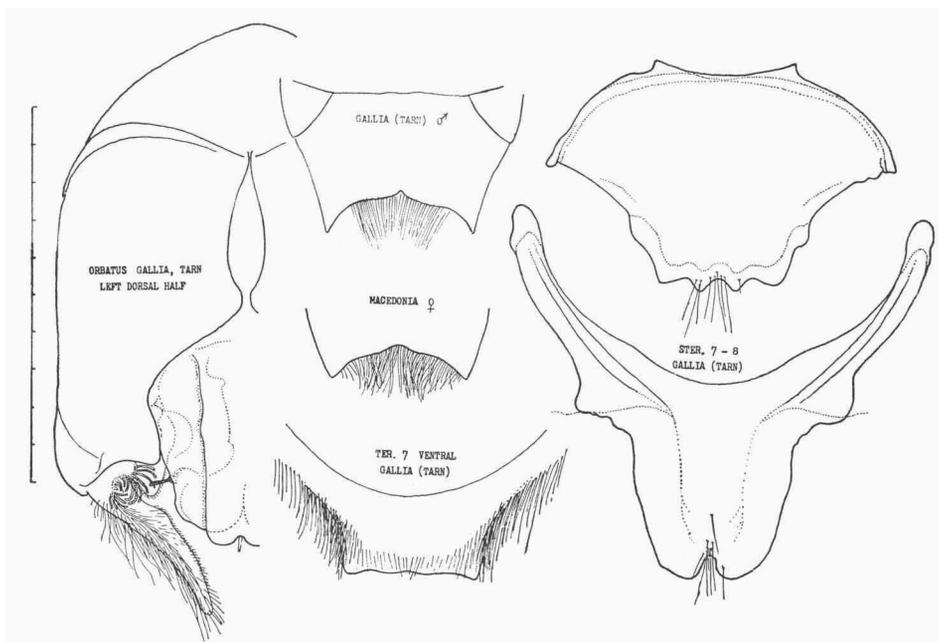


Fig. 11. *Thyreus orbatus* (Lep.), from France and Macedonia (Jougoslavia). Scutella and ♂ terminalia. Scale-line = 1 mm.

punctures deep and of large size, separated on the disk of scutellum by one puncture width. Anterior scutellar suture markedly impressed. White hair fringe projecting from beneath scutellum reaching well beyond hinder angles; dark hairs on dorsum erect and much shorter. Basal portion of mid and hind tibiae, and basitarsi entirely (or nearly so), white externally.

Male genital capsule almost three times length of gonostylus. Gonostyli in dorsal view directed inward, each finger-shaped with concave outer and convex inner faces, almost bare on the inside but on outer face the hairs are

long and thin, though shorter than diameter of gonostylus; dorsobasal process small and rounded, margin beset with very thick rod-like setae; ventrobasal process much larger and tongue-shaped, inner margin fringed with minute hairs (fig. 11).

The variability of *T. orbatus* has been discussed by de Beaumont (loc. cit.).

Bionomics and flower records. — Ducke (1898:142, sub *C. scutellaris* F.), dealing with the fauna of Silesia, writes as follows: "Bei Troppau sehr selten, bei Odrau nicht selten, in manchen Jahren sogar häufig. So z.B. fing ich eine bedeutende Anzahl im Jahre 94 in einem Garten, wo sie an den Blüten von *Lobelia* flogen. Auch an Lehmwänden und an Distelblüten". Unpublished flower records are: *Anchusa* sp. (Jena in Thüringen) and *Hyssopus* sp. (near Kolin and Susice in Bohemen).

Hosts. — *Anthophora quadrimaculata* (Panz.) and *A. borealis* Mor. (sec. Stoeckert, 1954); *Anthophora vulpina* Panz. (= *quadrimaculata* Panz.) and *A. parietina* F. (= *plagiata* Ill.) (sec. Bischoff, 1927, sub *Crocisa scutellaris* F.).

Distribution. — Widespread and locally common throughout southern Europe and the Mediterranean as far east as Asia Minor. In western Europe it is the only *Thyreus* whose range extends northward into northern Germany, Belgium and the Netherlands.

N.B. — Schmiedeknecht (1930, sub *C. scutellaris* F.) writes: "Nördlichster Fundort in Deutschland die Neumark (bei Sternberg)", i.e. about long. 15° E, lat. 52° 15' N in Brandenburg. Slightly more northward in the same province is Bellinchen (near Eberswalde at the Oder, about lat. 53° N), whence I have seen specimens myself. In western Europe the northernmost locality seems to be Echt in the Netherlands (about long. 5° 50' E, lat. 51° 7' N).

### **Thyreus altaicus** (Radoszkowski) (pl. 3 fig. 15; and figs. 12-13)

1893. Radoszkowski, Bull. Soc. Imp. Nat. Moscou, n.s. 7: 175, pl. 5 fig. 20 (scutellum). — ♀ Minusinsk [E. Kazakhstan] (*Crocisa altaica* n. sp.)

1921. Meyer, Archiv f. Naturgesch. 87 A: 77 (key ♀), 93-94 (addit. descr.) — ♀ Minusinsk; ♀ China (*C. altaica* Rad.)

Type material. — U S S R: ♀ holotype, labelled: Siberie occid. (print), coll. Radosz. (print), Minusin (Radoszkowski's writing), *Altaica* Rad. (id.). (ZMB).

Further material. — Mongolia: ♀, S. Mongoliet 1927 (print), Sven Hedins Exp. Ctr. Asien (print), *C. altaica* Rad., det. J. D. Alfken 1935 (NRS). — China: ♀, China, Lantsdrôu, W. Filchner S. (written on

yellow), *C. major* Mor. ♀, det. Enderlein, *C. major* Mor. var. ♀, det. H. Friese 1904, *C. altaica* Rad., det. Dr. R. Meyer (ZMB). — M a n c h u r i a : ♂ (diss.), Harbin, 28.vii.1953, S. Asahina (KU). ♀, Mandschurei, Tscher., 8.7.1951, V. Alin leg., vend. Eing. Nr. 5, 1952 (print), *Crocisa* sp. ♀, det. P. Blüthgen 1952 (ZSM).

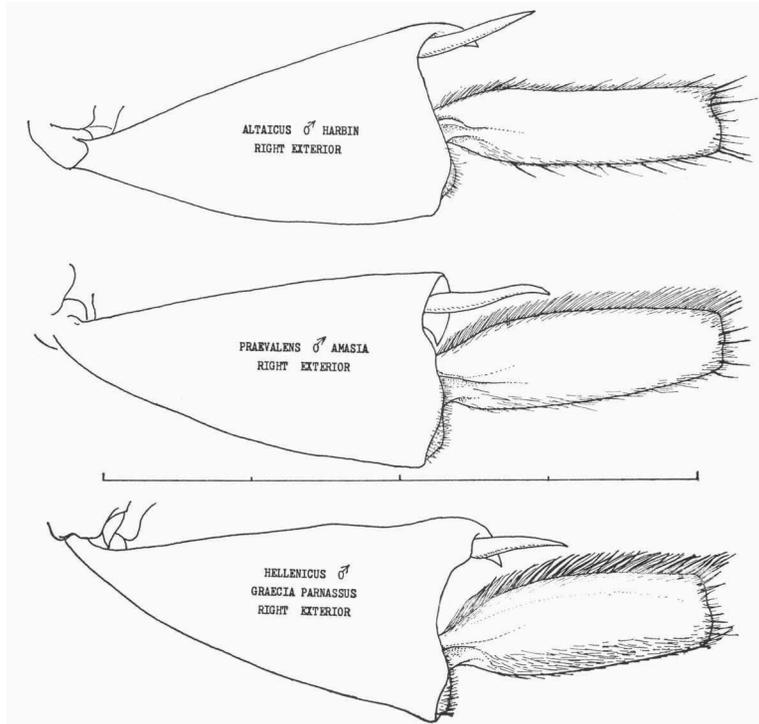


Fig. 12. *Thyreus altaicus* (Rad.), from Manchuria, *T. praevalens* (Kohl), from Asia Minor and *T. hellenicus* sp.n., from Greece. External views of right hind tibia and basitarsus of ♂. Scale-line = 4 mm, all on the same scale.

This species is the first of three (including *T. hellenicus* sp. n.) which are difficult to distinguish in the female sex. As hinted at already in my specific key (footnote), *altaicus* and *praevalens* run out far apart as a result of the differently coloured pubescence on the anterior parts of the head. Though inevitable, this separation is unnatural and misleading for in reality the two are closely related. Whereas in the female type of *altaicus* the clypeal hairs are mixed black and white, these hairs in the male type of *praevalens* are entirely black. In general appearance and size the two bees are so similar that it was a difficult matter to find the appropriate male for *altaicus* and the opposite sex for *praevalens*, both of these being still undescribed.

Female (holotype, see photograph on pl. 3 fig. 15). — Labrum and clypeus with mixture of short, mostly appressed, finely branched white and black hairs, surface of both covered moreover with fewer long, erect dark bristles; paraclypeal area and patches on either side of frontal crest mostly white; frons and vertex covered with short black hair but long tufts of white

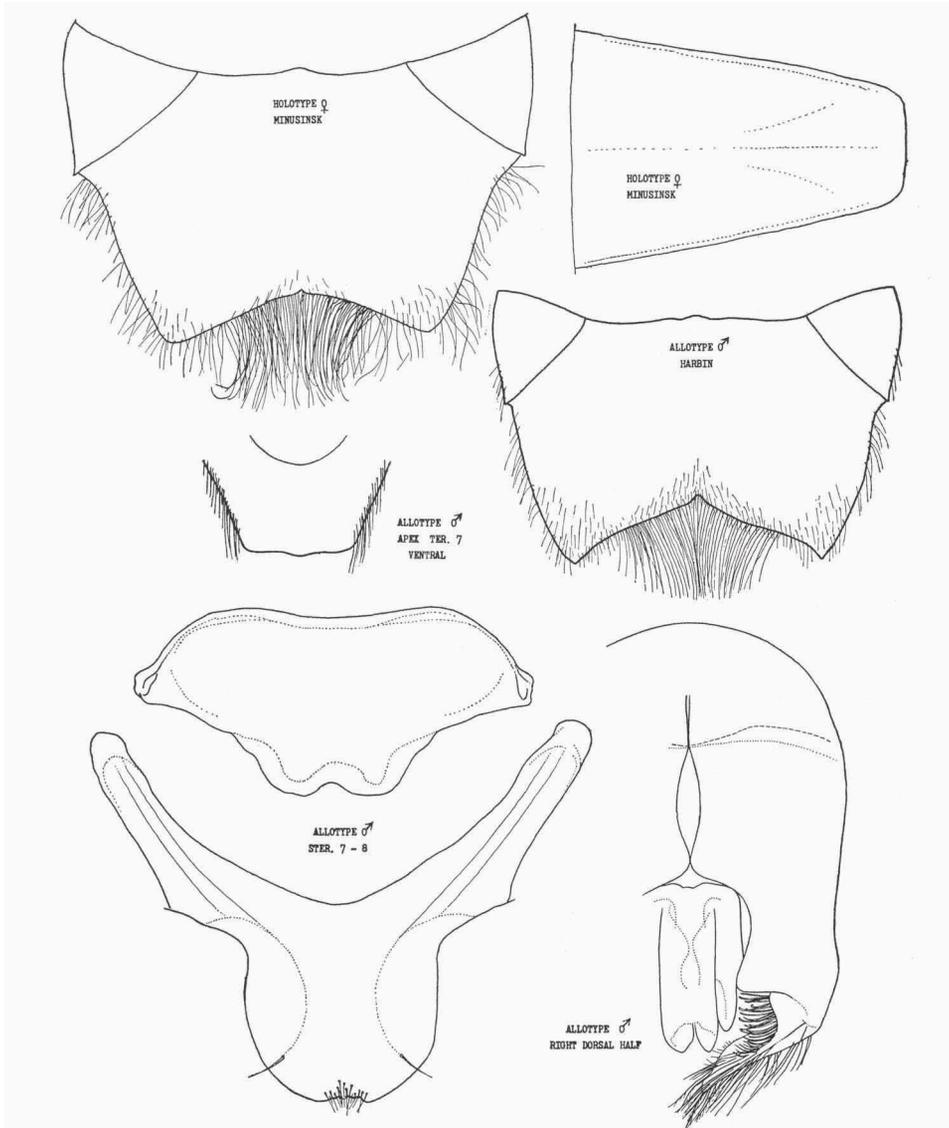


Fig. 13. *Thyreus altaicus* (Rad.), ♀ holotype from Minusinsk and ♂ allotype from Manchuria. Scutellum and pygidial plate of ♀ and scutellum and terminalia of ♂.

extend up along eye margin on either side of frons and behind antennal bases; hair on temples decumbent, also white, the long and dense collar of erect white pubescence fringing occipital border narrowly interrupted by black medially. Interocellar and ocellorbital distances almost equally long (10:9.1), the ocelloccipital distance much shorter. Surface of scutellum uneven but not at all biconvex: basal two-third very slightly convex, then sloping down with the free border a little upturned; punctures larger than interspaces, disk sparsely clothed with erect black hair, lateral pubescence projecting from beneath black, long and feathery; median fringe long, pure white, restricted to middle of emargination (fig. 13). Outer face of fore tibia almost wholly, of mid and hind tibia for slightly less than basal half, white. White mark at sides of gastral 2 interrupted laterally, cutting off a circular spot at inflexed portion of tergite; remaining spots single, sub-rectangular. Sternites all black. Pygidial plate as described in the key (fig. 13).

Male. — The only available example is the one from Harbin which in all probability belongs here, differing from the female only in sexual characters, the body texture and form of scutellum being very much alike.

Less robust, with more slender legs, than *praevalens* and differing from that species in a number of clear-cut characters, enumerated in the key and shown by the figures. The most obvious differences are found in the shape of the head, the form of the hind legs (fig. 12), and the terminalia (figs. 13 and 14).

Measurements: ♂ body 13.5 mm, fore wing 10.6 mm; ♀ (holotype) 13.4 mm and 10.0 mm, respectively. The ♂ from China is larger, measuring 14.0 and 11.5 mm.

Distribution. — Central Asia (Altai and Mongolia) to Harbin in Manchuria.

N.B. — Careful investigation of the maxillary palpi, exposed in our material only in a single individual of each species, reveals the following remarkable differences between the three species involved:

- T. altaicus* (♀, China), 2-segmented, total length 0.08 mm; segments of equal length.
- T. praevalens* (♀, Armenia), 4-segmented, total length 0.34 mm; length of separate segments 0.07, 0.14, 0.09, 0.04 mm.
- T. hellenicus* (♀, allotype Greece), 3-segmented, total length 0.39 mm; length of separate segments 0.07, 0.18, 0.14 (left) and 0.07, 0.24, 0.08 mm (right).

**Thyreus praevalens** (Kohl) (figs. 12 and 14)

1905. Kohl, Ann. k.k. Naturh. Hofmus. Wien **20** (2-3): 243-244, pl. 9 & 10 fig. 21, 31 (♂ scut. & apex abd.). — ♂ Erdschias (Illany-Dagh) (*Crocisa praevalens* Kohl n.sp.)

1921. Meyer, Archiv f. Naturgesch. **87** A: 78 (key ♂), 96-97. — ♂ orig. descr.; ♂ [doubtful!] Chin. Turkestan, no descr. (*C. praevalens* Kohl)

Type material. — Asia Minor (Turkey): ♂ (dissected), lectotype by present designation, Erdschias, Asia min., Penther leg. (print), 8.7 (print), *praevalens* det. Kohl (F. F. Kohl's writing) (NMW).

Further material. — Asia Minor (Turkey): ♂ (diss.), Amasia (print), coll. J. Pérez 1915, *nigripenicillata* J. P. (J. Pérez' writing) (MP). ♀, allotype, Armenia, Monastero Cherard, 13.vii.1963, A. Giordani-Soika (MP).

Original description:

“Nigra. Flagelli articulus secundus tertio paullulo longior, subaequalis. Tempora et occiput quam in *Cr. majore* M. evidenter multo crassiora. Scutellum undulatum, margine posteriore arcuate exciso (Taf. X, Fig. 21). Capite thoraceque albo-variegato hirtis. Abdominis tergita 1—5 margine postico utrinque fasciatim niveo-maculata. Tarsi fusconigri absque pubescentia ulla alba. Long. 14—15 mm.

Von der Grösse grosser Stücke der *Cr. major* Mor.

Schwarz. Kopf und Thorax weisslich, letzterer dünn behaart und ohne Flecken. Hinterleibstergite 1—5 dünn schwarz behaart, jederseits mit einem queren weissen Haarfleck; der Haarfleck des 1. Tergits erweitert sich seitlich nach vorne kaum nennbar, ist also kein „Doppelfleck“. Die Schienen tragen aussen eine weisse anliegende Pubescenz, die an den hintersten zu einem Basalfleck reduziert ist. Die Tarsen sind ohne jede weisse Pubescenz, braunschwarz. Die Schläfen und das Hinterhaupt sind viel dicker als bei *Cr. major* F. Mor., so dass der Abstand eines hinteren Nebenauges vom Hinterhauptsrande mehr beträgt als der Abstand des vorderen Nebenauges vom benachbarten Netzauge, während er bei *major* sehr viel kleiner ist.

Das 2. Geisselglied ist ein klein wenig, wenn auch unbedeutend, länger als das 3. Das Schildchen ist uneben, auf der Scheibe leicht gewölbt (Taf. X, Fig. 21), hinten bogenförmig ausgeschnitten, mit zahnartigen Hinterecken. Die Seitenplatten des Schildchens vorne sind verhältnismässig gross, gleichfalls leicht gewölbt. Hinten ragen unter dem Schildchen braune Haare hervor; es erscheint somit kein weisser Haarzipfel wie bei den meisten *Crocisa*-Arten (ob beständig?). Form der oberen Afterklappe: Taf. X, Fig. 31.

Erdschias (♂ — 8./VII. Illany-Dagh 1500 m)“.

A feature not mentioned before and applying to both sexes, is the very closely punctate median area of the vertex: before and behind the ocelli the punctures are small and very closely set, whereas the area between lateral ocellus and eye margin is polished, having only a few scattered and deep punctures, which are much larger.

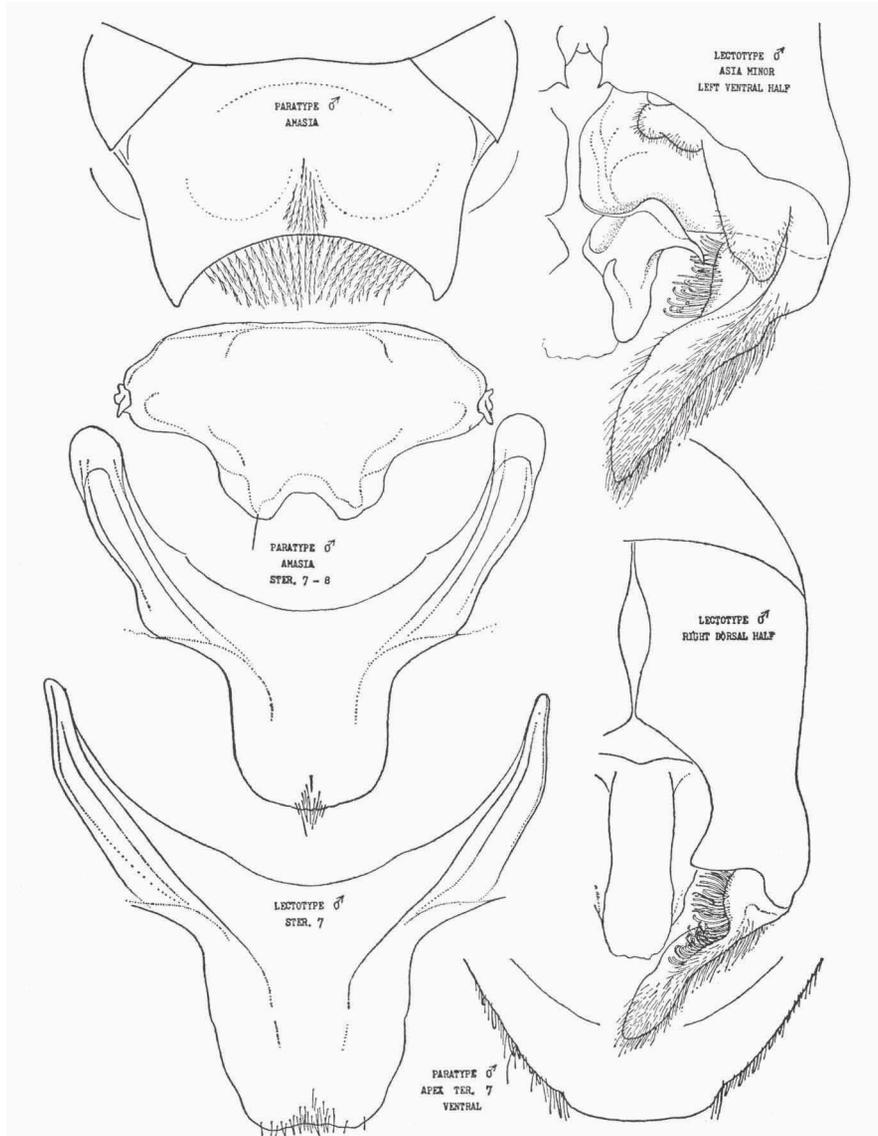


Fig. 14. *Thyreus praevalens* (Kohl), ♂ lectotype and ♂ paratype from Asia Minor. Scutellum and terminalia.

The male from Amasia, whose structures are here figured along with those of the lectotype (figs. 12 and 14), matches the latter in every respect. Like this it has the clypeal pubescence black, not white as might appear from the original diagnosis; but long grey-white tufts cover the paraclypeal area and a small space on either side of the frontal crest. The pubescence between base of antenna and eye margin as well as that fringing the occipital border is long, greyish white; otherwise the hairs are black.

Female (allotype). — Differs from the male in having the clypeus and sides of labrum mainly clothed with appressed feathery white hair, long erect dark bristles being interspersed. The white thoracic spots, though confluent anterolaterally as far back as the tegulae, stand out clearly, *ms* being broad and elongate, reaching level of posterior limit of the circular *mls*; like the other spots, the transverse *pls* are isolated. Fore wing membrane very dark brown with faint purplish hue; non-papillate area bordering the cells outwardly clear hyaline. Legs mainly black haired; fore tibia entirely white, mid and hind pairs only for about three-fifth to four-seventh their length from base; scattered white hairs at hind margin of hind basitarsus; last tarsal segment of mid and hind legs entirely white. All transverse tergal marks of abdomen entire, 1 and 2 sending out short forward extensions laterally. Pygidial plate strongly carinate.

Measurements: ♂ (Amasia) body 16.0 mm, fore wing 11.2 mm; ♀ (allotype), 14.0 mm and 11.7 mm, respectively.

Distribution. — Asia Minor.

**Thyreus hellenicus** sp.n. (figs. 12 and 15).

?1958. Iuga, Anthophorinae in Faun. Republ. Pop. Romine 9 (3) fig. 82A-E (pars: ♂ terminalia, sub *Crocisa histrionica* Ill.)

Material. — Greece: 2 ♂ (dissected) ♀, Graecia, Parnass[us], 1000, 19.vii.1956, leg. H. Bytinski-Salz (CBS, ML). ♀, Graecia, Peloponnesus, Alt-Korinth, 3.vi.1964, Max. Schwarz (CMS). ♂ (diss.), Griechenland, Gythion [S. Peloponnesus], 3.vi.1937, leg. F. Werner, *C. major* ssp. *truncata* J. P., det. J. D. Alfken 1937 (NMW). 2 ♂ (1 diss.), Greece, Legrena, 1.vi.1965, "on sandy beach", K. V. Krombein (USNM). — Spain: ♂ (diss.), Madrid, G. Mercet, Colección Ga. Mercet (IEM). — Asia Minor (Turkey): 2 ♂ diss.), Turkey, Cankiri, 15 km Ilgaz-Cankiri Road, 1400 m, 23.vii.1962, K. M. Guichard & D. H. Harvey, 1962-299 (BM). — Syria: ♂ (diss.), S. Syria, Mt. Hermon, 30.vii.1945, Middle East Biol. Studies Scheme, G.H.O.M.E.F., BM 1947-393 (BM). — U S S R:

2 ♂ (diss.), Uralsk, M. Bartel (print), *Thyreus apotomus* Bkr. MS, det. D. B. Baker (NMW). — ♂ (diss.), patria ign., ex coll. C. & O. Vogt, acq. 1960 (MA). — Holotype ♂, Graecia, Parnassus, 1000, 19.vii.1956, H. Bytinski-Salz (CBS); allotype ♀, Graecia, Peloponnesus, Alt-Korinth, 3.vi.1964, Max. Schwarz (ML). Paratypes of both sexes in the above-mentioned collections.

Male. — Interocellar and ocellorbital distances in the ratio of 10:7.8. Head and thoracic segments above coarsely and densely punctate; punctures finest and contiguous on anterior mesoscutal area, stronger and separated by one puncture width posteriorly, still larger and deeper and more irregularly spread on shining ground on scutellum and parascutella. Mesoscutal line and parapsidal furrows distinct; basal four-fifth of tegulae, densely finely punctate, the rest dull, microscopically tessellate with few superficial punctures. Scutellum short and broad, well separated from mesoscutum by a deeply recessed transverse suture, its surface somewhat convex, posteriorly with slightly depressed median sulcus; parascutella situated on a slightly higher level than scutellum.

Legs robust; femora, as well as middle and hind tibiae, compressed, not unusually swollen, mid tibia slender, parallel-sided; hind tibia rather strongly expanded towards apex, flattened on the inside (fig. 12).

Wing-membrane subhyaline but apical margin of fore wing broadly tinged with light brown; there is, besides, a still darker costal streak beyond *Rs*. Third submarginal cell relatively small, slightly higher than long and not much larger than the second, the latter with its sides well separated costad, both cells together scarcely longer than the first.

Gaster elongate, tergites moderately strongly punctate, less densely and more superficially so than on mesoscutum, punctures much smaller than interspaces; apical margins rather broadly impunctate and shining. Exposed portion of tergite 7 flat, a little broader than long, almost parallel-sided in dorsal view, squarely cut off apically, hind margin slightly undulated or perfectly straight; surface dull, almost bare, rugosely punctate, the punctures most conspicuous laterally at base; lateral margins slightly raised with short and thick bristle-like hairs (fig. 15). Sternites gradually more finely and densely punctate from before backwards; surface of 1—4 shining, the remainder dull and very closely punctate. Sternite 1 sharply longitudinally carinate. Disk of sternite 6 evenly, densely punctate and covered with short dark hair; apical portion with deeply impressed, oval, longitudinal median area which is somewhat more sparsely punctate than the rest and feebly ridged medially; apex somewhat produced, subrotundate. Sternal plates 7

and 8 shaped as in fig. 15, the marginal bristles of 7 moderately strong. Genital capsule of large size, 2.4-2.7 mm long, intero-apical angles of gonocoxite strongly protuberant in dorsal view. Gonostylus broad, about two-seventh length of gonocoxite, at first incurved, then somewhat twisted and gradually outbent, apex broadly rounded; dorso-basal process not clearly differentiated, hardly protuberant but whole dorsal ridge of main body with dense fringe of rather thick incurved setae; ventro-basal process in the form

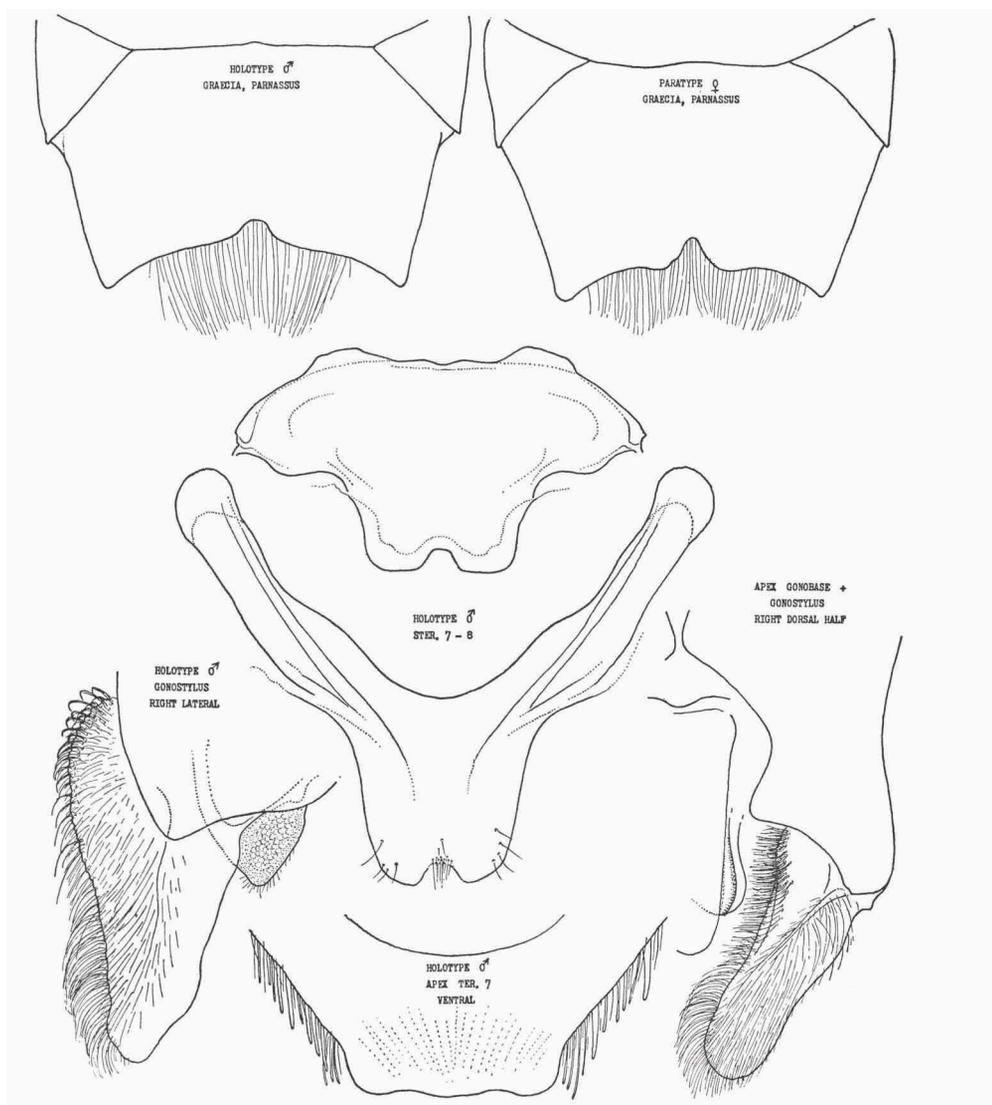


Fig. 15. *Thyreus hellenicus* sp.n., from Greece. Scutella and terminalia of ♂ holotype.

of a short roundish lobe, the surface of which is finely reticulate; inner as well as outer surface of gonostylus densely clothed with long fine hairs which are directed caudad, surpassing the apex but slightly (fig. 15).

Pubescence. Mostly white and suberect on lower parts of head, labrum, mandibles and genal area; decumbent and consisting of multibranchiate snowy-white hairs entirely concealing surface on clypeus; also white but much longer, erect and finely plumose on vertex and temples; short, rather dense and appressed on antennal segments 1—2. Long erect hair on anterior part of mesoscutum greyish white, rather dense, finely plumose and dowdy without forming a definite pattern; hairs more crowded in front and along inner margin of tegulae, forming moreover a pair of widely distant transverse *pls* patches of small size along hind border; also spots on each side filling out anterior and posterior parts of tegulae. Scanty black hair on scutellum and parascutella, some marginal ones in emargination longer and plumose; dense fringe emerging from beneath apical border of scutellum long, white and plumose (fig. 15). Thoracic pleurae with long, thin, suberect, plumose, greyish-white hairs covering most of the surface, though ill-defined, longest and densest on lower portion of sides; hair encircling mesospiracular area depressed and more conspicuous than elsewhere; on ventral parts scanty, mostly white. Metanotal area with long white tuft on either side above, the pubescence around and below it scanty and obscured. Femora and inner faces of all tibiae and tarsi black-haired; hind coxa with tufts of white; outer face of fore and mid tibiae, except narrowly at apex, and of hind tibia for about basal half to three-fourth, clothed with white decumbent pubescence, not very dense and leaving occasional black specks of ground colour; basitarsi almost wholly and next segments partly, white externally. Disk of gaster sparsely clothed with black hairs; 1-5 with large, transverse, snowy-white lateral patches, the L-shaped spots on 1 separated by a distance about equal to the transverse limb of the L whose forward prolongations are slightly narrower but reach the base of segment; spots on 2 similar but forward extensions much smaller and thinner, arising from the transverse bar somewhat more inward; remaining spots narrowed laterally, 3-4 tending to become constricted or obliterated. Sternites 2-4 each with quite conspicuous transverse patch of white on either side along posterior border.

Female. — Maxillary palpus distinct, three-segmented, the second segment longest (palpus vestigial, only one- or two-segmented in *T. histrionicus*). Interocellar and ocellorbital distances in the ratio of 10:9. Antenna more slender than in male; 3 about  $1\frac{1}{2}$  times longer than 4; rhinaria present but

poorly indicated, in the form of feebly impressed hair-lines, the last two segments only weakly carinate.

Punctuation of body described for the male. Posterior border of scutellum bracket-haped with distinct triangular median incision similar to that seen in typical specimens of *histrionicus*; white hair-fringe projecting from beneath scutellum extending almost along full length of apical border. Legs shaped much as in male; hind tibia less markedly expanded and produced apically; curved extero-apical process of mid tibia long and slender (much longer than in *histrionicus*). Outer face of fore tibia along full length, of mid tibia to about half-way and of hind tibia to a little before that level, not very densely white-haired, the clothing of thick black wart- or spine-like hairs remaining visible in places; outer faces of all mid and hind tarsal segments also white.

Wings hyaline but the broadly obscured apical margin of fore wing much darker than in male and sharply defined, the inner border of this band running parallel to the wing margin, curving inward roundabout the closed cells from apex of marginal cell to end of vein *1A*.

White marks on each side of tergites 1-5 as in male, all of them separated across dorsum by a distance equal to their own transverse diameter, those on 3-5 abbreviated outwardly and not nearly reaching the side margin, 3 with additional white lateral point. Sternites 2-3 with transverse white hair streaks; surface of 5 densely, finely punctate except mid-apically, where it is smooth and shiny, the extreme apex obtusely carinate. Exposed portion of pygidial plate narrowly triangular, surface dull, slightly concave on each side of a strong, ridge-like longitudinal carina that broadens out gradually towards a swollen, narrowly rounded tip.

Measurements (approx.): ♂ and ♀ body 15.0-15.5 mm.

Though undoubtedly closely allied with *T. altaicus* and *praevalens*, the male of this new species can be distinguished from both by the key characters and by comparing the illustrations. The female resembles a large-sized *T. histrionicus* but differs therefrom by the much shorter, much more coarsely punctate and less shining scutellum, the short and broad white posterior scutellar fringe and impressed sutures of same; and by the slender, not incurved, lateral extensions of the white abdominal marks. It differs also from *histrionicus* by the poorly developed antennal rhinaria, the long apical process at the mid tibia, and the shape of the pygidial plate. The dorsal thoracic spots of *hellenicus* are remarkably similar in arrangement to those of *histrionicus* but the *pls* marks appear smaller than in that species.

I am satisfied that the sexes have been correctly associated.

I have neither examined Rumanian specimens of *T. hellenicus* nor even of *histrionicus*, but there is every reason to suspect Iuga's material of *histrionicus* to be composed of both species, the male terminalia of the supposed *T. histrionicus* from Rumania in all probability having been taken from an example of *hellenicus* (See also under *T. histrionicus*, p. 85).

Distribution. — Whole Mediterranean region and central Russia. Possibly a widely distributed, though scarce, species.

***Thyreus mauretaniensis*** (Strand) (pl. 3 fig. 16; and fig. 16)

1911. Strand, Rev. Zool. Afric. 1: 78-79. — ♂ Algier (*Melecta mauretaniensis* n. sp.)

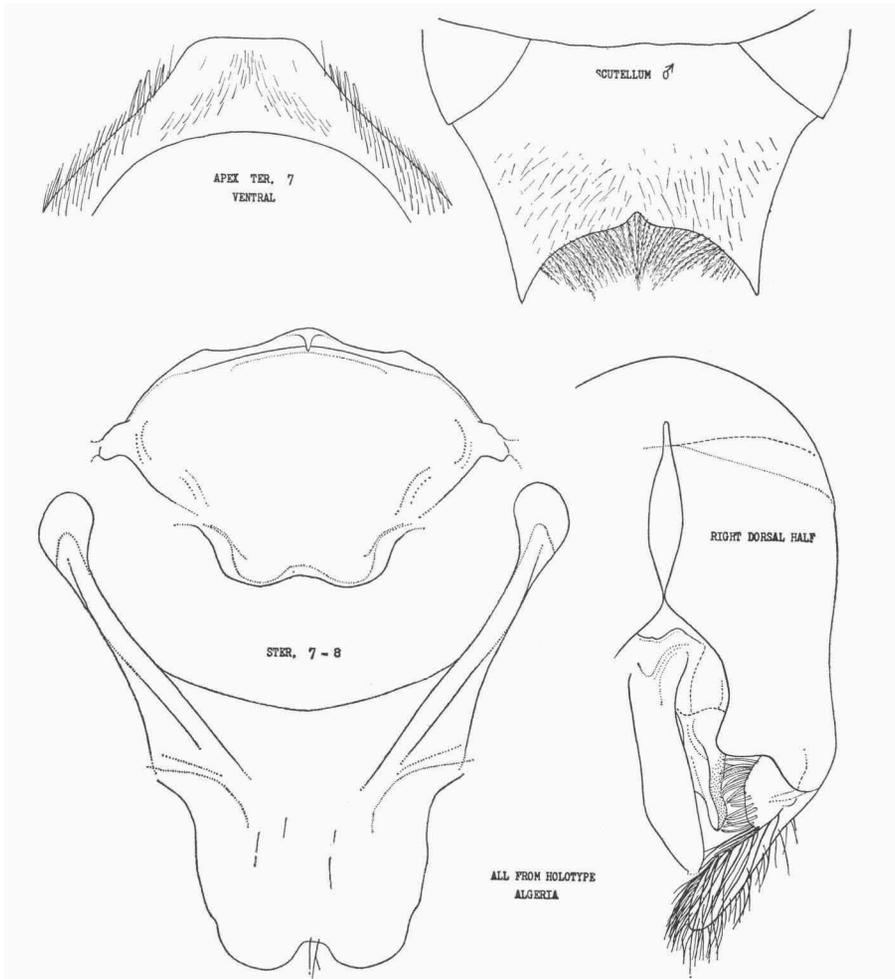


Fig. 16. *Thyreus mauretaniensis* (Strand), ♂ holotype from Algeria. Scutellum and terminalia.

1934. Alfken, Bull. Soc. R. Ent. Egypt **18** (1-2): 173, 175-176 (addit. descr. type ♂)  
(*C. mauretaniensis* Strand, comb. nov.)

Type material. — Algeria: ♂ (dissected), holotype *Melecta mauretaniensis* Strand, Algerien, M. Quedenfeldt (print on blue), Type (red cadre), *Melecta mauretaniensis* m. Strand det. ♂ (in Strand's writing) (ZMB).

Known only from the type. Correctly transferred to *Crocisa* by Alfken, who complemented Strand's insignificant description in the following way: "Das Schildchen, das sehr ähnlich gestaltet ist wie das der *C. crassicornis* F. Mor. [= *scutellaris* F., huj. op.] ist locker, hinten weisz, vorn weisz und schwarz behaart; auch das Nebenschildchen ist teilweise weisz behaart. In der Behaarung ähnelt es dem *C. nadigi* m. [= *truncatus* Pérez, huj. op.] von Marokko. Die Behaarung lässt sich am besten erkennen, wenn man das Tier von der Seite her betrachtet. Die Hinterwinkel des Schildchens von *C. nadigi* sind nicht, wie bei *C. mauretaniensis* in eine scharfe Spitze ausgezogen, sondern stumpfeckig. Ich würde nicht sagen, dass das Schildchen „eine besonders hinten tiefe, ziemlich unregelmäßige, mittlere Längsgrube" aufweist, sondern dass sich in der Mitte des Hinterrandes ein Längsrübchen befindet. Die Unregelmäßigkeit dieser Bildung dürfte individuell sein. — Die Flecke der ersten beiden Rückenplatten sind nach vorn kaum vorgezogen. Bemerkenswert ist die Zeichnung der 3. und 4. Platte: die Flecke der ersteren sind seitlich am Vorderrande eingebuchtet, die der 4. seitlich in 2 Flecke getrennt, von denen der äussere sehr klein und rund ist. Es verdient hervorgezogen zu werden, dass die weisse Behaarung unter dem Schildchen-Ausschnitt, sowie die der Rückenplatten sehr dünn, wenigstens viel dünner als bei den meisten übrigen Arten ist".

This good description, together with the key characters and accompanying figures (fig. 16), may serve to the recognition of this very distinct species. The photograph of the type (pl. 3 fig. 16) clearly shows the dowdy vestiture of the head and thorax.

Distribution. — Algeria.

### **Thyreus impexus** sp. n. (fig. 17)

Material. — Central China, prov. Szechuan: 10 ♂ 16 ♀ (2 ♂ dissected), from the following localities: Dong Men Wai, 10 mi. W of Wei Chow, 5600-8500 ft., 28.vii.1930 (2 ♂ 1 ♀); id., 5600 ft., 23.viii.1933 (♂); Yellow Dragon Temple, near Songpan, 11000-14000 ft., 31.vii.1924 (♀); O-Er, 26 mi. N of Li Fan, 9000 ft., 1933, no date (3 ♂ 2 ♀) and id., 6-16.viii.1933 (4 ♂ 1 ♀); Songpan, 8000-9500 ft., 12.vii.1924 (♀), Suifu, no date (♀), 5000-8000 ft., 25.vii (♀); between Chengtu & Mowchow, 1400-4500 ft.,

3-10.vii.1924 (2 ♀), Mowchow, 1400-4500 ft., 9.vii.1924 & 3-10.vii.1925 (4 ♀); between Uen Chuan and Mowchow, 1-6.viii.1924, 4500-5500 ft. (2 ♀). All collected by D. C. Graham (USNM, ML). Holotype ♂ and allotype ♀, Szechuan, Dong Men Wai, 10 mi. W of Wei Chow, 5600-8500 ft., 28.vii.1930, D. C. Graham; allotype ♀, Szechuan, Songpan, 8000-9500 ft., 12.vii.1924, same collector (USNM); paratypes of both sexes in USNM and 3 ♂ 5 ♀ in ML.

A slender, narrow-bodied species.

Male. — Maxillary palpi short and cylindrical, two-segmented, the first segment barely longer than the second. Antenna long, reaching well beyond tegula; flagellar segments distinctly longer than broad. Length ratios between interocellar, ocellorbital and ocelloccipital distances slightly variable, as 10:9:7 or 10:10:8 in about equal proportion. Integument black, smooth and rather shining; gaster with very faint dark metallic lustre. Head and dorsal thoracic segments strongly punctate, all punctures on top of head, mesoscutum and scutellum large, circular and pit-like, those between lateral ocellus and orbit, and on either side of median mesoscutal line, generally smaller than the interspaces, elsewhere closely set, those of scutellum largest, drop-shaped and of different sizes towards the pointed hinder angles. Punctuation of gastral segments and most of the legs much finer, all punctures of minute size, widely spaced and superficial. Brown and subhyaline areas of fore wing strongly contrasting.

Silvery grey and black pubescence on nearly all parts of head and thorax erect, long and thin and nowhere concealing the surface. Pubescence of legs not conspicuous, rather long, decumbent and silvery only at outer faces of mid and hind tibiae and basitarsi, on which it covers most of the surface, but mid tibia lacking a dense felt-like pad of short hair. Gastral tergites almost bare, the disk of all segments with scattered erect hairs; 1-5 posteriorly with narrow transverse whitish bands consisting of finely branched appressed hairs, the band of 1 very narrow, complete or nearly so, somewhat widened at the side edges and giving rise to indistinct forward extensions; bands of 2-5 somewhat wider and broadly interrupted middorsally, the spot of 2 with lateral prolongation reaching hind margin of first segment. Sternites 2-5 also light-spotted on either side, these marks on 4 and 5 forming complete transverse bands of rather long and dense, decumbent hairs of a silvery tint. Tergite 7 glossy black, surface hollowed out towards the truncated apex, the hind margin of which is straight or shallowly emarginate (fig. 17). Disk of sternite 6 with distinct oval impression, whole surface punctate and clothed with short scanty hairs but integument rather

glossy; sides more densely clothed with longish dark hairs and hind margin with long apical fringe of the same colour. Apical sternal plates and genitalia as in fig. 17.

Female. — Closely similar to the male. Finely branched grey-white and black hairs covering head and thoracic segments decumbent only on clypeus, where they are long but not very dense; on all other parts erect, longest on vertex, at temples and on either side at metapleurae and nowhere concealing

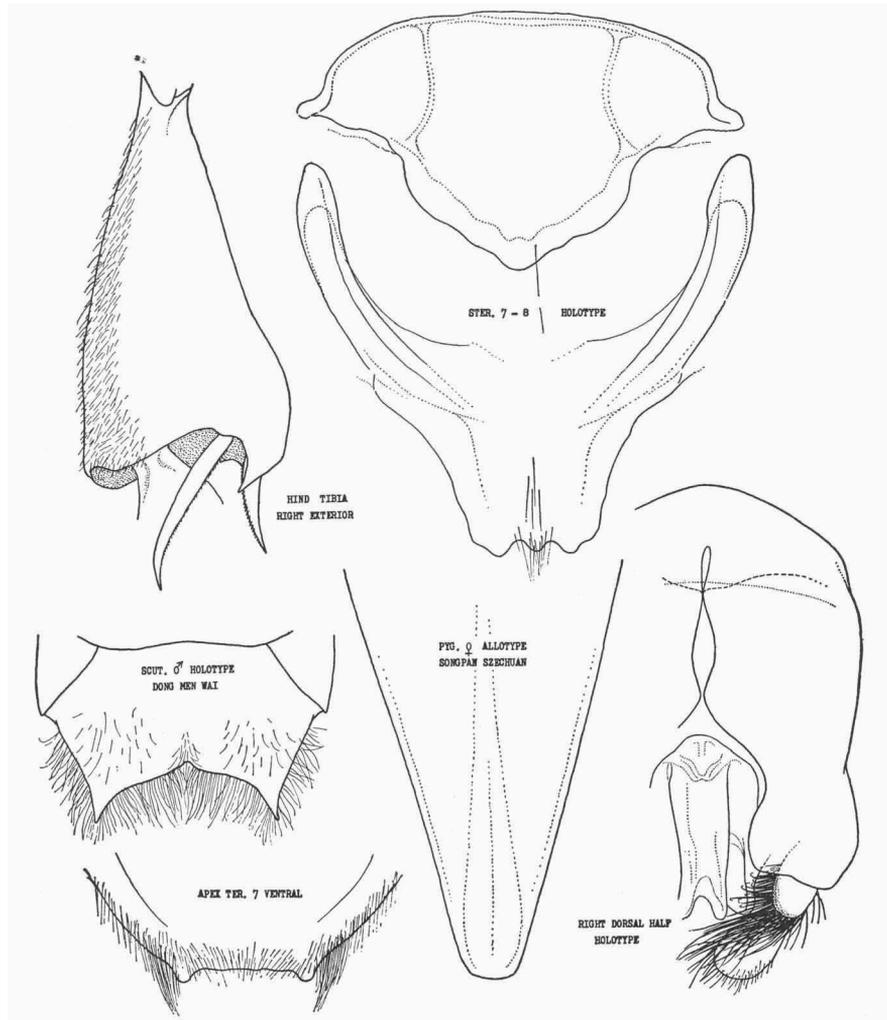


Fig. 17. *Thyreus impexus* sp.n., from China. Scutellum, external view of ♂ right hind tibia, ♂ terminalia and ♀ pygidial plate. All figures (except tibia of paratypic ♂ from Li Fan) after ♂ holotype and ♀ allotype.

the surface. On mesoscutum this pubescence forms no definite pattern but a darkish discal area is surrounded on all sides by a broad collar of light hairs with indication also of a light *ms* patch leaving off at level of tegulae. Scutellum covered with numerous erect black hairs, as in male, the much longer ones fringing the entire border grey-white, standing out horizontally at right angles. Narrow, transverse, ante-apical whitish band of gastral 1 widest and angulated laterally in fresh specimens though scarcely or not at all interrupted medially, where it is narrowest; lateral bands of 2—5 as in male, only the one of 2 having a forward extension laterally. Disks of all gastral segments sparsely covered with semierect dark hairs longer than the rest, these hairs white and more crowded together at the inflexed sides of the tergites. Basal portion of pygidial plate with scattered superficial punctures, surface smooth, microscopically tessellate and rather shining; middorsal crest low but distinct, gradually broadened towards apex (fig. 17).

Measurements: ♂ (holotype) body 8.5 mm (gaster retracted), fore wing 8.0 mm; ♀ (allotype) 11.5 mm and 9.0 mm, respectively.

Distribution. — Mountains of Central China.

### **Thyreus incultus** sp. n. (fig. 18)

Material. — Central China, prov. Szechuan: ♂ (dissected) 2 ♀, Suifu, no altitude or date, D. C. Graham collector. Holotype ♂ and allotype ♀ in USNM, one paratype ♀ in ML.

General appearance and vestiture very similar to *T. impexus* sp. n. In addition to the key characters both sexes can be held apart from that species by the following differences.

Postocular lobes well developed, the lateral angles being at first broadly rounded then incurved, the posterior margin being transverse and almost straight in antero-dorsal view (*impexus*: postocular lobes shorter, more rapidly incurved and less bulging, the sides straighter and distinctly converging towards middle of occiput, the latter projecting markedly beyond the lateral angles so as to be more strongly protuberant in antero-dorsal view). Position of ocelli, as well as punctation of head, mesoscutum and scutellum much as in *impexus*, except that the punctures on the posterior part of the mesoscutum (just in front of the impunctate area) are larger and more closely set than in that species. Also, the punctures on the first two gastral tergites, though well spaced, are somewhat larger and more deeply impressed than in *impexus*. Male gastral sternite 6 broadly rounded apically, as in *impexus*, the median impressed area being well developed in both species.

Legs also similar, except for the slightly different form of the male hind tibia (fig. 18). I can find no differences in wing colour between the two species, the membrane in either of them being dark brown with the hyaline areas strongly contrasting.

Male sexual characters as in fig. 18; genitalia hardly different from those of *impexus*, save for the more slender form of the gonostylus (fig. 18). Pygidial area of female a little broader and more abruptly truncated than in *impexus*, otherwise very similar (fig. 18).

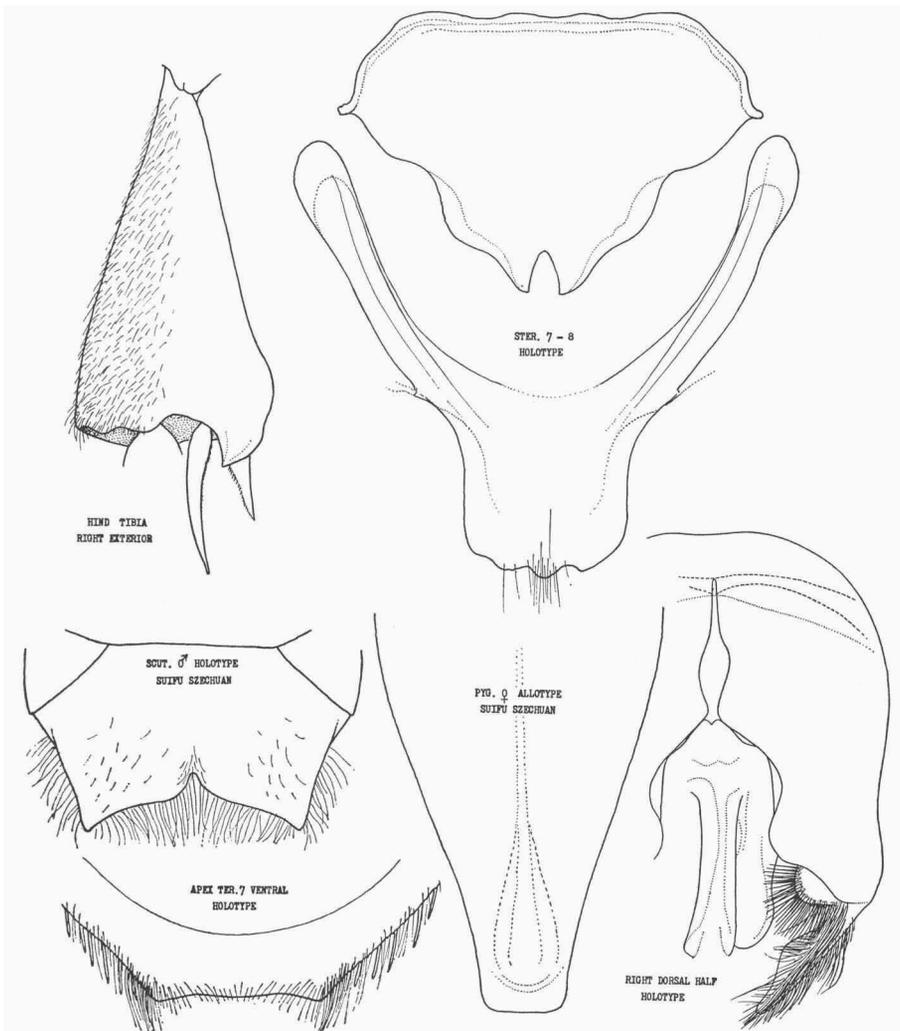


Fig. 18. *Thyreus incultus* sp.n., ♂ holotype and ♀ allotype from China. Scutellum, external view of ♂ right hind tibia, ♂ terminalia and ♀ pygidial plate.

Measurements: ♂ (holotype) body 9.0 mm, fore wing 8.3 mm; ♀ (allotype) 9.8 mm and 8.2 mm, respectively. The ♀ paratype is somewhat smaller.

Evidently very close to *T. impexus*. There are no near allies unless *Crocisa uncinata* Hedicke also belongs here, see p. 134). The names chosen for these two mountain species are allusions to the unkempt appearance of their body pubescence.

Distribution. — Mountains of Central China.

***Thyreus illudens* sp.n. (fig. 19)**

Material. — Central China, prov. Szechuan: ♂ (dissected), Wei Chow, 65 mi. NW of Chengtu, 5500-9000 ft., 1-4.viii.1933, D. C. Graham collector. Holotype in USNM.

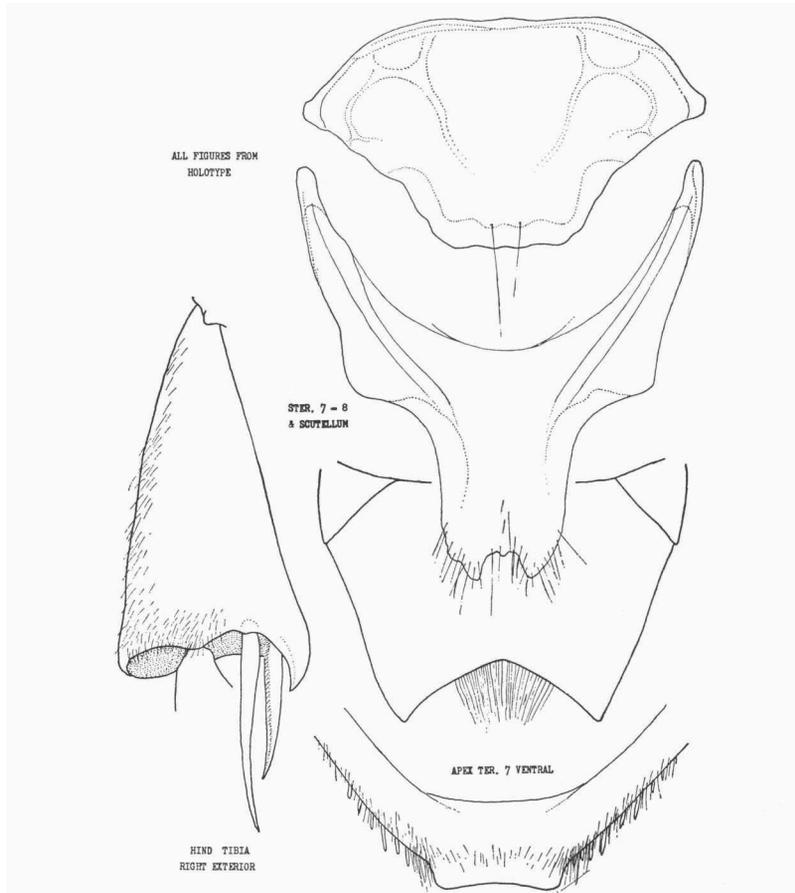


Fig. 19. *Thyreus illudens* sp.n., ♂ holotype from China. Scutellum, external view of right hind tibia and terminalia.

Male. — A unique specimen. Pubescence and wings rather worn but readily recognizable as a distinct species.

Superficially resembling *T. impexus* sp. n. and *incultus* sp. n., but body broader, shaped much as in *T. ramosus* and allies. Immediately distinguished from the latter by the long, loose, erect, greyish white and black hairs covering head and thoracic segments without forming a distinct pattern, the tomentum in this respect recalling the two species first mentioned. Like these, the fore wing membrane is strongly contrastingly coloured: hyaline are the radial cell (except a sharply defined stripe along basal vein), area posterior to the discoidal cells but including most of the hindermost (first) discoidal, as well as a streak below pterostigma and coalescent spots bordering the submarginal cells; for the rest the membrane is dark brown. Differs very markedly from *impexus* and *incultus* (which are both of them from the same region and altitude) by the flat scutellum, the hinder angles of which are even a little upturned; also the punctures of mesoscutum and scutellum are small, superficial and much more widely spaced than in these. The terminalia are, of course, entirely different (fig. 19).

Median impressed area of sternite 6 very shallow, narrowly oval with feebly developed longitudinal crest, punctures and hairs slightly fewer in number than on the surrounding area.

Female unknown.

Distribution. — Mountains of Central China.

### **Thyreus histrionicus** (Illiger) (pl. 3 fig. 17; and fig. 20)

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1883. Pérez, *Act. Soc. Linn. Bordeaux* **37**: 310-311. — Bordeaux, Royan; Pyrénées; Montpellier (*C. major* Mor.)
1893. Radoszkowski, *Bull. Soc. Imp. Nat. Moscou, n.s.* **7**: 174, fig. 1 (♂ structures) (*C. major* Mor.)
1895. Friese, *Bienen Europa's* **1**: 173-174 (key ♀ ♂), 175-176. — Europa; Canary Is.; Syria (*C. major* Mor.)
1905. Dusmet, *Bol. Real Soc. esp. Hist. nat.*: 156-157 (key ♀ ♂), 158. — Spain, various locs. (*C. major* Mor.)
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1915. Dusmet, *Mem. Real Soc. esp. Hist. nat.* **8**: 333. — ♀ Morocco (*C. major* Mor.)
1920. Fertou, *Ann. Soc. ent. France* **89**: 332-333 (biol. notes). — Djidjelli, Algeria (*C. major* Mor.)

1921. Meyer, Archiv f. Naturgesch. **87** A: 77-78 (key ♀ ♂), 94-95 (partim: excl. var. *truncata* Pér.), incl. var. *alboscuteolata* Meyer. **Syn. nov.**
1927. Alfken, Konowia **6**: 114, 117-119 (key ♀ ♂). — ♀ ♂ Cyrenaica (*C. dimidiatipunctata* M. Spin.)
1927. Alfken, Konowia **6**: 114, 117-119 (key ♀ ♂). — ♀ ♂ Cyrenaica (*C. rimosiscutum* sp. n.) **Syn. nov.**
1927. Bischoff, Biologie Hym. Berlin: 399 (host record) (*C. major* Mor.)
1929. Alfken, Mitteil. Entom. Ver. Bremen 15.-17. Ber. 1927-1929, p. ? (sep.). — ♀ ♂ Malta, descriptive notes (*C. major* Mor.)
1930. Schmiedeknecht, Hym. Nord- u. Mitteleuropas: 831-832. — ♂ ♀ "Südeuropa bis Budapest" (*C. major* Mor.)
1934. Alfken, Bull. Soc. R. Ent. d'Egypte **18** (1-2): 167, 169 (key ♀ ♂), 174. — Egypt (*C. major* F. Mor.)
1937. Maréchal, Bull. & Ann. Soc. ent. Belg. **77** (11): 400-403 (compar. notes), fig. 1, 3, 5, 6 and 10 (♂ ♀ struct.) (*C. major* Mor.)
1939. De Beaumont, Ann. Soc. ent. France **108**: 164-165 (key ♂ ♀), 166-167, fig. 1 (♂ genit.), 8, 10, 16 and 20 (♂ ♀ struct.) — Europe, Afrique du Nord, Asia occ., Egypte (*C. histrionica* Ill.)
1954. Stoeckhert, Ahb. Bayer. Akad. Wiss. N.F. **65**: 64. — S. Germany & Austria.
1957. Moczár, Apidae in Fauna Hung. **19**: 1334-1335. — Hungary (*C. histrionica* Ill.; excl. var. *truncata* Pérez).
1958. Iuga, Anthophorinae, in Faun. Republ. Pop. Romine **9** (3): 215-216, 217-218 (pars), not fig. 82! — ♀ only; Rumania, various locs. (*C. histrionica* Ill.)
1958. Lieftinck, Comment. Biol. **18**, Soc. Sci. Fennica: 30-31. — ♀ Canary Is.
1958. Moczár, Rovart. Közlem. (Fol. Ent. Hung.) n.s. **11** (24): 415. — Hungaria, various locs. (*C. histrionica* Ill.)
1965. Leclercq, Bull. Inst. agron. et Stat. Rech. Gembloux **33**: 115. — S. France, Spain, Portugal, Italy, Dalmatia, Sicily; flower records.
1967. Popov, Trudy Zool. Inst. Moscou **38**: 102-103, 304 (host and flower records).
1967. Vergés, Miscelánea Zoológica, Barcelona **2** (2): 102 (key ♀ ♂), 104-105, fig. 1, 2, 7, 10 and 18. — Spain.

Type material. — S p a i n: ♀, holotype *Crocisa divisa* J. Pérez, labelled: La Garige 15.vii. Bofill (J. Pérez' writing), Typus (red) 942, *Crocisa divisa* n. sp.? (unknown hand) (MZB). — T r i p o l i t a n i a: ♀, syntype *C. simosiscutum* Alfken, lectotype by present designation, labelled: Cyrenaica, R. U. Agrario, Derna, VII, Geo C. Krüger, and *C. rimosiscutum* m., det. Alfken 1933 (ex coll. J. D. Alfken, ZMB).

Further material. — Like *T. ramosus*, this species in Europe has mainly a southern distribution, being of common occurrence throughout the Mediterranean basin and far beyond towards the east. In West and Central Europe *histrionicus* seems to have a more easterly range and to be more widely spread than *ramosus*. Stoeckhert (1954) records it from Sachsen, Brandenburg (Frankfort-Oder), Franken (Erlangen), Hessen-Württemberg (Aschaffenburg) and Niederbayern in Germany; also from Schlesien in Poland and Niederösterreich in Austria. I have seen German *histrionicus* from the environs of Frankfurt a.M., Spandau (near Berlin), Giessmannsdorf in Nieder Lausitz (2 ♂ diss., vii.1950, ZMB) and Oberbayern. Records

for Austria are Wies (leg. Pittioni), Styria (BM) and Griffen, iii.1961, in Carinthia (CB). In collections from Czechoslovakia which I could examine *histrionicus* was represented from Celakovice, Karany, Hodonin, Uher and Bzenek (Moravia mer.). Apparently widely distributed in Hungary (for records, see Moczár, 1958). Localities in Rumania are given by Iuga (1958). In France, *T. histrionicus* and *ramosus* often occur together: identified specimens are from Vaucluse (La Bonde), Var (Ramatuëlle, Callian, Montauroux, St. Aygulf), Bses-Alpes (Digne), Pyrén. Or. (Argelès-Plage, Banyuls), Hérault (Montpellier), Bouches-du-Rhône (Port de Bouc), Alpes-Mar. (Cagnes, Menton, Plateau S. Michel), Char.-marit. (Royan), H.-Gar. (Toulouse). Authorized localities in northern Italy are: Piemont (MP), Bolzano and Merano (ZMB), Triest, 12.vii.1897, leg. Ducke, *C. major*, det. J. D. Alfken (ZMB), and Venezia (CGS). Numerous specimens were examined by me from the Iberian Peninsula, Ibiza, the Baleares, Corsica, central and southern Italy, Sardinia, Sicily, Malta, all countries along the Adriatic coast, the Ionian islands, Macedonia and Greece. Also from the islands in the Aegean Sea, Crete (where it is very common), and Rhodos.

The examples from Malta in the Berlin Museum (♂, Citadelle, Pleimes 1920; ♂♀, 1914, A. Rautenburg) were identified with *C. major* by Alfken in 1933, one being marked by him with "Schildchen grober punktiert". This is of interest, because in 1929 the same author also recorded *C. circulata* Alfken, a synonym of *T. ramosus* (Lep.), from Malta. This means that both *T. histrionicus* and *ramosus* occur in the island. Further specimens, also from Malta are: ix.1926, H. C. Harford (BM) and "Malte" (MP).

The following material, arranged more or less geographically from west to east, is from North Africa, the Eastern Mediterranean and other eastern countries.

C a n a r y I s.: many ♂♀, Tenerife, 2.98. leg. Hintz (ZMB); Tenerife, various locs. (CV, CVS, ZSM). ♀, Gran Canaria, Maspalomas, 17.vi.1964, K. M. Guichard (BM); ♀, Gran Canaria, Cruz de Tejada, 27.vi.1957, O. Lundblad (NRS); ♀, Hiero, Valverde, 500 m, vii.1966, K. M. Guichard (BM). ♂♀, Las Palmas (BM, DEI, ZMB). Series ♀, Fuerteventura, Puerto del Rosario, 30.iv. & 12.v.1964, K. M. Guichard (BM). — M o r o c c o: ♀, Marocco (ZMB). ♀, Tanger (MP). ♀, Maroc, Ifrane, vii.1932, leg. Nadig, *C. major*, det. J. D. Alfken 1933 (ZMB). ♂♀, Haut Atlas, Asni, 1150 m, 14.vii.1963, W. Linsenmaier (CL). ♀, Rabat-Chellah, 18.v.1966; 2 ♀, Marrakech, 31.v.1966; and Jbelet, 50 km E of Marrakech, 9.vi.1966; all M. A. Lieftinck (ML). — A l g e r i a: ♀, Alger, R. P. Guillemé (ML); ♂♀, La Calle, vii.96, Biskra and Algérie (BM). ♂, Biskra, A.5.54, W.

Linsenmaier (CL). ♂, Algier, leg. Merkl. (MBUD). ♂♀, Bône and Alger (MP). ♀, Algerien, Constantine, vii.1910, leg. Seitz, *C. scutellaris*, det. E. Strand (ZMB). ♂♀, Sahara, Laghouat (IRSN). — Tunisia: ♂ (diss.), Tunisie, Hammamet, iv.1960, W. Grünwaldt (CVS). — Tripolitania: series ♂♀, Leptis Magna, vi, K. M. Guichard (BM). Series ♂♀, Cyrenaica, Wadi Derna, viii and Benghazi, Rommel's Pool, viii, K. M. Guichard (BM). ♂ (diss.) ♀, Cyrenaica, R. U. Agrario 8229, Geo. C. Krüger, *C. dimidiatipunctata*, det. J. D. Alfken and *C. major*, det. J. D. Alfken 1932 (ZMB). — Egypt: several ♂♀, Egypt, Beni Meggon, xi.1924; Wadi Mayer, x.1925; Pyramids, vi.1932, all leg. Mabroek, labelled *C. major* Mor., by J. D. Alfken (ZMB). ♂, Egypt, Meadi, Dept. Agric. Egypt 1911, coll. L.H.G. (BM). ♀, "Syria Aegypten", Morice 10, *C. truncata*, det. H. Friese, *C. major* Mor., det. R. Meyer (ZMB). ♀, Eastern Desert, Wadi Hof, 12.vi.1930, H. Priesner, *C. major* Mor., det. J. D. Alfken (CP). ♂ (diss.), Egypt, Abou Rouache, 3.II.1938, Coll. Anastase Alfieri (USNM). — Syria: ♂, Nord-Libanon, Becharre, 1-4.vii.1931, leg. Zerny (NMW). ♀ Syrie, Akbès, Été 1890, leg. Ch. Delagrangé (ML). ♂ (diss.), Beirut, ii-iv.1919, E. S. Sewell (BM). — Cyprus: many ♂♀, various locs. & coll. — Asia Minor (Turkey): ♀, Bosphorus, Beiko (MBUD). ♀, Asia Minor (DEI) and Asia Minor, Amasia (MP). Series ♂♀, Turkey, Bursa Orhangazi; Ankara; İçel; ♂ (diss.), Ararat, below Serdarbulak, 5000 ft., 7.ix.1960; ♂ (diss.), Adana, Osmanlye Area, 200 ft., 19.vi.1960; all K. M. Guichard & D. H. Harvey (BM). ♀, Taurien, Sudagh, viii.1861, leg. Nordmann, *C. ramosa*, det. H. Friese 1908 (ZMB). 2 ♂ (diss.) ♀, Turkey, Mut, 9-13.vi.1965, Max. Schwarz (CMS). — Sokotra [Gulf of Aden]: Hadibo, ii.1953 (BM). — Iran: ♂ (diss.) 3 ♀, Persien, Elburs, Meshediser, vi.1927 & Kiasar, 1200 m, vii.1927, G. Heinrich, *C. scutellaris* F., det. J. D. Alfken (ZMB). — USSR: ♂, E. Russia, Orenburg, coll. O. Sichel (MP). 2 ♀, Russia mer., Jekaterinalow, leg. (?) Bramson (ML). ♂ (diss.), Sarepta [= Krasnoarmeysk, S. of Saratov], 1893, leg. Becker, *C. major*, det. R. Meyer, *C. tricuspis*, det. H. Friese (ZMB). ♀, Sarepta, coll. O. Vogt (MA) and ♂♀, Sarepta (MBUD). ♂♀, Krim, leg. Nordm. (ZMB). ♂♀, Nord Ukraine, südl. Gomel, viii.1941, leg. Kl. Zimmermann (ZMB). ♀, Caucasus, Batum, coll. Konow (DEI). ♂ (diss.), Transcaucasus, Helenendorf 1886 (BM). ♀, Turkestan, Mts. Ghissar, F. Hauser 1898 (ZMB). ♀, Samarkand (MP). ♂ (diss.), Bucharia/Repetek [Repetek, S of Thardjou] (ZMW). ♂♀, Bukhara, Tschardschui [Thardjou], 1913, H. Veth (BM). ♂♀, Ost-Turkestan, Narin (ZMB). 2 ♀, Aulie Ata, Syr-Darja and Altai (DEI). 2 ♂ (diss.) 2 ♀, Tyan Chan occid. [Kirgiz], Monts Sussamyr, Ketmen Tjube, M. Pic 1914 (MP). — China (Sinkiang): 2 ♂ (diss.)

♀, Chin. Turkestan, Chassan Bugra-Jarkand, 1740 m, 9.7.90 (♀) and Sampula b. Chotan, 1250 m, 13-15.6.1890, and Chotan, 1200 m, 6.1890

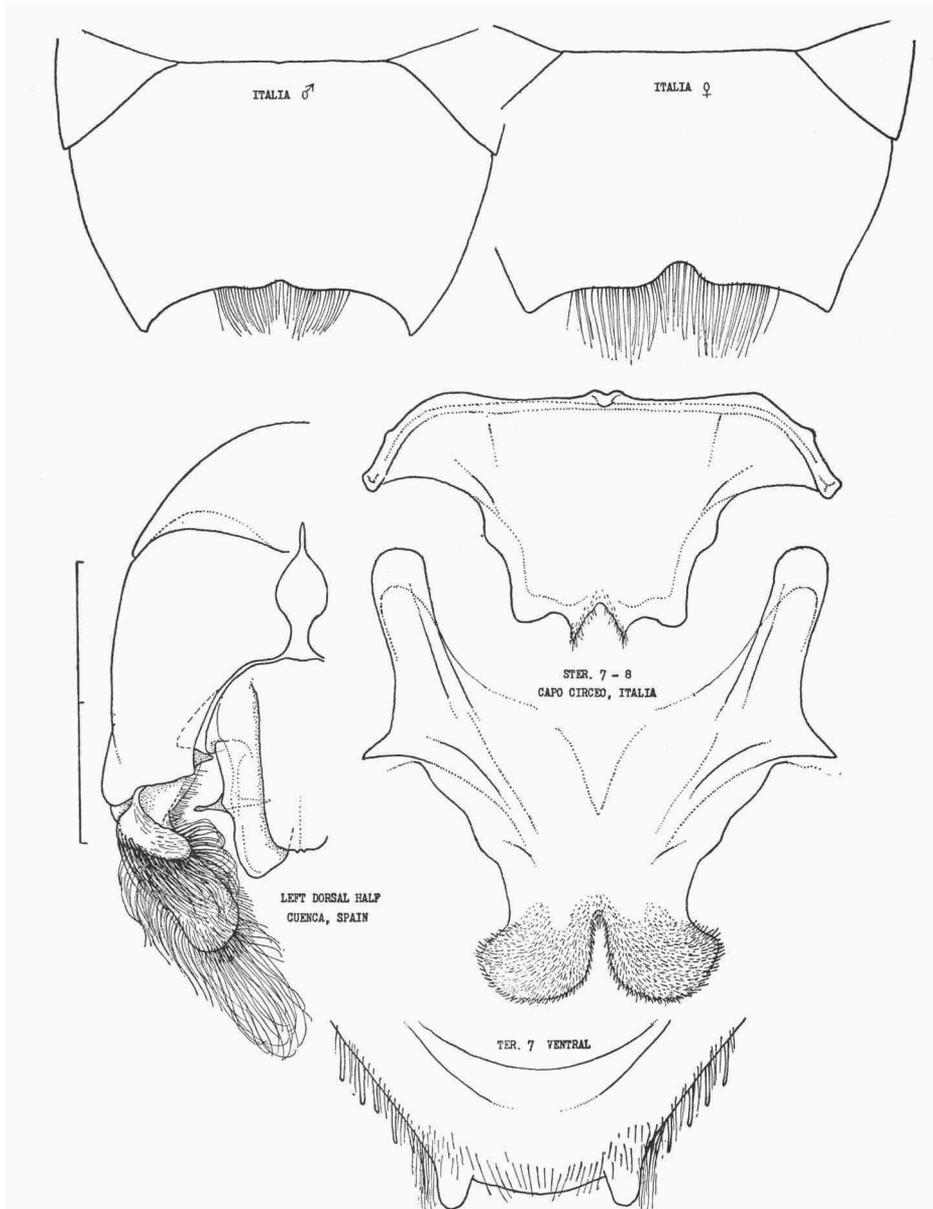


Fig. 20. *Thyreus histrionicus* (Illiger), from Italia and Spain. Scutella and ♂ terminalia after specimen from Capo Circeo (Italy) and genitalia after ♂ from Spain. Scale-line = 1 mm.

(♂), all leg. Conradt (ZMB). ♀, Kashgar, leg. Raquette (NRS). ♀, Sin-Kiang, Dsungarei, Kuldsha, ix.1924, leg. Beik (ZMB).

A well-known and widely distributed species that has often been mentioned in the literature. All the same, it is easily confounded with other members with partly overlapping ranges, like *T. hellenicus* sp.n., *picaron* sp.n. and certain individuals of *parthenope* sp.n. The most obvious characters thus far employed in taxonomic works, i.e. shape of scutellum and apical tergite of abdomen, do not always suffice to recognize even the male. In doubtful cases, where the existing variability of external body parts may give rise to confusion with other species, it will be necessary to dissect out the terminalia, which are altogether different on comparison with those of the species just mentioned. With respect to the general form and microvestiture of the internal organs, two other species, *T. truncatus* and *hirtus*, appear to be more nearly allied. In details of structure, however, *histrionicus* shows some characteristic differences, most easily understood by comparing the figures, which have proved to be constant, ensuring its recognition. The gonostylus of the three species involved, viewed from the side, has been well figured by de Beaumont (1939).

Vestiges of the maxillary palpi usually consist of two minute segments, as in *T. ramosus*, but the palpus may be reduced to a single rudiment.

Females diverging from the common type in some way or other should be looked on with caution as they might belong to the undescribed sex of the much rarer *T. picaron* sp. n. For instance, in a series of 11 males (all of them dissected) and 19 females from Palamos (Catalonia, Spain), vii-ix. 1959, leg. Bischoff (ZMB), I found 10 males and all (?) females to be *histrionicus*, only 1 male belonging to *T. picaron* sp. n. (see under that species).

Synonymic notes. — I have not seen Meyer's variety *alboscuteolata* (♂, Gultscha), which is admittedly only a variety with some whitish hairs above the emargination of the scutellum. The type of *C. divisa* Pérez is a normal individual of *histrionicus* and it is difficult to comprehend why the author considered it a distinct species. A direct comparison reveals the following discrepancies in the description: (1) total body length 12.5 mm (not 10 mm, as stated); (2) the "pinceau sous-scutellaire" is not "dédoublé", although the hairs are shortest medially, as they frequently are; (3) only the basitarsi and last segment are white-haired externally; (4) antennae differ not from those of *histrionicus*; (5) scutellum comparatively short but posterior emargination and hinder angles not unusually formed; and (6) pygidial plate normally triangular, the median crest not "fortement

caréné", but blunt. I have compared the type of *divisa* also with the female of *hellenicus* m., a species likewise occurring in Spain. Suffice it to say that the two are not conspecific, the differences between *histrionicus* and *hellenicus* being set forth in the description of the latter. The status of two North African species, *C. rimosiscutum* and *C. circulata*, both described by Alfken (1927), also requires consideration. But for the characterization he gave of *tricuspis*, the key characters Alfken used to discriminate between the four *Crocisa* he had from Cyrenaica, are quite misleading. This is due mainly because Alfken mistook the true *histrionicus* for *C. dimidiatipunctata* (sic), an error that was admitted and corrected by him some years later (see Alfken, 1934: 172, sub *C. major* F. Mor.). And secondly, Alfken failed to realise that the definitions of his two new species (male as well as female) are based on trifling characters falling well within the range of individual variation of each. His *C. rimosiscutum* now turns out to be *histrionicus* as well, while both sexes of *C. circulata* are identical with *T. ramosus* (Lep.). It must be pointed out also that the localities given for *C. rimosiscutum* in Alfken's list should be transposed, the female (not the male) being labelled as from Derna. I have not seen the male (which is probably lost) but since both examples were listed "Typus" in Alfken's paper, I have designated the female from Derna in the Berlin Museum as the lectotype of *C. rimosiscutum*. This differs in no way from typical *histrionicus* of that sex (pl. 3 fig. 17).

Lastly, attention must be drawn to Iuga's account of the anthophorid bees of Rumania, in which the author supplies figures of the 7th gastral sternite and male genitalia of alleged *T. histrionicus*. The slide preparations on which these drawings were based are, however, obviously taken from a different species, probably *T. hellenicus* sp. n. If so, it would mean that the latter species also occurs in Rumania, which is not surprising.

Flower second. — *Knautia arvensis* (near Spandau).

Host (see also p. 8, *huj. op.*). — *Anthophora* (rect. *Amegilla*) *quadrifasciata* (Vill.), sec. Ferton, 1920, and Bischoff, 1927, sub *Crocisa major* Mor.; *Amegilla quadrifasciata* (Vill.), sec. Stoeckhert, 1954, Iuga, 1958, and Popov, 1967. A series of ♂♀ from Simontornya (W. Hungary), in the Budapest Museum, bear labels with "7.1933, bei *Anthophora albigena*, leg. Pillich"; these were identified by Alfken as *C. albociliata* R. Meyer.

### **Thyreus hirtus** (de Beaumont) (fig. 21)

1905. Dusmet, Bol. Real Soc. esp. Hist. nat.: 156-157 (key ♀ ♂), 157. — ♂ Madrid, notes (*C. scutellaris* F.)

1939. De Beaumont, Ann. Soc. ent. France **108**: 163 (key ♂ ♀), 169-170, fig. 5 (♂ genit.), 12 and 22 (structures). — ♂ ♀ Suisse, France & Corse (*Crocisa hirta*, n. sp.)

1965. Leclercq, Bull. Inst. agron. et Stat. Rech. Gembloux **33**: 115 — ♂ S. France.  
 1967. Vergés, Miscelánea Zoológica, Barcelona **2** (2): 102 (key ♀ ♂), 108-109, fig. 16. —  
 Spanish locs.

Material. — From southwestern Europe some thirty specimens of either sex were examined, several from localities in Switzerland (terr. typ.), France, Spain, Portugal, Algeria and S. Russia having been thoroughly investigated. — **Switzerland**: ♂♀ (including paratypes *C. hirta* de B.), Wallis, Stalden, various dates, leg. Steck et al., det. J. de Beaumont (NMB, CDB, MZUC). ♀, Wallis, Enseigne, vii.1951, W. Linsenmaier (CL). ♂♀, Wallis, Useigne, *C. hirta* de B., det. J. de Beaumont (NMB). ♂♀, Wallis, Stalden & Useigne, leg. Steck, ex Mus. Bern, *C. hirta* de B., det. J. de Beaumont (ZMB). ♂, Stalden, 7.84, *C. scutellaris* var. *orbata*, det. H. Friese (ZMB). ♀, Sierre, vi. leg. H. Friese, *C.?* *tricuspis*, det. H. Friese & *C. ramosa*, det. R. Meyer (ZMB). — **France**: several ♂♀, Var, Callian, ♀ ult.vii.1956, W. Linsenmaier, some det. J. de Beaumont (NMB, CL). 2 ♀, Var, Croix-Vaimier, Mas de Cigaro, v. 1952 and St. Aygulf, vii.1957, P. F. M. Verhoeff (CV). 2 ♂ (diss.) 2 ♀, Var, Callian, St. Cézaire, 27.vi.1960; Selves, N562 XD55, 1.vii.1960; Montauroux, Bagnols e.F., 500 m, 26.vi.1960, and Camiole, 2.vii.1960; all J. van der Vecht (ML). 2 ♂, Basses-Alpes, Digne, 26-29.vi.1935, *C. hirta* de B., det. J. de Beaumont (CV, MZUC). — **Spain**: ♂, Granada, Staudinger vend.; ♀, Sierra de Guadarrama, 9.7.16, leg. Dusmet; ♂ (diss.), Manteigas, Serra Estrela, 28.vi-9.vii.29, leg. Kricheldorf (all ZMB). ♂, Canet Altura, nr. Canet de Mar, Barcelona, v.1959, F. Vergés (CVS). Series ♂♀, Madrid, El Escorial, San Rafael, and Navalparal, coll. Mercet (IEM). ♀, Catalonia, Argenton; ♀, Cataluña, Viladrada Tala (?), 10.vii.29, leg. A. Villarrubia (MZB). ♀, Granada, Andalusia, 29-31.v.1925, leg. Zerny (MZUC); ♀, Granada, Mecina Bombarón, Alpujarra, J. Suarez (CSA). ♂ 2 ♀, Pontevedra, Villajuan, 14.vii.1963, J. A. G. Delfos (ML). 5 ♂ (1 diss.), Salamanca, Parade de Rubiales, 24.vi.1961, C. van Heyningen et al. (ML). ♂ (diss.), NW Spain, Caldas de Reyes, 3.vii.1963, at flower of *Rubus*, C. van Heyningen (ML). — **Portugal**: ♀, Estremadura, Caldas da Reina, 70 m, 14.v.1958 (ML). ♂, Lago Albufeira, 21.vi.1953, F. de Andrade (MZUC). ♂ (diss.), Montemor, 1½ km, 3.vi.1958, M. A. Diniz (MZUC). — **Crete**: ♂ (diss.), Crete, Sitia, 19.v.1963, Max. Schwarz (CMS). — **Algeria**: ♂ (diss.), East Algeria, Collo, 14.vi.1944, K. M. Guichard (BM). ♀, Algeria, Mascara, 1902, Dr. Cros (ML). ♂ (diss.), Algeria, Kabylie, Yakouren, 26.vi.1954, G. L. van Eyndhoven (MA). — **USSR**: ♂ (diss.), Sarepta (MA). — **Asia Minor** (Turkey): ♂ (diss.), Erzeroum, Kopdagi Gecidi, 22.vii.1960, 5000 ft., K. M. Guichard & D. H. Harvey (BM). — Unknown

country: ♂ (diss.), Palermo, 9.v-14.vi (ZSM).

The Spanish material comprises a ♂ from Barcelona with the mss. name *C. hispanica* J. P. in J. Pérez' writing (MP) and a second ♂ labelled: "S. Ildef. 7.02", ex coll. J. Vachal (MP).

Flower record. — *Scabiosa maritima*, 5 ♂, Parade de Rubiales (Spain).

This very distinct species has been adequately characterized by de Beau-

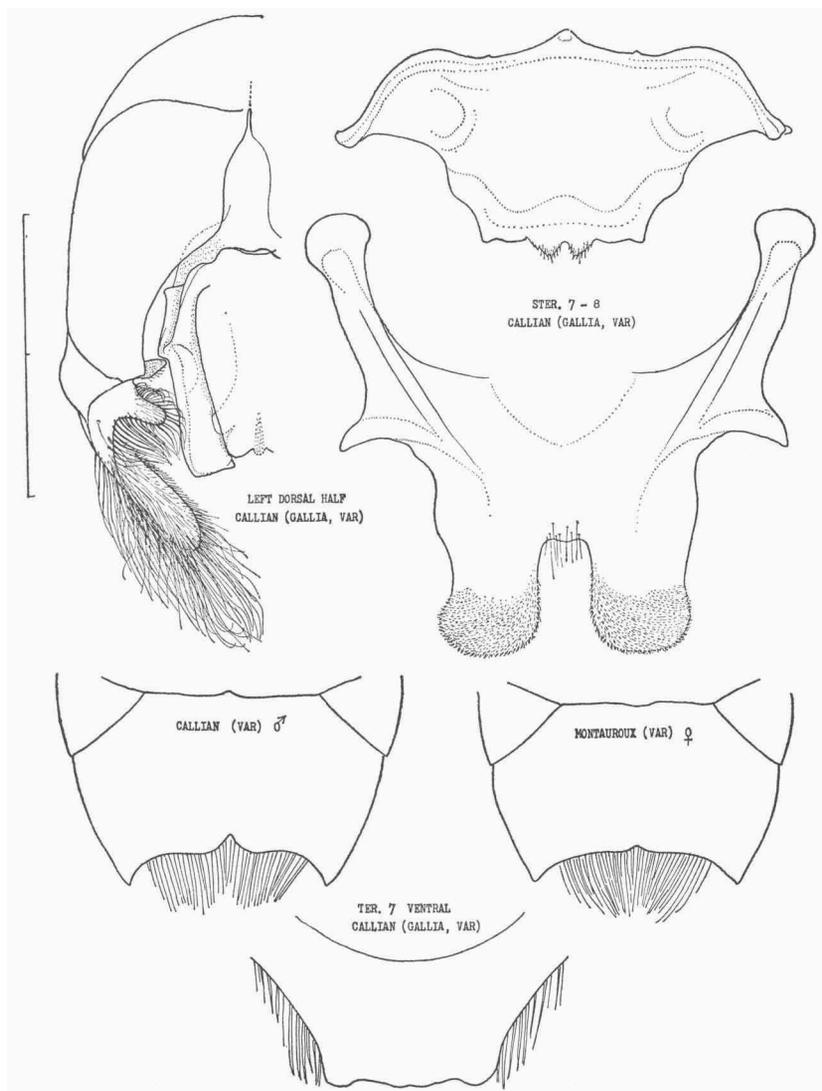


Fig. 21. *Thyreus hirtus* (de Beaumont), from France. Scutella and terminalia. Scale-line = 1 mm.

mont, whose illustrations of the colour design and male gonostylus in lateral aspect should be compared with the present discussion and figures. De Beaumont compared his species in the first instance with *T. orbatus*, to which it only bears a prima facie resemblance, these species being, in fact, very different structurally. Taking into account all characters, it is evident that not this species but *T. histrionicus* is most nearly related, in spite of the fact that *hirtus* can be distinguished at first sight by having the clypeal pubescence invariably black, not white. The following characters are supplementary to those given in the key.

Maxillary palpus very short, three-segmented, the last two equally long or the second segment a little longer than the others. Length ratio between interocellar and ocellorbital distance as 10 : 8 or 10 : 8.5. The form of the scutellum varies between limits; in some specimens the distal margin of the plate is brace-shaped, hence almost exactly as in typical examples of *histrionicus* (fig. 21). White hair spots on dorsum of female thorax, especially the anterior ones, much less defined, more erect and a little longer, than in *histrionicus*.

Male accessory genitalia (fig. 21). The form of the apical sternal plates is relatively constant although the median excavation of the 7th sternite may have a more circular outline than in the specimen figured, the contour of the 8th sternite being at times also a little different. As in other species (e.g. *T. truncatus*), the shape of the dorsobasal process of the gonostylus varies: in some examples it is distinctly more expanded than in others. Ventrobasal process smaller and more oval than in *histrionicus*, in which it is almost circular. Bristle-like setae at apex of gonostylus invariably shorter than in the last species.

Distribution. — Whole Mediterranean area and West Asia, in Europe as far north as southern Switzerland.

### **Thyreus picaron** sp.n. (fig. 22)

Material. — J o u g o s l a v i a: ♂ (dissected), Stobrec near Split, 13.vi.1962, C. van Heyningen (ML). — I t a l y: ♂ (diss.), prov. Emilia, Pésaro near Rimini, 25.vii.1962, S. Erlandsson, no. 866 (NRS). — R u m a n i a: ♂ (diss.), Mehadia [Transsylvania], coll. Oldenberg, *C. major* Mor. var. *truncata* Per., det. Hartig 1938 (DEI). — S p a i n: ♂ (diss.), Catalonien, Palamos, 19.vii.1959, leg. Bischoff (ZMB); ♂ (diss.), Valle de Ordesa [Pyrenees, Parque Nacional de Ordesa], vii.1923, leg. Seitz, *C. major*, det. J. D. Alfken 1933 (ZMB). — U S S R: ♂ (diss.), station Dzhuma, Uzbekistan, Ljuts. Brig. ZIN'a, V. Popov, 2.vii.1937, on *Tamarix* (transl. from Russian), *C. ashabadensis* Rad., det. V. Popov (ZIL). Turkestan: ♂ (diss.),

E. Turkestan, Djarkeuch, H. Rolle vend., *C. ramosa*, det. H. Friese 1912 (OUM); 2 ♂ (diss.), Turkestan, Kasalinsk (or Karalinsk), one with *C. ashabadensis* Rad., det. J. D. Alfken (NAMP). Holotype ♂, Jugoslavia, Stobrec near Split, 13.vi.1962, C. van Heyningen (ML).

Facies of *T. ramosus* and *histrionicus* but resembling the latter most closely in the majority of characters.

Male. — Flagellar segments of antenna from 4 onwards a trifle longer than wide and all approximately of equal length; segm. 3 slightly shorter anteriorly than its apical width and subequal in length to 4; paired rhinaria present on 4-13 (the one on 3 broadly oval), moderately impressed, as in *histrionicus* and *ramosus*, but more narrowly oval than in either.

White pubescent pattern of head and thorax resembling *histrionicus* rather than *ramosus* in that the *plsa* streak is indistinct, all mesoscutal spots except *pls* being ill defined, only the latter standing out more clearly than the rest. Body punctuation as in the two species compared but punctures on mesoscutum and scutellum finer and less deep than in either of these. Scutellum very variable, its shape in some males resembling *ramosus* (fig. 22) but in several others the plate is shorter, with the postero-lateral sides less convergent and the emargination distinctly ~ like, the scutellum in the type having exactly the shape characteristic for *histrionicus*, even the additional median notch being present (fig. 22, ♂ Catalonien). White fringe projecting from beneath posterior border squarish in outline, restricted to middle of emargination. Shape and pubescence of legs much as in *histrionicus*, i.e. generally longer than in *ramosus*, length ratios of hind tibia and basitarsus in the type as 100 : 70 (in *histrionicus* as 100 : 77 and *ramosus* as 100 : 66, all measured specimens likewise originating from Jugoslavia). Hind basitarsus shaped similarly to *histrionicus*: only little narrowed from base to apex, with outer face slightly concave and outbent, the dense fringe of thick black hairs bordering lower margin decumbent and all hairs, though rather longer than in *histrionicus*, of equal length. (*T. ramosus*: hind basitarsus shorter and straight, more distinctly narrowed toward apex, the dense fringe bordering lower margin more conspicuous, the hairs being suberect, longest basally). Colour of wing membrane as in *histrionicus* and *ramosus*.

Gaster with white pubescent markings present only on tergites 1-5, shaped as in *histrionicus*, an additional pair of spots on 6 being present only in the somewhat aberrant example from Uzbekistan. Sternites with transverse white pubescent patches on each side of segments 2-5.

For further details see the key characters and illustrations.

Female unknown.

There is little variation in the configuration of the sternal plates and parts of the genital capsule, the total length of the latter varying from 1.6-2.0 mm,

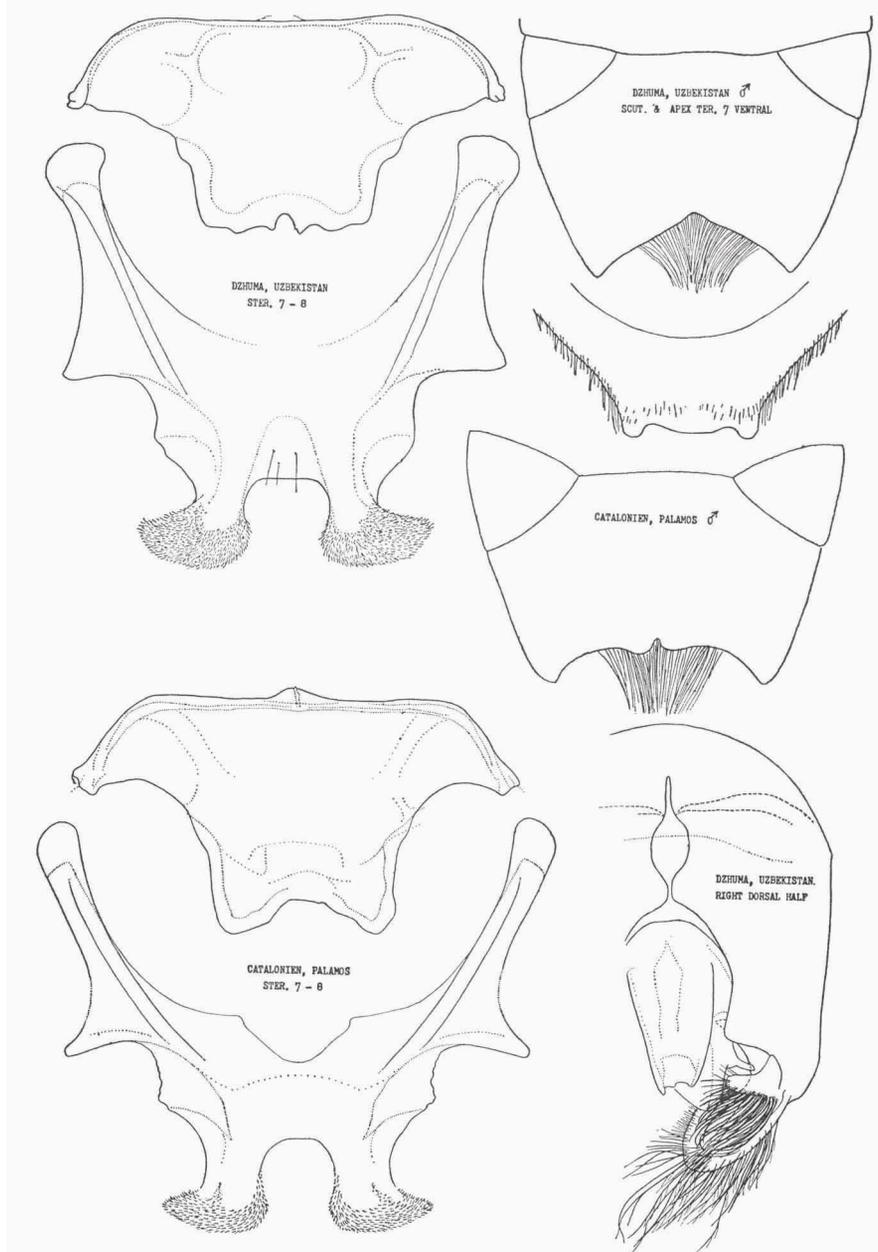


Fig. 22. *Thyreus picaron* sp.n., ♂ from Uzbekistan and Catalonia (Spain). Scutella and terminalia.

corresponding with the different size of the insects. The holotype is an average-sized specimen, measuring 10.7 mm for the body, 8.5 mm for the fore wing. All remaining males may be considered paratypes.

The male of this new species, though very similar superficially to the common *histrionicus*, can be immediately distinguished therefrom on dissecting out and comparing the terminalia, which are altogether different in most details. The strongly projecting apodemal angles and lobes of the 7th and 8th sternites are reminiscent of those of *T. hirtus* (de B.) and *histrionicus* (Ill.), the former, however, having a black-haired clypeus and a different body pattern. Yet these three species may be more intimately allied than either of them can be linked with *T. ramosus*. It will be noted that some of the Asiatic examples were named *C. ashabadensis* Rad. by Popov and Alfken. The type of the latter is a female of *ramosus*, while Radoszkowski's male, judging by his figures, is almost certainly *T. picicornis* (Mor.).

I have not succeeded to discover the female of *T. picaron*. It is quite possible that one or more examples of that sex were not recognised by me and are still hidden among the numerous specimens of *histrionicus* that have come under my eyes during the past several years. In any case I failed to disclose good characters by means of which the two species can be told apart.

Distribution. — From the Iberian Peninsula and southern Central Europe eastwards far into West Asia. Apparently a wide-ranging species.

**Thyreus fallibilis** (Kohl) (pl. 4 fig. 23; and fig. 23)

1906. Kohl, Denkschr. mathem.-naturw. Kl. Akad. wiss. Wien **71**: 20. — ♀ Makalla [Hadramaut], Südarabien (*Crocisa fallibilis* nov. sp.)

1921. Meyer, Archiv f. Naturgesch. **87** A: 137, orig. descr. quoted; not seen (*C. fallibilis* Kohl).

Type material. — S. A r a b i a (Hadramaut): ♀, holotype *Crocisa fallibilis* Kohl, labelled: Makalla, 4. '99, leg. O Simony (print), *C. ramosa* ♀, det. H. Friese 1900, *fallibilis* Kohl, Type (Kohl's writing), det. Kohl (print) (NMW).

Further material. — A r a b i a: ♂ (diss.) ♀, Arabia, Taif, 13.v.1934 and 12.vii.1934, H. St. J. B. Philby, BM 1934-432 (BM); ♂ (diss.), same country, Wahat, 6.viii.1934, same collector (ML). Allotype ♂, Arabia, Taif, 13.v.1934 (BM).

Previously known only from the type. The males here associated with it show that the pubescent pattern resembles that of the female but differs

from that of similarly-looking species in the tint of the spots being pale blue instead of pure white. The light tomentum on almost all body parts is dense, appressed and strongly contrasting; in both sexes the light lateral marks on gastral sternites 2-4 (or 2-5) are of large size. The interocellar and ocellor-bital distances are in the ratio of about 10 : 7. The holotype female is photographed in pl. 4 fig. 23. The allotype male is a good deal larger than the second specimen of that sex, equalling the females in size (see key to species).

The shape of the male apical sternal plates and genitalia (fig. 23), particularly the frayed apex of the 8th sternite, suggests real relationship with *T. histrionicus* (Ill.) and *hirtus* (de B.)

Distribution. — Arabia.

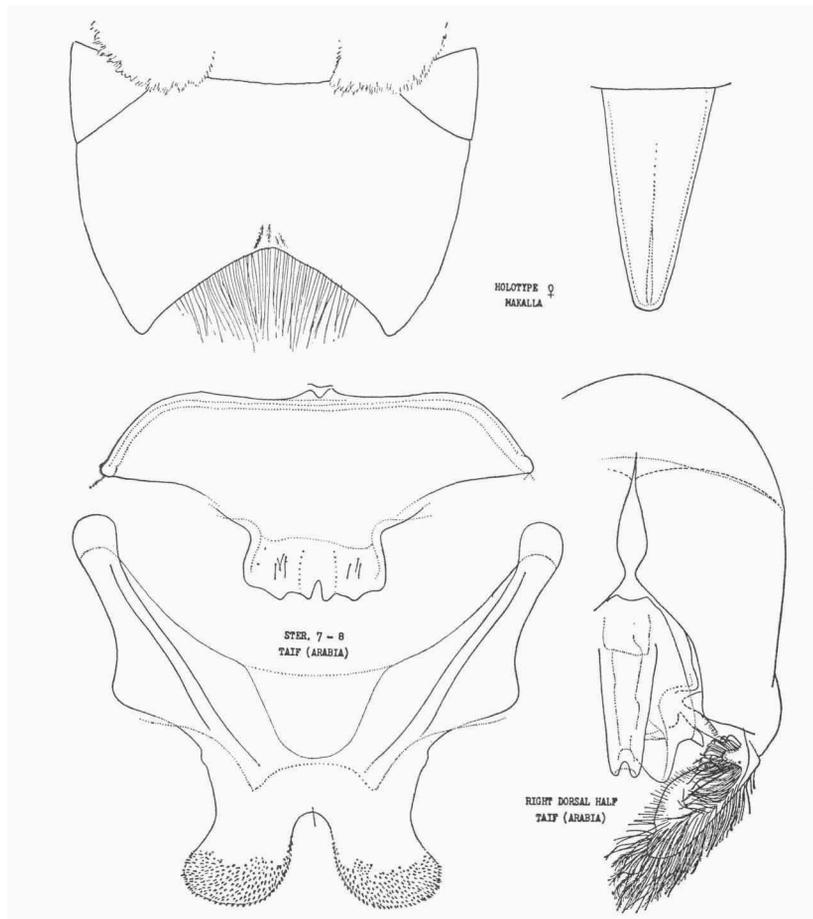


Fig. 23. *Thyreus fallibilis* (Kohl), from Arabia. Scutellum and pygidial plate of ♂ holotype and terminalia of ♂ allotype.

**Thyreus uniformis** (Kirby) (fig. 24)

## Selected references:

1900. Kirby, Bull. Liverpool Mus. **3** (1): 21-22. — Sex not stated, Sokotra, various locs. (*Crocisa uniformis* nov.)  
 1903. Kirby, in Forbes, Nat. Hist. Sokotra etc.: 252 pl. 16 fig. 10 (colour picture). — Sex not stated, ditto (*C. uniformis* K.)  
 1906. Kohl, Denkschr. mathem.-naturw. Kl. Akad. Wien **71**: 188 (20 sep.). — ♀ Sokotra (*C. uniformis* K.)  
 1913. Meade-Waldo, Ann. Mag. Nat. Hist. (8) **12**: 93 (note; not seen) (*C. uniformis* K.)  
 1921. Meyer, Archiv f. Naturgesch. **87** A: 136-137 (citations; not seen) (*C. uniformis* K.)

Type material. — Sokotra I. (off Somalia): ♀ (mounted), labelled: Sokotra, Alitspan, 3500 ft., 3.2.99 (pencil on large disk), Type BM, 17B 1207 (BM). Lectotype by present selection.

Further material. — Sokotra I.: 3 ♀, with same labels as type (BM, general coll.). — 2 ♀, Sokotra, Ras Shoab, I. '99, O. Simony (print), *uniformis* Kirby, det. Kohl (NMW); 2 ♀, Sokotra, Hagien-Gebirge, O. Simony, *uniformis* Kirby, det. Kohl, and one with 31 (print), *Cr. ramosa* var. *atra*, det. Friese 1900 (NMW, ML).

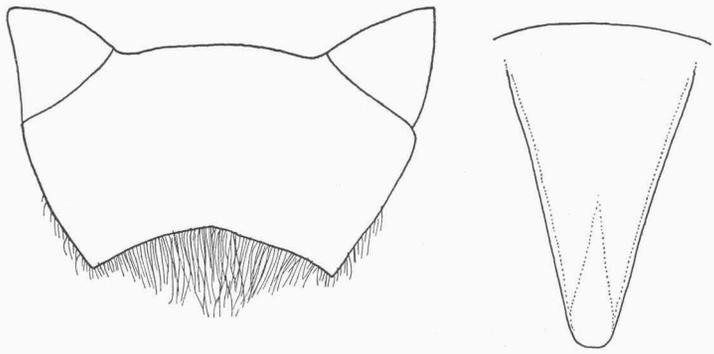


Fig. 24. *Thyreus uniformis* (Kirby), ♀ from Sokotra. Scutellum (Ras Shoab) and pygidial plate (Hagien Mts.).

## Original description:

“Long. corp. 10 mm.; long al. ant. 9 mm.

Deep inky black, antennae clothed with fine greyish pile, the tegulae reddish in the middle, and the trochanters, femora, and tibiae of the four hind legs more or less ferruginous, at least beneath. Wings purplish hyaline, with some subvitreous spaces just beyond, and around the outer cubital cell of the fore-wings; hind-wings paler towards the base. Marginal area of all the wings thickly sprinkled with brown dots. Clypeus obtusely truncated at the extremity; a strong median carina between the antennae. Head, thorax.

and scutellum thickly punctured; abdomen more finely, but still more thickly. Scutellum very broad, only slightly narrowed at the extremity, where it ends in a point on each side, between which is a concavity which is rather obtusely angulated than rounded. Between the sides of this angle projects a tuft of rather strong greyish bristles.

Sokotra: Moukaradia (800 ft., 16.XII.98); Alilo Valley (3000 ft., 11.I.); Adho Dimellus, (3000-3500 ft., 3-5-7.II.99); seven specimens."

This peculiar species, sufficiently characterized in the key and by the description, is here included because the type and topotypes could be studied and the scutellum and pygidial plate figured (fig. 24). *T. uniformis* seems to take an isolated position among its congeners; its relation to others must remain uncertain until the male has been discovered.

Distribution. — Sokotra.

### **Thyreus truncatus** (J. Pérez) (pl. 3 figs. 18-20; and figs. 25-27)

#### Selected references:

1883. Pérez, Act. Soc. Linn. Bordeaux **37**: 312-313. — ♂ Provence et Languedoc (*C. truncata* nov.)
1895. Friese, Bienen Europa's **1**: 173 (key ♀ ♂), 176-177. — Europa; Algeria (*C. truncata* J. P.)
1922. Maidl, Ann. Naturhist. Mus. Wien **35**: 92. — ♂ Albania (*C. truncata* J. P.)
1925. Friese, Konowia **4**: 30. — ♀ Kleinasien (err. pro Egypt!) (*C. ramosa* var. *mucoea* n. var.) **Syn. nov.**
1927. Bischoff, Biologie Hym. Berlin: 399 (host record) (*C. truncata* J. P.)
1930. Schmiedeknecht, Hym. Nord- u. Mitteleuropas: 831. — ♂ ♀ "Südeuropa bis Ungarn" (*C. truncata* Pér.)
1933. Alfken, Mitt. D. ent. Ges. **4** (9): 136-137. — ♀ ♂ Morocco: El Hajeb (*C. nadigi* sp. nov.) **Syn. nov.**
1934. Alfken, Bull. Soc. R. Ent. d'Egypte **18** (1-2): 167, 169 (key ♀ ♂), 169-170, 174. — ♀ ♂ Egypte (*C. curviscutum* sp. n.) **Syn. nov.**
1937. Maréchal, Bull. & Ann. Soc. ent. Belg. **77** (11): 403, fig. 9 & 11 (♀ struct.). — ♀ Midi de la France (*C. truncata* J. Pér.)
1939. de Beaumont, Ann. Soc. ent. France **108**: 164 (key ♂ ♀), 167, fig. 3 (♂ genit.), 11, 17 and 21 (♂ ♀ struct.). — Europe mérid. (*C. truncata* J. P.)
1957. Moczár, Apidae in Fauna Hung. **19**: 1334-1335. — Hungary (*C. histrionica* Ill. var. *truncata* Pérez).
1958. Moczár, Rovart. Közlem. (Fol. Ent. Hung.) n.s. **11** (24): 415-416. — Hungaria, various locs. (*C. histrionica* Ill. var. *truncata* Pérez).
1958. Iuga, Anthophorinae, in Faun. Republ. Pop. Romine **9** (3): 215, 220-221. — ♀ Rumania (*C. truncata* Pérez).
1967. Popov, Trudi Zool. Inst. Moscou **38**: 103-104, 307 (host and flower records).
1967. Vergés, Miscelánea Zoológica, Barcelona **2** (2): 102 (key ♀ ♂), 105, fig. 4, 6 and 13. — Spain.

Type material. — Morocco: ♂ (dissected), 2 ♀, Maroc, El Hajeb, 22.vii.1932, Ad. Nadig, ♂ with red label Typus, 2 ♀ labelled Allotypus and Paratypus (print on red) and *C. nadigi* m., det. J. D. Alfken 1933. Holotype ♂, allotype ♀ and paratype ♀ *Crocisa nadigi* Alfken (ZMB). — Egypt: 3 ♀, Min. Agric. Egypt, Pyramids, 12.iv.1914, Coll. Adair, one with red label Typus, two others with Paratypus (print on red) and all with *C. curviscutum* m., det. J. D. Alfken 1933. Holotype ♀ and two paratype ♀ *Crocisa curviscutum* Alfken (ZMB). — ♀, holotype *C. ramosa* var. *mucoorea* Fr., Heliop

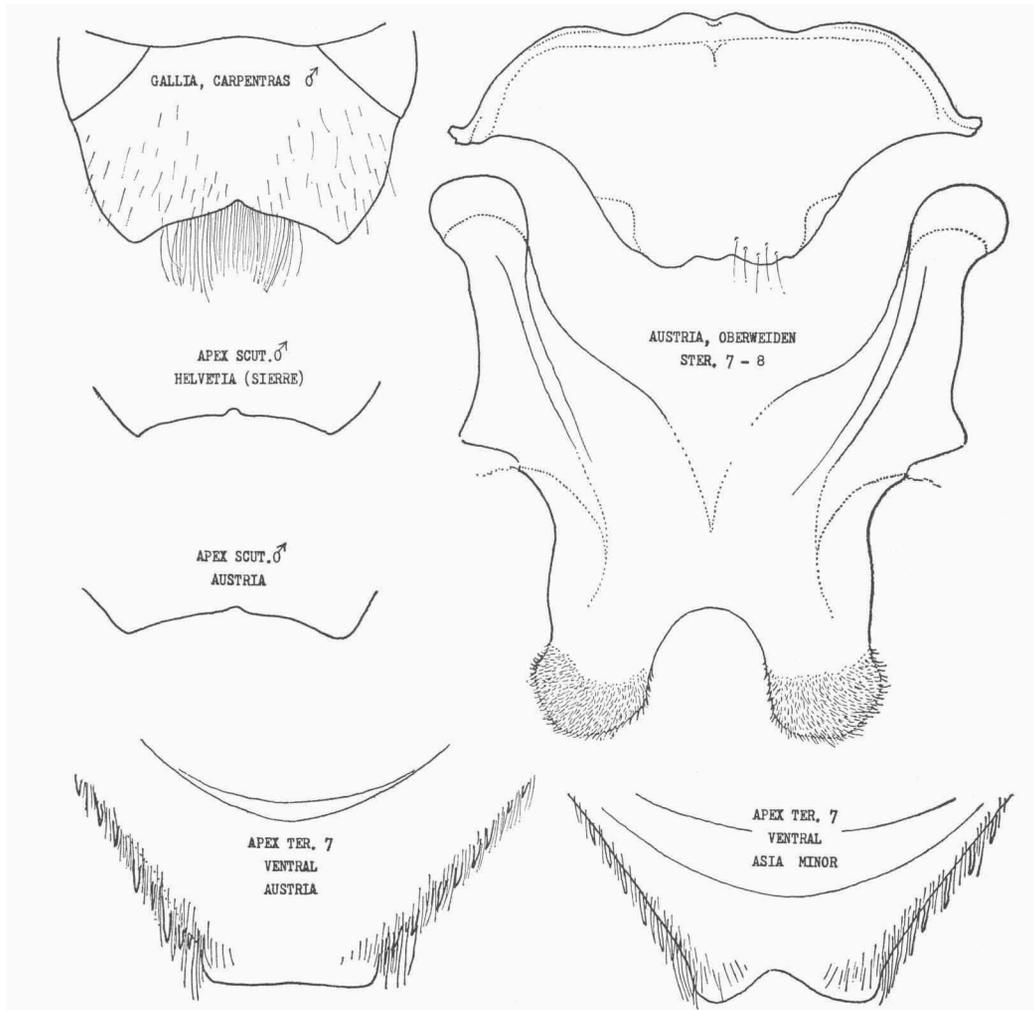


Fig. 25. *Thyreus truncatus* (J. Pérez), ♂ from various European localities. Scutella and terminalia.

[olis] 21.4.96 (O. Schmiedeknecht's writing), Aegyptus 1890 (print), Typus (print on red), *C. ramosa* var. *mucorea* Fr. Aeg (large cadre, H. Friese's writing) (ZMB).

Further material. — France: ♂♀, Vaucluse, Carpentras, vii.1951 and viii.1953, P. M. F. Verhoeff (CV, ML). ♀, Pyren. or., Argelès-Plage, 6.viii.1950, P. M. F. Verhoeff (CV). ♂, Marseille, coll. Ernest André 1914 (MP). ♂ (diss.), Vaucluse, Carpentras, vi.1934, leg. P. Bovey (CDB). ♂ (diss.), Montpellier, 30.vi.1911, Lichtenstein, *C. truncata* J. P., det. J. D. Alfken 1933 (ZMB). ♂, Monspel., Lichtenstein (ZMB). — Austria: ♀, Burgenland, Neusiedl, 14.viii.1960, Max. Schwarz (CMS). ♂ (diss.), Ober-Weiden, A.i., leg. Mader (ZSM). ♂, Oberweiden, N.Ö., 19.vii.1934, leg. Mikolasch (CMS). — Switzerland: 2 ♂ (one diss.), Valais, Sierre, 1178 and 18.vii.1897, leg. B. Jacob, *C. truncata* J. P., det. J. de Beaumont (CDB). ♂ (diss.), Wallis, Siders, vii.1903, *C. scutellaris* (ZMB). — Hungary: ♂♀, Budapest, leg. Mocsary (ML). Long series ♂♀, various locs. (Gellérthegy, Sukoró, Budapest, Grebenác, Hild, various dates & coll. (MBUD). ♂ (diss.), Hungaria, Stofex [?], *C. scutellaris*, det. J. D. Alfken (ZMB). ♂ (diss.), Hung. occ., Simontornya, vii.1931, leg. Pillich (ZMB). ♂♀, Budapest, leg. Mocsary, *C. truncata*, det. J. D. Alfken (ZMB). ♀, Gellérthegy, Aluth., 19.viii (ZMB). ♂, Deliblát, 23.vii.1886, H. Friese *C. truncata*, det. H. Friese (ZMB). — Yugoslavia: 3 ♀, Macedonia, Izvor, 17 km SSW Titov Veles and Stip, 22-23.vi.1965 (MA). — Italy: ♀, Liguria, Pegli, vi.1897, leg. O. Seitz (ZMB). ♀, Italia (ZMB). — Sicily: 2 ♂, Sicilia or., Lentini, 1949-50, leg. L. Hartig (INER). — Greece: ♂♀, Saloniki, vii.1932, Paduschin. Kattinger (?) (ZMB). ♀, Greece (?), Aegina (ZMB). ♀, Greece, Legrena, 1.vi.1965, "on sandy beach", K. V. Krombein (USNM). — Spain: ♀, Hispania, Cuenca, leg. Korb (MBUD). ♂ (diss.), 2 ♀, Hispania (ZMB). ♂ (diss.), Cataluña, Sitges, 42 km S of Barcelona, 6.vii.1952, S. Erlandsson, *C. truncata* J. P., det. J. de Beaumont (NRS). — USSR: ♀, Russia merid., *C. truncata*, det. H. Friese (MBUD). ♂ (diss.), Caucasus, Elisabethpol, *C. truncata*, det. J. D. Alfken (ZMB). ♀, Südl. Uralgebiet, Kargala b. Orenburg, H. Grothe 1915-17 (ZMB). Turkestan: ♂ (diss.), coll. v. Leonhardt (DEI). — Asia Minor (Turkey): 3 ♂, Kayseri Sultanhari, 1200 m and Kutahya, Akcakertik, 1400 m, vi-viii.1962, K. M. Guichard & D. H. Harvey (BM). ♂ (diss.), Anatolien, Ak-Chehir 1900, leg. Korb, *C. truncata*, det. H. Friese (ZSM). ♂ (diss.), Asia Minor, Kara-Tshehir, leg. Dr. Lendl (MBUD). 2 ♀, Taurien, Sudagh, viii.61, leg. Nordmann, *C. major*, det. H. Friese (ZMB). — Israel: 2 ♂ (diss.), Palestine, Jerusalem, 6.vi.41 & 25.vi.42, H. Bytinski-Salz (CBS). — Arabia: ♂ (diss.), Arabia, Kuwait, 6.v.1937,

Mrs. H. R. F. Dickson, pres. by Imp. Inst. Ent., *C. major* Mor., det. B. Uvarov 1937 (BM). — Iran: 31 ♂♀ (2 ♂ diss.), SW Persia, Escalera, 1900-61 (BM). ♂♀, Iran, base of Damawand Mt., 14.viii.1964, G. E. Bohart (BLU). — Algeria: 2 ♀, Hamman-Mescoutine, iv-v.1914, leg. W. R. & K. J. (BM).

Distinguished from *T. histrionicus* and *hirtus* by a combination of characters incorporated in the key. Most readily recognised by the shape of the scutellum, the relative lengths of the basal flagellar segments of the antenna, the L-shaped spots of gastral tergite 1, and also by the form of the white spots on the succeeding segments, which are more abruptly truncated inwardly than usual. The wing membrane is mostly very dark but there are exceptions proving this not to be a reliable character. *T. truncatus* has been well characterized by de Beaumont (1939), who also pointed out the variation in the extent of white markings. Alfken's earlier description of *T. nadigi* is very full but there can be no doubt about the synonymy presently established. The type (pl. 3 fig. 19) is a male selected by Alfken himself; though having most of the thoracic dorsum and scutellum clothed rather densely with grey-white tomentum, it does not differ structurally from *truncatus* (fig. 26). The females taken with it (pl. 3 fig. 20) are very different in regard to the thoracic pattern, which consists of the usual partly isolated spots, the scutellum at the same time lacking the abundant light hairs found in the male (see also de Beaumont, loc. cit.). In the type of *T. ramosa* var. *mucoorea* Friese (pl. 3 fig. 18), the anterior mesoscutal spots are larger and fused together laterally, only *ms* standing out clearly as a long white median band. All females of *T. curviscutum* Alfken are worn specimens having most of the thorax pubescence rubbed off; they do not differ in any way from similar individuals of *truncatus*.

Additional characters not mentioned before are the minute two-segmented maxillary palpus and the position of the ocelli. The length ratios between the interocellar and ocellorbital spaces were found to vary in both sexes, the latter fluctuating between 10 : 7.8 and 10 : 9, even in specimens from the same locality. Some variation exists in the contour of the sternal plates 7 and 8 of the male (figs. 25-27). The dorso-basal process of the gonostylus in all individuals examined is well developed, carrying robust finely branched marginal setae; it is either rather broad and but slightly convex (fig. 27), or more compressed and hollowed out beneath so as to appear narrower, as in fig. 26 of *nadigi*. This difference is, however, entirely due to the degree of expansion of the process.

Examination of the internal structures of *T. truncatus* seems to indicate fairly close relationship with *T. histrionicus* and *hirtus*, from both of which it can be easily distinguished when other characters are used. All agree in the configuration of the male 7th sternite, with its finely microsetiferous lobes, but whereas in *histrionicus* these lobes are separated by a narrow cleft, they are more widely distant in the other two, the emargination being widest (and devoid of setae at its bottom) in *truncatus*. On the other hand, the frayed and setiferous apex of the 8th sternite, rather unapparent in *truncatus*, is a distinctive feature shared alike by *histrionicus* and *hirtus*. The male genitalia also are rather similar in the three species, the differences being best understood by consulting de Beaumont's figures of the gonostylus in lateral aspect, and by comparing the accompanying illustrations.

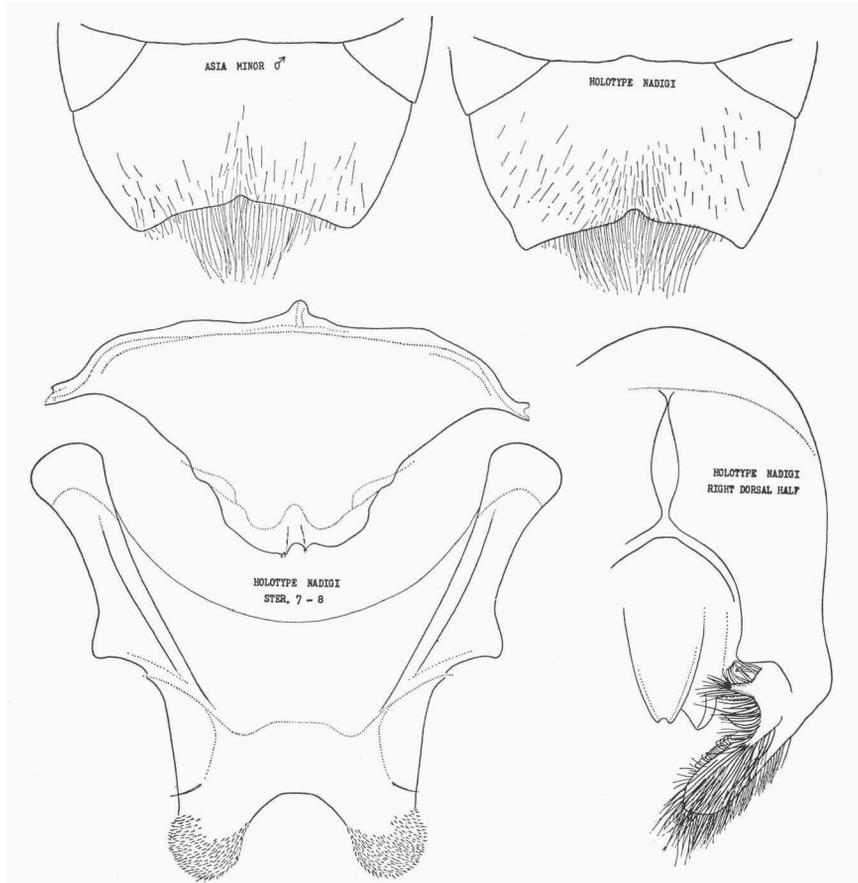


Fig. 26. *Thyreus truncatus* (J. Pérez), ♂ from Asia Minor and Morocco (holotype *Crocisa nadigi* Alfken). Scutella and terminalia.

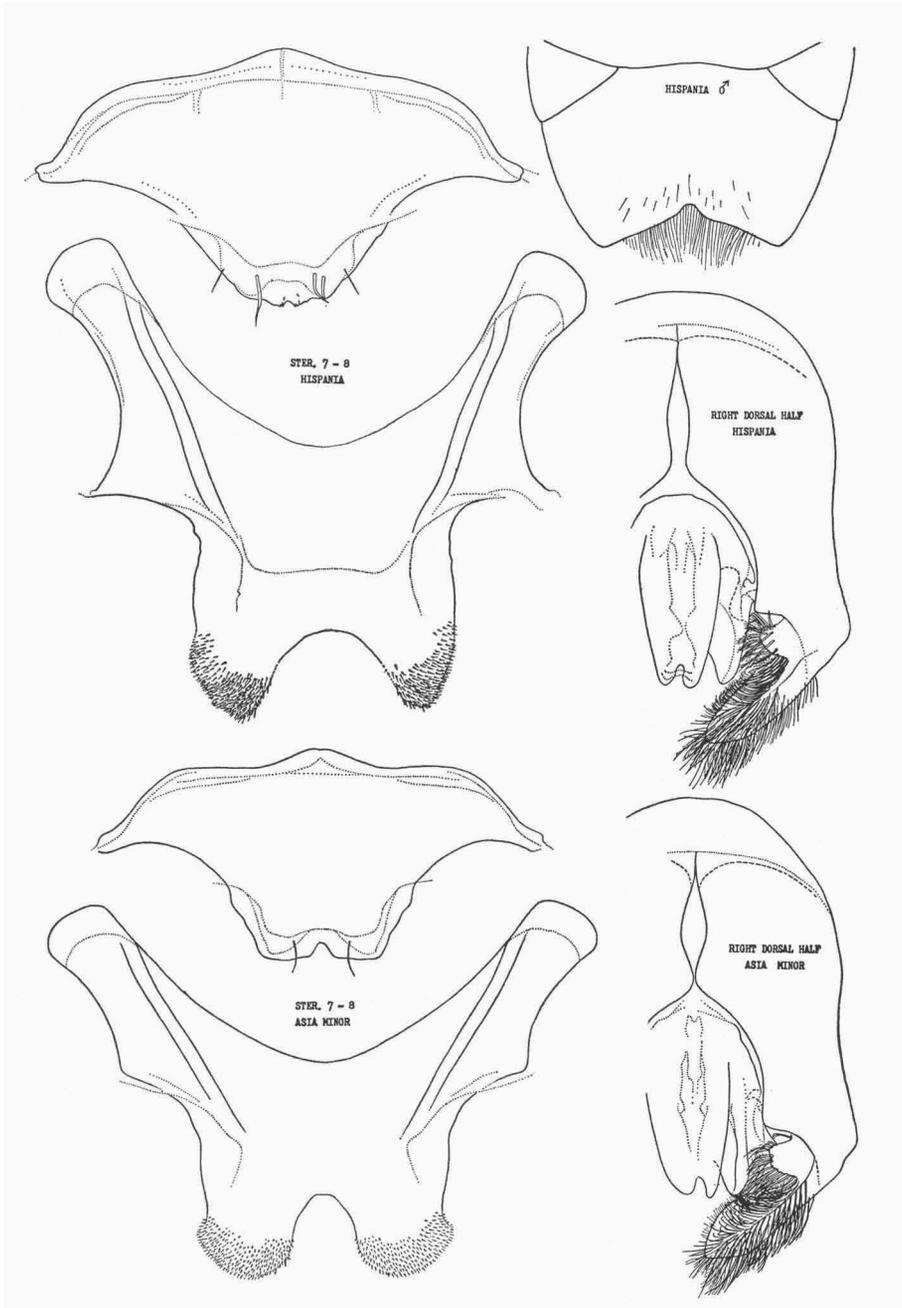


Fig. 27. *Thyreus truncatus* (J. Pérez), ♂ from Spain and Asia Minor. Scutellum and terminalia, after specimens from "Hispania" and ♂ terminalia after ♂ from Ak-Chehir.

The long series from Escalera in Iran (BM) average smaller in size than individuals from other localities, including in fact the smallest specimens I have seen, several among them measuring only 8.5 mm total body length. The two dissected males are quite typical as to their terminalia. Another small male from Asia Minor (Kara-Tshehir, fig. 25) differs in that the apex of tergite 7 is excised, by having additional white spots on tergite 6 and the sternites 3-5 white-spotted, which is unusual (see also de Beaumont, loc. cit.).

Host. — *Anthophora* (rect. *Amegilla*) *garrula* Rossi (sec. Bischoff, 1927; Iuga, 1958; Popov, 1967).

Distribution. — Southwest and central Europe; whole Mediterranean area into western Asia and Arabia.

### **Thyreus tricuspis** (J. Pérez) (pl. 4 fig. 21; and fig. 28)

1883. Pérez, Act. Soc. Linn. Bordeaux **37**: 312. — ♂ "algérienne" (*C. tricuspis* J. P.)  
 1895. Friese, Bienen Europa's **1**: 182 (orig. descr. quoted; not seen) (*C. tricuspis* J. P.)  
 1915. Dusmet, Mem. Real Soc. esp. Hist. nat. **8**: 333-334 (descr. ♀). — ♀ Mogador, Morocco (*C. tricuspis* J. P.)  
 1915. Dusmet, Bol. Real Soc. esp. Hist. nat. **15**: 258 (notes). — ♂ ♀ Morocco (*C. tricuspis* J. P.)  
 1921. Meyer, Archiv f. Naturgesch. **87** A: 78 (key ♂), 92-93. — ♂ hab. ign.; ♂ Syria (*C. tricuspis* J. P.)  
 1925. Friese, Konowia **4**: 30. — ♂ ♀ Aegypten [rect. Syria?] (*C. truncata* Pér. var. *niveicollis* n. var.) **syn. nov.**  
 1927. Alfken, Konowia **6**: 114, 116-118 (key ♀ ♂). — ♀ ♂ Cyrenaica (*C. tricuspis* J. P.)  
 1934. Alfken, Bull. Soc. R. Ent. d'Egypte **18** (1-2): 166, 168 (key ♀ ♂), 174 (notes). — Egypt; "auch Cyrenaika und Marokko; Syrien". (*C. tricuspis* J. Pér.)

Type material. — Algeria: ♂, holotype *Crocisa tricuspis* J. Pér., labelled: Type (red cadre), Bône 979 coll. J. Pérez (print) (MP). ♀, allotype by present designation, with same labels (MP). — Syria: ♂, holotype *C. truncata* var. *niveicollis* Friese, labelled: Syria 1899 (print), Aeg. (H. Friese's writing), *C. ? truncata* var., det. H. Friese 1911, *C. truncata* v. *niveicollis* Fr., Aeg. (large cadre, Friese's writing), TYPE (print on red), *C. tricuspis* Per. ♂, det. R. Meyer (ZMB).

Further material. — Algeria: ♂, Oran; ♀, Algérie; 2 ♀, Bône (one of these with Pérez' remark in reference book: 979, ♂ décrit dans ma Faune); all coll. O. Sichel 1867 (MP). ♂, Orléansville, coll. J. de Gaulle (MP). ♀, Sfax, Ducouret 57-50 (MP). ♂ ♀, Oran, Ernest André 1915 (MP). ♂ (diss.), Algerie 4965 (BM). — Morocco: ♀, Tanger, coll. J. de Gaulle (MP). ♂, Maroc, Marrakech, Oued Tensift, 29.iv.1965, H. Linsenmaier (CL). ♂, Maroc, Ifrane, 18-21.vii.1931, leg. Ad. Nadig,

*C. tricuspis* Per., det. J. D. Alfken 1933 (ZMB). ♀, Maroc, El Hajeb, 22.vii.1932, same collector & identif. label (ZMB). 2 ♀, Maroc, Asni, 10-14.vii.1932, same collector & identif. label (ZMB). — Tripolitania: ♂, Cyrenaica, R. U. Agrario, 15.vii.1924, 8221, Geo C. Krüger, *C. tricuspis* Per., det. J. D. Alfken (ZMB). — Israel: ♂ (diss.), ♀, Palestine, Bir Rechme, 8.v and 23.v, H. Bytinski-Salz (CBS). ♂ (diss.), S. Palestine, Deir El-Belah, 8 mi. of Gaza, iv.1917, E. E. Austin (BM). ♀, Israel, Jerusalem, 12-14.v.1951, P. M. F. Verhoeff (CV).

A stoutly built species with a large head, comparatively short legs, dark wings and sharply contrasting, pure white abdominal markings. Easily known by the shape of the scutellum and the presence of an additional white median spot at extreme base of first gastral tergite.

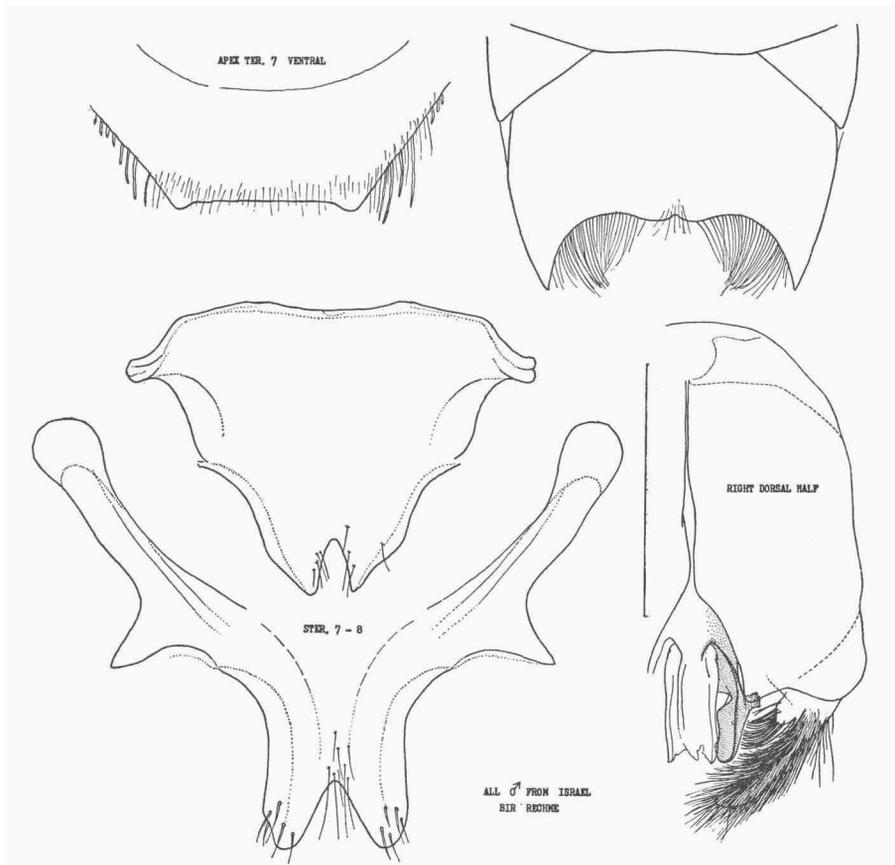


Fig. 28. *Thyreus tricuspis* (J. Pérez), ♂ from Israel. Scutellum and terminalia. Scale-line = 1 mm.

Male and female. — Maxillary palpus vestigial, one-segmented. Interocellar and ocellorbital distances subequal, length ratio varying between 10 : 9.5 and 10 : 9. White suberect pubescence covering mesoscutum of male not forming a definite pattern, extending back to level of tegulae, thereafter turning abruptly black, marked only with pair of smallish *pls* and *t*; dorsum of scutellum all black. Thoracic markings of female similar except anteriorly fairly distinct *ms* and vestiges of *mls* but *plsa* wanting. Legs without peculiarities; pad of dense felt-like hair at outer face of male mid tibia not enlarged; basitarsi and last tarsal segment nearly always partly white externally in both sexes.

Surface of exposed portion of male tergite 7 slightly concave, punctate and shining, the hind border polished and impunctate, margin often undulated with slightly produced and raised angles. Sixth sternite of male lacking impressed median area. Apical sternal plates and genitalia of male as shown in fig. 28.

A photograph of the type of *C. truncata* var. *niveicollis* Friese is given in pl. 4 fig. 21.

Evidently a rare species. I have not seen any European example or record in the literature. Meyer (1921) regards *Crocisa divisa* J. Pérez to be probably synonymous with *tricuspis*; this is, however, not so, the type of the former being identical with *T. histrionicus* (Ill.).

Distribution. — Southern and easternmost countries of the Mediterranean.

### **Thyreus nubicus** (Lepeletier) (fig. 29)

1841. Lepeletier, Hist. Nat. Ins. Hym. 2: 453-454, pl. 14 fig. 1 (insect), 1a-d (structures). — ♀ Nubie (*Crocisa Nubica* nov.)  
 1912. Strand, Mitt. Zool. Mus. Berlin 6: 298. —? sex, Tsad-See, Kamerun (*C. nubica* Lep.)  
 ?1921. Meyer, Archiv f. Naturgesch. 87 A: 105 (key ♀), 109-110 (quotations & references, partim ?). — ♀ Kamerun, Tsad-See; no descr. (*C. nubica* Lep.)  
 1933. Cockerell & Mackie, Stylops 2: 37 (key, sexes not stated!). — N. Nigeria and Sudan (*C. nubica* Lep.)

Material. — Egypt: ♂ (diss.), Egypt, coll. H. H. King 1913-42/3122 (print) (BM). — Sudan: ♂ (diss.), British Sudan, Darfur Province, 45 mi. NE of Fasher, ii.1922, Admiral H. Lynes (print) 1922-262 (BM). ♀, Sudan, W. Darfur, S. Jebel Murra, Kallikitting, 4450 ft., i.vi.1932, leg. M. Steele (print), *nubica* Lep., det. D. B. Baker (BM). ♂, Sudan Govt., Menzi River, 22.iii.1911, H. H. King (written), Ent. Coll. WTRL. C 4785, pres. by Imp. Inst. Ent. 1933-192, *C. nubica* Lep., det. T. D. A. Cockerell (BM). ♀, Sudan Govt., Khartoum, leg. H. H. King, 10.iii.1924 (written),

Ent. Coll. WTRL 19727 and C4784, pres. by Imp. Inst. Ent. 1933-192, *C. nubica* Lep., det. T. D. A. Cockerell (BM). — Nigeria: ♀, N. Nigeria, Azare, 1926, Dr. Ll. Lloyd (print), pres. by Imp. Inst. Ent., *C. nubica* Lep., det. T. D. A. Cockerell (BM). All above specimens over drawer-label "*dimidiatipuncta* = *nubica* Lep.", det. D. B. Baker.

The present specimens of this very handsome bee resemble each other closely and show no likeness to *dimidiatipuncta* (Spin.) nor to any other Mediterranean or West Asiatic species. By its large size, clear-cut mark-

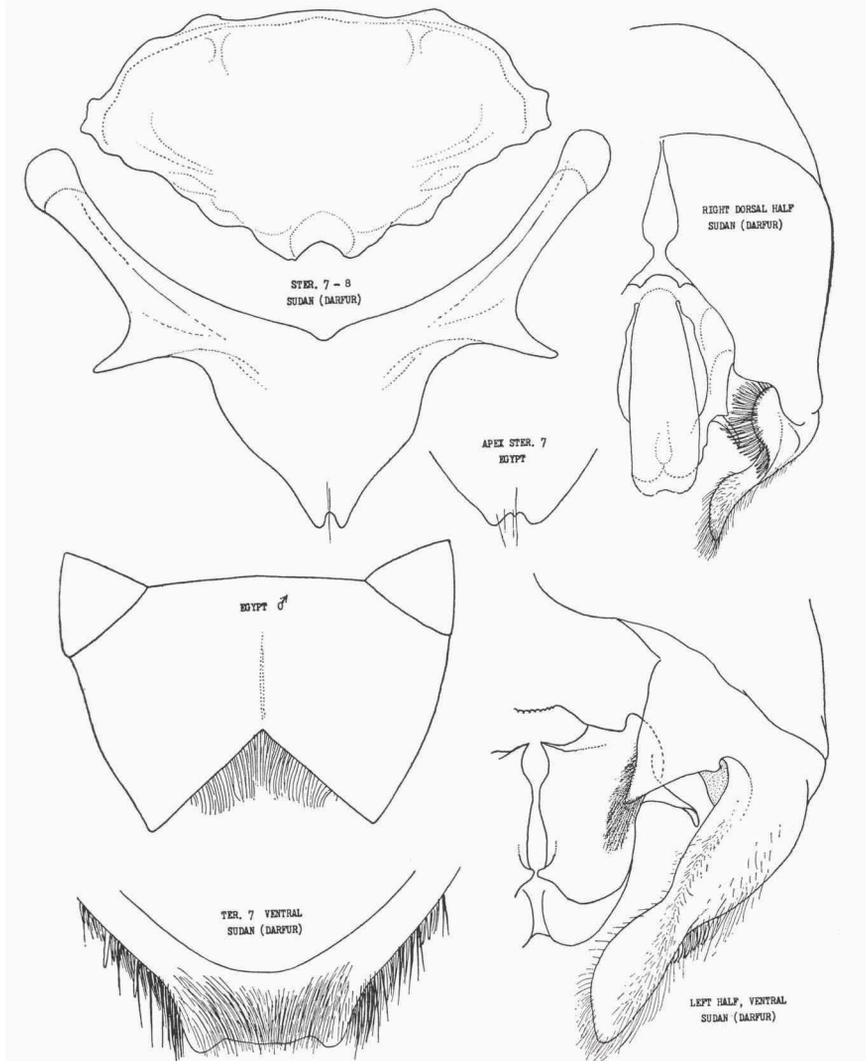


Fig. 29. *Thyreus nubicus* (Lep.), ♂ from Sudan and Egypt. Scutellum and terminalia.

ings and very dark fore wings, *T. nubicus* strongly recalls *T. surniculus* Lieft., from India and Ceylon, described by me earlier (Lieftinck, 1959). Here, it is true, the resemblance ends, for in *nubicus* the dorsolateral white spots on the thorax are coalescent and the scutellum is less deeply notched, this plate at the same time having a distinct median longitudinal sulcus which is lacking in *surniculus*. The male genitalia also are shaped differently (fig. 29), yet the two species may be nearly related.

Lepeletier's description is insignificant but the illustrations are good, serving well to its recognition. *T. nubicus* was recorded by Cockerell & Mackie (loc. cit.) from North Nigeria and Sudan, some of these specimens being now before me. The authors placed it in a key with three other white-haired African congeners "of this immediate alliance" (i.e. forms having an unspotted scutellum with W-like incision), but I doubt whether the latter are at all related. I am not convinced, either, that all specimens mentioned by Strand and Meyer are really *nubicus* because the first author compares it with *Crocisa sejuncta* Sauss., a very different species from Madagascar.

In both sexes of *T. nubicus* the interocellar and ocellorbital distances are in the ratio of about 10 : 8.5.

Distribution: Northeast Africa to Nigeria.

**Thyreus bimaculatus** (Radoszkowski) (pl. 4 fig. 22; and fig. 30)

1893. Radoszkowski, Bull. Soc. Imp. Nat. Moscou, n.s. 7: 175-176, pl. 5 fig. 24s (♀ scutellum). — ♀ Chine (*Crocisa bimaculata* n. sp.).

1921. Meyer, Archiv f. Naturgesch. 87 A: 140 (key ♀), 147 fig. (scutellum); descr. quoted, no comments (*C. bimaculata* Rad.)

1958. Lieftinck, Nova Guinea, new ser. 9: 25 (list).

1962. Lieftinck, Zool. Verhand. Leiden 53: 204 (spec. incert.)

Type material. — C h i n a: ♀ (left fore wing missing), holotype *Crocisa bimaculata* Rad., labelled: China (print on green), Coll. Radosz (print), *bimaculata* (Radoszkowski's writing) (ZMB).

The specimen is unique and the photograph (pl. 4 fig. 22) as well as the drawings of scutellum and pygidial plate (fig. 30) may give an impression of its general appearance and morphology. It has the facies of the eastern Mediterranean *T. nubicus* (Lep.) and *parthenope* sp.n., recalling also the Indian *surniculus* Lieft. in certain respects. At once distinguished from *nubicus* and *surniculus* by the spotted scutellum and much lighter wings. The female of *parthenope* is still unknown but in that species the white hair fringe projecting from beneath scutellum is short and broad whereas in *bimaculatus* it is confined to the central part, at the same time extending far beyond the hinder angles.

Interocellar and ocellorbital distances in the ratio of 10 : 7.5. Antennae slender, third segment 1.6 times longer than its apical width and only little longer than the succeeding segments.

Although *T. bimaculatus* in stature and texture resembles the three species mentioned above, I doubt whether they are at all related. At any rate I do not venture to predict anything about the form of the male terminalia of *bimaculatus*.

Distribution. — China.

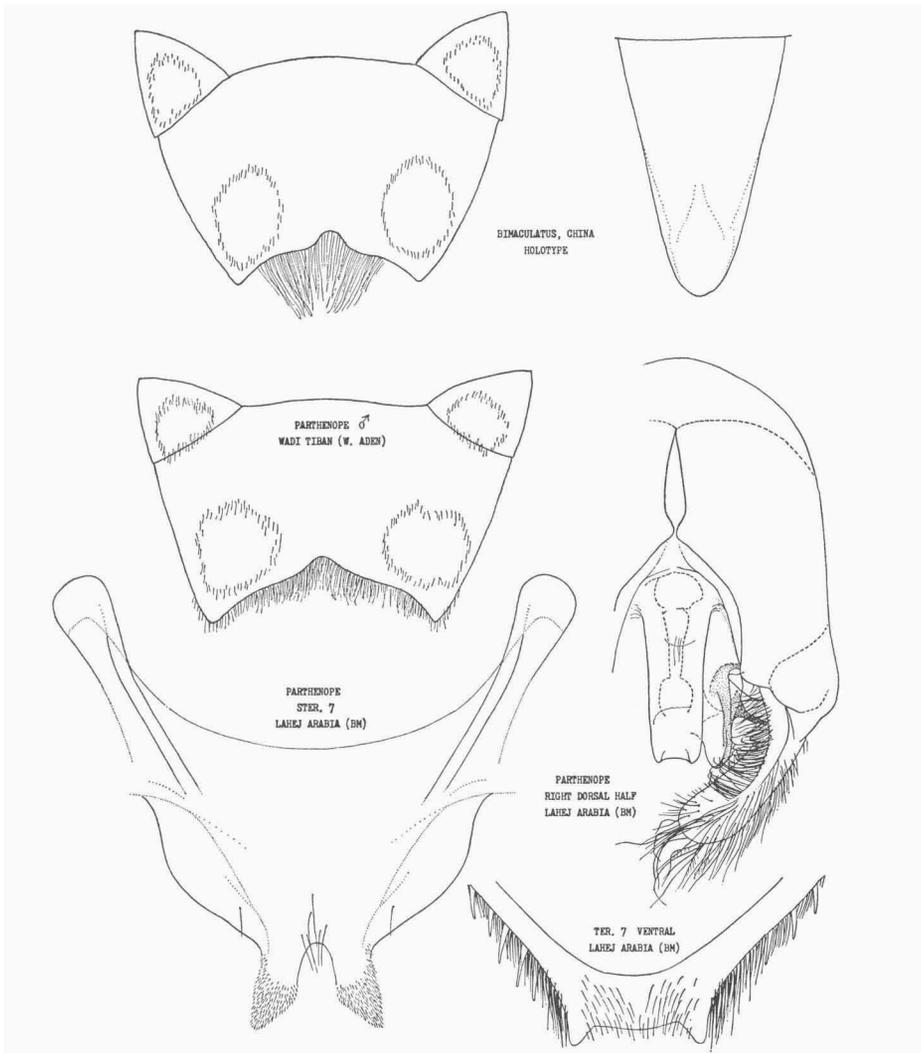


Fig. 30. *Thyreus bimaculatus* (Rad.), scutellum and pygidial plate of ♀ holotype from China. — *T. parthenope* sp.n., ♂ terminalia after specimens from Arabia and Egypt

**Thyreus parthenope** sp.n. (fig. 31)

1921. Meyer, Archiv f. Naturgesch. **87** A: 101 (pars: ♂ Lakej, note) (*C. dimidiatipunctata* Spin., part.)

1934. Alfken, Bull. Soc. R. Ent. d'Egypte **18**: 171-172 (descr. ♂ Aden) (*C. histrio* sens. R. Meyer; sub 2. *C. gibba* R.M.)

Material. — S. A r a b i a (Hadramaut): ♂ (dissected), Lakej-Aden, 12.2.95, Coll. Bingham (written on dark blue), *C. scutellaris* Fabr. ♀ (T. C. Bingham's writing), *C. histrio* F., det. J. D. Alfken 1933, *C. dimidiatipunctata* Spin., det. R. Meyer (ZMB). 2 ♂ (diss.), Lahej, Arabia, 20 & 21.2.95 (written), Col. C. S. Nurse collection, BM 335-1920-72 (print) (BM & ML). ♂ (diss.), W. Aden Protect., Wadi Tiban, NW of Jebel Jihaf, ca. 3800 ft., 21.x.1937, R. M. Exp. to SW Arabia, H. Scott & E. B. Britton, BM 1938-246 (BM). — E g y p t : ♂ (diss.), Aegypten, Ehrenberg S. (print on light green), 700/L|Var| *braunsiana* (unknown pencil writing) (ZMB). Holotype ♂, W. Aden Protect., Wadi Tiban, ca. 3800 ft., 21.x.1937 (BM).

Male. — Black with pure white markings. Antenna long and rather thick, shaped as described in the key, apical segments 11-12 squarish; paired rhinaria closely approximated and slightly converging apically; antennal scape devoid of longish hairs. Body puncturation fine and rather superficial, punctures on thoracic elements and abdomen smaller than interspaces. Pubescence of head pure white, few dark hairs present only on labrum and mandibles. All white hair spots on dorsum and sides of thorax sharply defined: *lpn*, *als*, *plsa* (which stands out clearly as a narrow curved stripe) all coalescent roundabout; *ms* long, pointed caudad and ceasing at level of circular *mls*; *pls* conspicuous, triangular in outline, detached from *plsa*; dorsal half to three-fifths of thoracic sides as well as *lp* tuft all white, lower boundary straight; dorsal pubescence of spiracular cover jet-black. White spots on tegulae, parascutella and scutellum conspicuous.

Legs rather short and robust but of simple structure, inner face of mid tibia quite flat, rather shiny and scantily pubescent, apex simply truncated; outer face of hind basitarsus not hollowed out, pubescence concealing most of the surface. Fore and mid tibiae entirely clothed with white felt-like pubescence externally but white hair on outer face of hind tibia longer and replaced by black at distal two-fifth to one-third; white external streaks also along upper margin of all basitarsi and ultimate tarsal segments.

Wing membrane grey-brown especially along main veins, with subhyaline streaks and spots in cell-centres and beyond submarginals; hence membrane much darker than in *T. hyalinatus* but more variegated than in species like *ramosus* and *histrionicus*.

Gastral tergites 1-6 with regular row of lateral spots shaped much as in *ramosus* and allies, the U-shaped marks of 1 very pronounced; all spe-

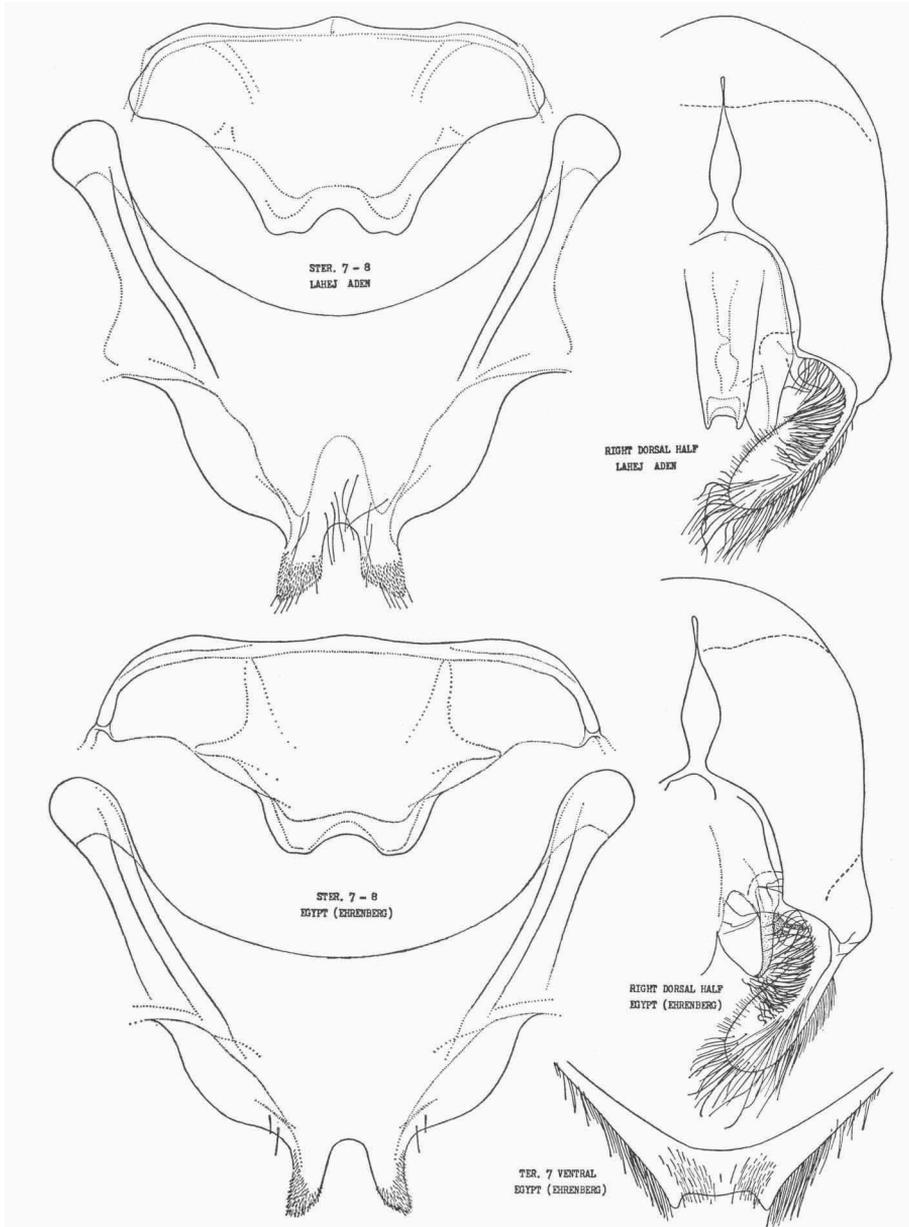


Fig. 31. *Thyreus parthenope* sp.n., scutellum of ♂ holotype from Wadi Tiban (Aden) and terminalia after two ♂ from Lahej (Arabia).

cimens with lateral hair spots on sternites 2-4 or 2-5. Median impressed area of sternite 6 feebly indicated, entirely covered with dark hair. Dorsal surface of tergite 7 concave, densely punctate, marginal hairs short and dense, apex shallowly emarginate, the hinder angles obtusely tuberculate, margin between tubercles almost straight (fig. 31). Apical sternal plates of very characteristic shape. Genital capsule large, 1.8-2.2 mm long; gonostylus half as long as gonocoxite, its apex broadly rounded, oval in dorsal view, outer face and all along margin clothed with long, finely plumose bristle-like hairs which at the tip are at least equal in length to the diameter of gonostylus; no basodorsal process: upper margin merging gradually into posterior border of gonocoxite, its fringing bristles closely set; ventro-basal process short, broadly triangular, apex evenly rounded. From the inside at the apex of the gonocoxite there arises, moreover, a triangular process pointing inward towards the bridge of the penis valves (not shown in the figures).

Variation. — The five males before me vary markedly in size, the body of the type and one paratype (Lakej-Aden; ZMB) measuring 14.0-14.2 mm, the other three being only 10-11 mm long. The white pubescence of the scutellar plates in the large example from Lakej is rubbed off and has disappeared completely, the insect thus simulating a different species. The terminalia of all males were examined and found to vary but little (cf. figs. 30 and 31).

The above male from Egypt (leg. Ehrenberg) labelled "*braunsiana*" is probably the same as the one mentioned by Meyer (loc. cit.: 124) as *T. tschoffeni* (Vachal, 1903). This is an earlier described species than *C. braunsiana* Friese, 1905, which Meyer has no doubt is only a synonym of the former. I have not seen the type ♂ of *tschoffeni*, whose finer structures should be investigated in order to characterize it.

This new species has apparently no near allies in the Palearctic Region nor does it fit any of the numerous described forms occurring in the Ethiopian fauna. The male gonostylus is somewhat similar to that of *T. ramosus* inasmuch as in neither of the two it shows any sign of a basodorsal process (cf. figs. 30-31 and 33). The presence of white spots on the scutellum and parascutella as well as the unique structure of the 7th sternite will facilitate the recognition of *parthenope*, the first character in all probability applying also to the female, which is still unknown.

Distribution. — Egypt and Arabia.

**Thyreus ramosus** (Lepeletier, 1841) (pl. 4 figs. 24-26; and figs. 32-33)

Selected references:

1841. Lepeletier, Hist. Nat. Ins. Hym. 2: 451. — ♀ ♂ France et Eur. mér.; Oran, Egypte (*Crocisa ramosa* nov.)

1883. Peréz, Act. Soc. Linn. Bordeaux **37**: 309-310. — Europa mer.; Algeria; Caucasus (*C. ramosa* Lep.)
1893. Radoszkowski, Bull. Soc. Imp. Nat. Moscou, n.s. **7**: 167-168 (♀ only!), pl. 4 fig. 6s (♀ scutellum). — ♀ Transcaspie (*C. ashabadensis* n. sp.) Syn. nov.
1893. Radoszkowski, Ibid.: 168, pl. 4 fig. 7a-c, s (♂ structures). — ♂ Caucase (*C. caucasica* n. sp.) **Syn. nov.**
1886. Radoszkowski, Horae Soc. ent. Ross. **20**: 18-19. — ♀ Transcaspia (*C. rufa* n.sp.) **Syn. nov.**
1895. Friese, Bienen Europa's **1**: 173-174 (key ♀ ♂), 177-178. — Europa (*C. ramosa* Lep.)
1904. Saunders, Trans. Ent. Soc. London: 623 (Majorca), 658 (Barcelona); no descr. (*C. ramosa* Lep.)
1905. Dusmet, Bol. Real Soc. esp. Hist. nat.: 156-157 (key ♀ ♂), 158-159. — Spain, various locs. (*C. ramosa* Lep.)
1915. Dusmet, Mem. Real Soc. esp. Hist. nat. **8**: 333 (distrib. note). — ♂ ♀ Morocco (*C. ramosa* Lep.)
1915. Dusmet, Bol. Real Soc. esp. Hist. nat. **15**: 257 (notes). — Morocco (*C. ramosa* Lep.)
1921. Meyer, Archiv f. Naturgesch. **87** A: 77-78 (key ♀ ♂), 98-99 (notes, references, distrib.). — ♂ ♀ Ungarn, Tirol, Schweiz, Südfrankreich, Spanien, Griechenland, Italien, Cypem, Kleinasien, Turkestan, Transkaspien, Nordafrika, Nubien (*C. ramosa* Lep. + var. *albociliata* n. var., lectotype ♂ hab. ign.; ♂ Nubien). **Syn. nov.**
1921. Meyer, Ibid.: 77-78 (key ♀ ♂), 99, notes. — ♀ ♂ Egypt (*C. ashabadensis* Rad.)
1922. Meyer, Ann. Mus. Nat. Hung. **19**: 182-183, notes (*C. ramosa* Lep.)
1925. Friese, Konowia **4**: 30. — ♂ Kleinasien (*C. affinis* var. *minor* n. var.) **Syn. nov.**
1926. Alfken, Senckenbergiana **8**: 103. — Egypt (Kingi) (*C. ashabadensis* Rad.)
1927. Alfken, Konowia **6**: 114, 118-119 (key ♀ ♂). — ♀ ♂ Cyrenaica (*C. circulata* sp. n.). **Syn. nov.**
1927. Bischoff, Biologie Hym. Berlin: 399 (host record) (*C. ramosa* Lep.)
1929. Alfken, Mitteil. Entom. Ver. Bremen 15-17 Ber. 1927-1929, p ? (sep.) — ♀ ♂ Malta (*C. circulata* Alfken)
1930. Schmiedeknecht, Hym. Nord- u. Mitteleuropas: 831-832. — ♀ ♂ "Südeuropa bis Ungarn" (*C. ramosa* Lep.)
1934. Alfken, Bull. Soc. R. Ent. d'Egypte **18** (1-2): 166, 169 (key ♀ ♂), 174. — Egypt (*C. ramosa* Lep. + *C. ashabadensis* Rad.)
1938. Alfken, Mem. Soc. Ent. Ital. **16**: 108, no descr. — Sardinia (*C. ramosa* Lep.)
1939. De Beaumont, Ann. Soc. Ent. France **108**: 163, 165 (key ♂ ♀), 165, fig. 2 (♂ genit.) 7, 9, 15 and 19 (♂ ♀ struct.). — Europe, Afrique du Nord, Asie Mineure, Egypte (*C. ramosa* Lep.)
- ?1947. Yasumatsu, Mushi **18**: 33, no descr. — ♀ Inner Mongolia (*C. ramosa* Lep.)
1957. Moczár, Apidae in Fauna Hung. **19**: 1334-1335, fig. 13 (♀ insect). — Hungary (*C. ramosa* Lep. + var. *albociliata* Meyer)
1958. Iuga, Anthophorinae in Faun. Republ. Pop. Romine **9** (3): 215-216, 218. — Rumania, various locs. (*C. ramosa* Lep.)
1958. Moczár, Rovart. Közlem. (Fol. Ent. Hung.) n.s. **11** (24): 416. — Hungaria, various locs. (*C. ramosa* Lep. + var. *albociliata* Meyer)
1965. Leclercq, Bull. Inst. agron. et Stat. Rech. Gembloux **33**: 116. — S. France, Spain, Portugal, Italy, Istria, Dalmatia; flower record.
1967. Popov, Trudy Zool. Inst. Moscou **38**: 102, 302-303 (host and flower records)
1967. Vergés, Miscelánea Zoológica, Barcelona **2** (2): 102 (key ♀ ♂), 102-104, fig. 3, 8, 9 and 11. — Spain.

Type material. — ♀, lectotype by present designation of *Crocisa ashabadensis* Radoszkowski, labelled: TRANS-CASPIA (black print on yellow), Coll.

Radosz. (print), *ashabadensis* Rad. (Radoszkowski's writing), *ramosa* Lep. (?), det. Friese 1907 (ZMB). — ♀, syntype *C. ashabadensis* Radosz., labelled: TRANS-CASPIA (black on yellow, ex coll. Radoszkowski, *Crocisa ashabadensis* Rad. ♀ Tipo D. Radoszkow (Gribodo's writing) (MCG). — ♀, syntype *C. ashabadensis* Radosz., labelled: CERSZAB (print on yellow), Coll. Radosz (print), *ramosa* Lep. (?) det. Friese 1907 (under drawer-label *C. ashabadensis* Rad., ZMB). — ♀, holotype *Crocisa rufa* Radoszkowski, labelled: Col. Radosz (print), *Crocisa rufa* Rad. (Radoszkowski's writing), Tach ken (print), Apra-Majapr (? , unknown writing), *C. affinis* Mor., det. Friese 1908 (ZMB). — ♂ (dissected), lectotype *C. albociliata* R. Meyer, black square, sine loc., Type (print on red), *C. major*, det. Friese 1896, *C. ramosa* var. *albociliata* R. Meyer n. var., det. R. Meyer (ZMB). — ♂ (dissected), holotype *Crocisa affinis* var. *minor* Friese, labelled: Asia min. 1890 (print), Type (print on red), *Crocisa hyalinata* Vach. (R. Meyer's writing), *Crocisa affinis* v. *minor* Fr. As.m. (large cadre, Friese's writing (ZMB).

Of this common Mediterranean species I have examined more than four hundred individuals from all over its distributional area. In western Europe *T. ramosus* probably reaches its northernmost limit at St. Rémy-la-Varenne (Marne-et-Loire) and the environs of Paris (MP). In France it becomes increasingly more abundant towards the south whence I have examined and dissected specimens from the provinces of Rhone (Lyon), Vaucluse (Carpentras), Var (Toulon, Draguignan, Callian, St. Aygulf), Htes-Alpes (Barret-le-Haut, 800 m), Pyrén.Or. (Vernet-les-Bains, Argelès-Plage), Hérault (Montpellier), Bouches-du-Rhône (Port de Bouc, Arles, Marseille), Alpes-Mar. (Menton, Plateau S. Michel), Hte-Garonne (Toulouse), and in the west from Char.-Mar. (Royan) and Gironde (Bordeaux). No German or Austrian records can be given<sup>1)</sup> but I have seen an example from Parkan (leg. Zavadil) in Czechoslovakia. Localities in Switzerland are restricted to the south: Sierre, Martigny and Brissago. In northern Italy it occurs at Gressan (near Aosta), Fassano (Lago di Garda), Agra (prov. of Como, Varese distr.), Val Pellino (Piemonte), Bolzano, Merano, Milano, Padova, Bologna — the species becoming more frequent southwards. I have seen many individuals from Spain and Portugal, Ibiza and the Balearic islands, Corsica, Sicily and Malta. Several records are known from Hungary, Rumania (Sihlele and Bucarest) and Croatia (Jougoslavia), while *ramosus*

1) In the Berlin Museum is a specimen labelled "Bieselang, Berlin, Gerstäcker leg."

appears to be common along the Adriatic coast (Istria, Dalmatia and Albania). Many were examined also from the Ionian islands, the whole of Greece and most islands in the Aegean, including Crete and Rhodos.

The following material, studied from outside southern Europe, has been arranged more or less geographically from west to east.

CANARY IS.: 3 ♂ (diss.) 4 ♀, Fuerteventura, above Ampuyenta, 500 m, 29.iv.1964, and Puerto del Rosario, 6.v.1964, K. M. Guichard (BM). — MOROCCO: ♀, Maroc, Agadir, vii.1931, leg. Nadig, *C. ramosa*, det. J. D. Alfken 1933 and ♂, Maroc, Asni, vii.32, leg. Nadig, *C. circulata* mihi, det. J. D. Alfken 1932 (ZMB). ♀, Maroc, Midelt, leg. P. Pallary 1919, sub *C. tricuspis* (MP). Several ♂, various locs. & coll., Middle and High Atlas, up to 6500 ft. (BM); Azrou, 19.vii.1963, W. Linsenmaier; Marrakech and Taroudant, P. F. M. Verhoeff; Asni-Imlil, 1150-1800 m, 1-6.vi.1966 and 14.vii.1963, M. A. Lieftinck & W. Linsenmaier; Marrakech, Oued Tensift, 10.vi.1966, M. A. Lieftinck (CL, ML, CV). — ALGERIA: ♂ 2 ♀, Alger, Mascara, leg. Cros (ZMB). ♀, Blidah-Medeah, vii-viii. 84, leg. Quedenfeldt (ZMB). ♂, Alger, leg. Richter (ML). ♀, Algiers (OUM). Several ♂ (diss.) ♀, le Tarf, Bab el Oued and Biskra, v. 1913, leg. Bequaert (ZMB, BM). ♂♀, Bône (BM) and several other locs. (MP). ♀, Sahara, Messouat (IRSN). — TUNESIA: ♀, Monastir, leg. Santschi (ZMB). ♂, Carthago, leg. Handschuh, *C. ramosa* Lep., det. J. D. Alfken (ZSM). — TRIPOLITANIA: Series ♂♀, Leptis Magna (BM). ♀, Tripolis, Oase Lmaia b. Zavia, x.1931, coll. Hecht (ZMB). — EGYPT: Series ♂♀ (several ♂ diss.), Meadi, Cairo, Tura near Cairo, Mansouriah, Helouan, Giza, Gabal Elba (2 ♂ diss., i.1933, H. Priesner), various dates & coll. (ZMB). 2 ♀, Memphis, leg. O. Schmiedeknecht (MBUD). ♂ (diss.), Heliopolis, 21.4.96, O. Schmiedeknecht, *C. ashabadensis* Rad., det. R. Meyer (ZMB). ♀, Egypt, *C. ashabadensis* Rad., det. J. D. Alfken 1931 (NAMP). 2 ♂ (diss.) 2 ♀, Egypt, Gebel Elba, 1.1933, H. Priesner, *C. ramosa* Lep. (1 ♀), det. J. D. Alfken (CP). ♂ (diss.), Aegypten '97, Helouan, O. Schmiedeknecht (NMW). ♀, Gizah, vi.1929, H. Priesner, *C. dimidiatipunctata*, det. J. D. Alfken 1932 (CP). Series ♀, Meadi, various dates, H. Priesner (CP). ♂ (diss.) 2 ♀, Egypt, Sids, 26.v.1966 (♂♀) and Saqqara, 10.v.1966 (♀), P. M. Marsh (USNM); ♂ (diss.), id., Giza, 19.v.1965, K. V. Krombein (USNM); 2 ♀, id., Esbet Nakhlé, 29.v.1913 & 7.v.1923, Coll. Anastase Alfieri, one with *C. scutellaris*, det. Story 1914 and *C. ashabadensis*, det. J. D. Alfken 1928 (USNM). — SUDAN: ♂ (diss.), Sudan Govt., Er Kowitz (BM) — ARABIA: 2 ♀, Ktubu, leg. G. W. Bury, and Muscat, leg. A. S. G. Jayakar (BM). Several ♂ (diss.) ♀, Arabien, leg.

Ehrenberg (ZMB). ♂ (diss.) 2 ♀, Arabia, Djedda, Botta 288-39 (MP). ♀, Hadramaut, W. Aden Protect., Dhala, ca. 4800 ft., 28.ix.1937 (BM). — I s r a e l : ♀, Jordan valley, Beisan (BM). ♂ (diss.), Palestine, Akka, coastal zone (BM). ♀, Shefayyim, N. of Herzliyya, 4.vi.1967, C. A. W. Jeekel (MA). Long series ♂ (several diss.) ♀, Jerusalem, Jericho, Tiberias, Bat Jam, Ramat Jam, Adu-Kabir, Ejn Geddi, Kirj Awassin, Benjamina and Beersheba, various dates, leg. H. Bytinski-Salz & P. F. M. Verhoeff (CBS, CV, ML). — S y r i a : ♂ (diss.), Syria (MBUD); 2 ♀, Syria, Beyruth (ML). — C y p r u s : several ♂♀, various locs. (MBUD, NRS, MP, BM, ML). — A s i a M i n o r (Turkey): ♂♀, Anatolien, Ak-Chehir, 1900, leg. Korb (ZMB). 2 ♀, Konia and Terapia (CBS). Series ♂♀, Turkey, Kondili, 13.v.1930; Konia, 8.viii.1951; Terapia, 10.vii.1930, leg. H. Bytinski-Salz (CBS, ML). ♀, Asia Minor, Brussa, vii.1900, Dr. Werner (NMW). ♀, Brussa 1863, leg. Mann (ZMB). ♀, Taurus, Seituw (?), viii.1930, *C. ramosa* var. *albociliata*, det. Stöcklein (ZSM). — I r a q : 3 ♂ (1 diss.) 3 ♀, Iraq, Bagdad, coll. Dr. Kálalová (NAMP). — I r a n : ♂ 2 ♀, Persien, Elburs, 2000 m, Chehor Dag and Meshediser, vii.1927, leg. G. Heinrich, *C. major*, det. J. D. Alfken (ZMB). 3 ♀ [Iran ?], Hawamdien, 10-20.vii.1925, sub *C. ashabadensis* (ZSM). ♂ (diss.) ♀, Persia, Schahkah, ded. Staudinger (ML). 2 ♂ (diss.), Kurdistan, Shakhlawa, Dr. Kalalová-Di Lotti (NAMP). — A f g h a n i s t a n : ♂ (diss.) 3 ♀, E. Afghanistan, Umgeb. Kabul, 1740 m, 17. ix.1952 and Darufulun b. Kabul, 1800 m, 17.vi. 1952, J. Klapperich (MKB, MBUD). — U S S R : ♀, Bessarabien, Tighina, vi.36, leg. Hering (ZMB). ♂ (diss.), Caucasus, Armenien, Eriwan, 29.vii. 1927, Univ.-Garten, leg. W. Ramme, *C. affinis* Mor., det. J. D. Alfken (ZMB). ♀, Kazakhstan, Inderskischer Salzsee, M. Bartel (ZMW). ♂ (diss.), Transcaspien, Golodnaja Steppe [Kazakhstan], vii.1901, leg. Heymons & Sauter (ZMB). ♂ (diss.), Turkestan [Uzbekistan], Khodzhent Hills, Samarkand prov. (BM). ♀, Turkestan merid., Capus Bonvalot 1881 (MP). ♂ (diss.), E Turkestan, Djarkeuch, H. Rolle vend., *C. ramosa*, det. H. Friese 1912 (OUM). ♂ (diss.) 3 ♀, Tschardschui [Thardjou] 1913, leg. G. von Rennenkampff (ML). — H i m a l a y a : ♂, Himalaya, Mene-strier, coll. O. Sichel 1867 (MP). — C h i n a : ♂ (diss.), Tchi-li, De Joannis 1898 (MP).

The proper status of *T. ramosus* has been set forth by de Beaumont (1937), whose characterization distinguishes it adequately from all more familiar species. The male is very well-marked structurally and easily recognized when examining the genital armature. The identification of females offers greater difficulty on account of the extraordinary similarity in facies shown

by some near allies, like *albolateralis* Ckll., from India, and the two regional species *ramosellus* Ckll. and *priesneri* sp.n. The first has been redescribed in my previous account (Lieftinck, 1962), the last is known only from a single male. As to *ramosellus*, there is a possibility that some females now assigned to *ramosus* are in reality the former species, no points of distinction between them having been found that are seriously at variance with the characters of either.

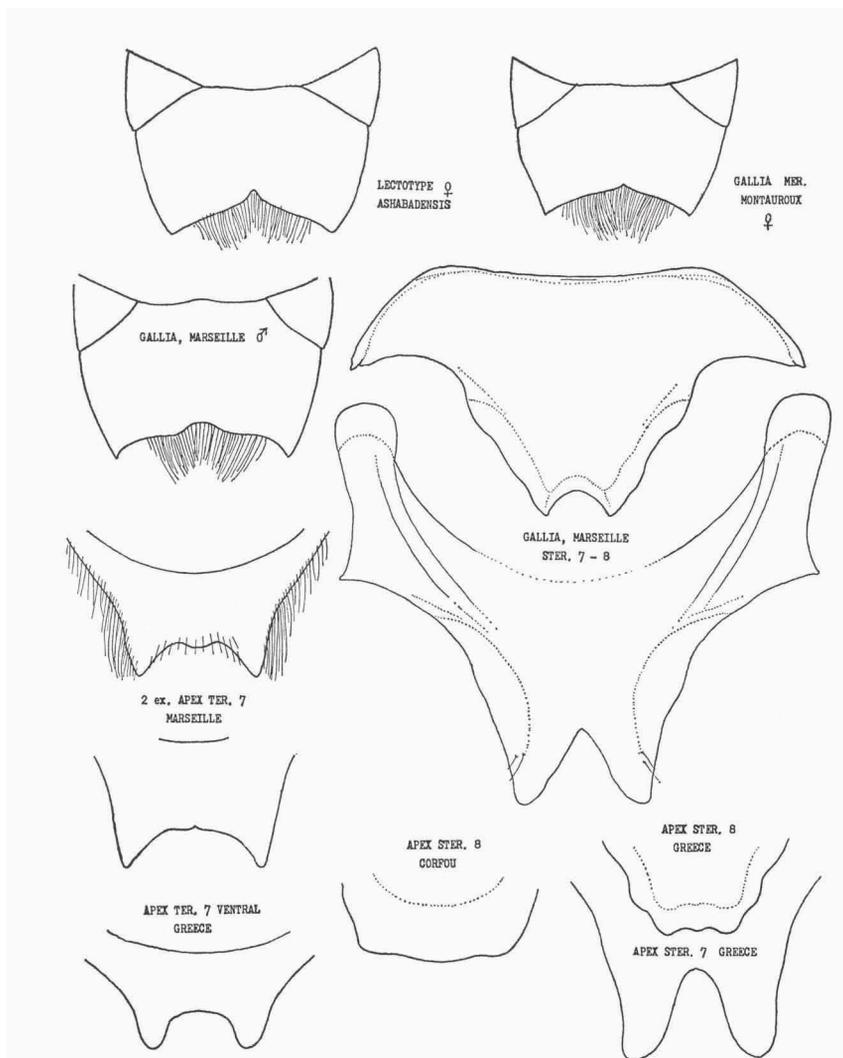


Fig. 32. *Thyreus ramosus* (Lep.), from Askhabad (Kazakhstan) and various Mediterranean localities. Scutella (♀ lectotype *Crocisa ashabadensis* Rad., and ♂ ♀ from France) and ♂ terminalia.

In respect of dimensions, shape of scutellum and extent of white pubescent markings, *T. ramosus* exhibits an even greater variation than some non-related species like *scutellaris* or *affinis*. In doubtful cases, especially when identifying specimens originating from eastern countries of the Palearctic region, the internal sexual organs of the male should always be investigated (figs. 32-33).

Characters not mentioned in the key are the vestigial maxillary palpus, which may consist either of an undivided rudiment or of two equally short segments. In both sexes the interocellar and ocellorbital distance ratios are approximately as 10 : 7.5.

For the synonymy of this bee, see the above references. The sinking of some names as synonyms of *ramosus* needs explanation. A re-examination of Radoszkowski's females of *C. ashabadensis* Rad., 1893, has revealed without doubt that these are identical with indisputable *ramosus*. The sexes were wrongly associated by Radoszkowski, but since the specimen first described is a female of *ramosus*, I have selected this as the lectotype of *C. ashabadensis* Rad. (pl. 4 fig. 24). The male could nowhere be traced and may have been lost. But judging from Radoszkowski's sketches of the genital armature, the opposite sex of *ashabadensis* is clearly not conspecific: it corresponds very well with a dissected male of *T. picicornis* (Mor.), discussed in the following pages. A second species unnecessarily described as new, is *C. caucasica* Rad. — whereabouts of the type equally unknown, the male being untraceable. However, the figures of the scutellum and male genitalia of this example are sufficiently clear to establish its identity as the true male of *T. ramosus*; it stands to reason that the name *caucasica* should therefore be regarded as a pure synonym of *ramosus*. A third Radoszkowskian species involved in synonymy is *Crocisa rufa* Rad.; this is before me and merely represents a quite normal, though somewhat discoloured (evidently immature!) female of *T. ramosus* (pl. 4 fig. 25). Besides a syntypic female of *C. ashabadensis* Rad., the Genoa Museum also possesses a "Cotipo" of *Crocisa rufa* Rad., which Gribodo obtained from Radoszkowski. When describing *Crocisa brezzii* Guiglia, the authoress compared the latter with the aforementioned *C. rufa*, giving drawings of the scutellum for both. I have not seen the above female of *C. rufa* but am satisfied that the holotype of *Crocisa brezzii* Guiglia, 1933, is a quite normal specimen of *Thyreus elegans* (Mor.)

With regard to other misidentified specimens recorded in the literature, I suggest that only those for which new specific or varietal names have been proposed deserve special attention here. The varieties *C. ramosa* var. *albociliata* R. Meyer and *C. affinis* (sic) var. *minor* Friese (pl. 4 fig. 26), proved

on dissection to be merely individuals of *T. ramosus*. A study of any long series of the latter from a single locality shows that the characters

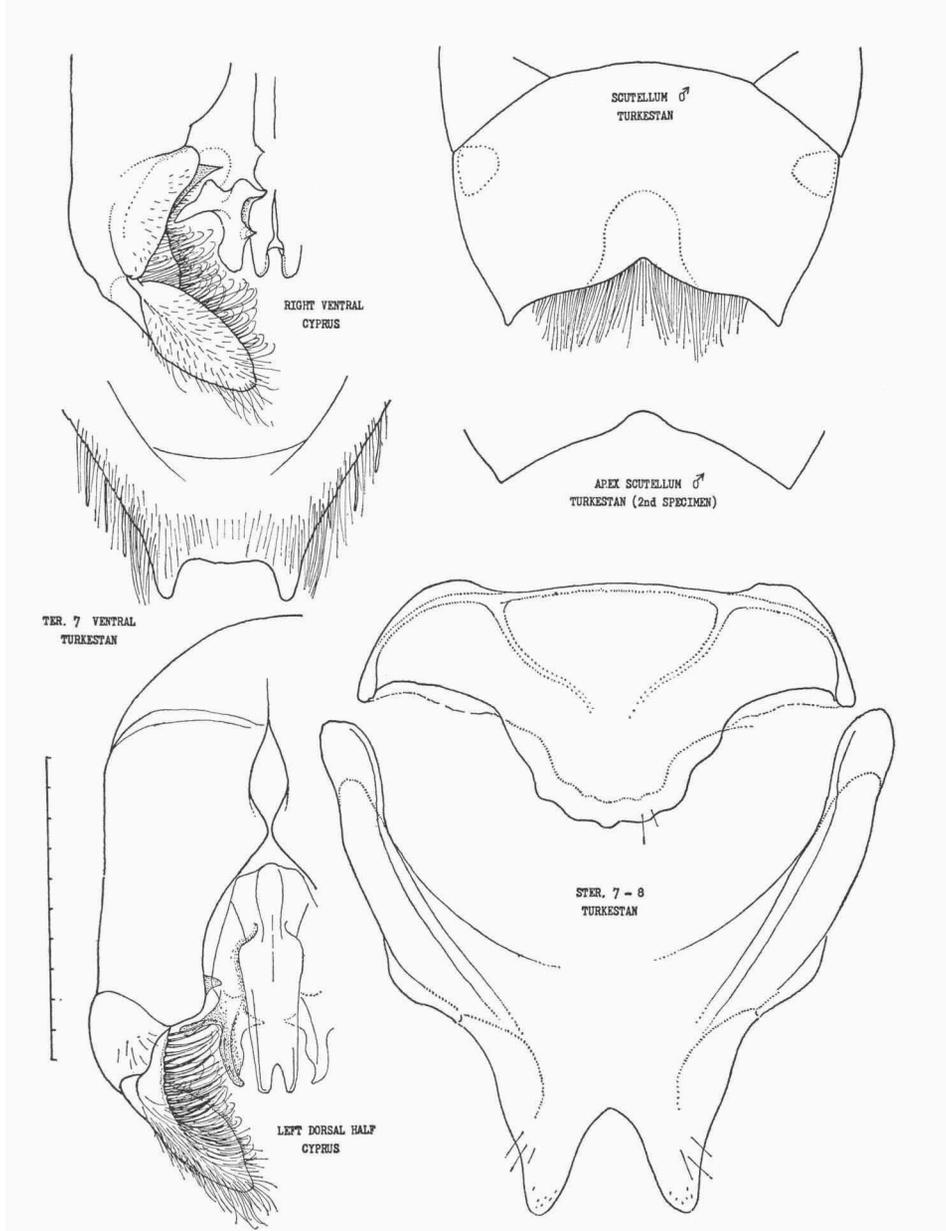


Fig. 33. *Thyreus ramosus* (Lep.), ♂ from Cyprus and Turkestan. Scutella (two ♂, one aberrant with white lateral hair-tufts) and terminalia. Scale-line = 1 mm.

distinguishing these varieties fall well within the range of individual variation. Lastly, we have to consider *Crocisa circulata* Alfken, female and male from Cyrenaica. The type (i.e. the female) from Porto Badia is declared to be in "Mus. Bengasi", but my inquiries about the present existence of Alfken's specimens there were left without response. It will be noted that there is absolutely nothing in the description of *circulata* that would suggest a different species: in point of fact all features mentioned by Alfken can be applied without reserve to individuals of *T. ramosus*. Added to this, I found a male of "*C. circulata*" from Morocco, identified in 1932 by Alfken himself, which proved to be a quite normal specimen of *T. ramosus*.

Flower records. — *Mentha cervina* and *M. pulegium*; *Thymus mastighina*; *Echium* sp.; *Ligustrum lucidum*; *Hirschfeldia incana*; and *Scabiosa maritima* (all from locs. in Spain). *Carlina vulgaris* (Assisi, Italy). *Echium italicum*; *Stachys thirkei*; *Marrubium incanum*; *Reseda lutea*; and *Onopordon illyricum* (all from locs. in Jugoslavia). *Scolymus hispanicus* and *Vitex agnus castus* (Cyclades, Greece).

Host. — *Amegilla albigena* (Lep.), nr. *Simontornya* in Hungary, teste Pillich (note on label); *Anthophora* (rect. *Amegilla*) *albigena* Lep. (sec. Bischoff, 1927; Iuga, 1958); *Megilla flabellifera* Lep. (= *Anthophora pubescens* (F.)) (supposition, sec. Friese, 1895). — "Ueberall im Kykladen-Archipel an Mauern, auf der Suche nach *Podalirius*-Nestern" (note on label).

Distribution. — South Europe (see before) and whole Mediterranean region including the Canary Islands and parts of NE Africa. Ranges through Arabia and West Asia more sparingly eastwards, possibly into Mongolia.

### **Thyreus picicornis** (Morawitz) (fig. 34)

1875. Morawitz, in Fedtsch. Reise Turk. Mellif. 1, Mem. Imp. Anthropol. & Ethnogr. **19** (2): 142. — ♂ Kizilkum (*C. picicornis* nov. sp.).  
 1877. Morawitz, Horae Soc. ent. Ross. **14** (1): 101 (addit. note) (*C. picicornis* Mor.).  
 1880. Morawitz, Bull. Acad. Imp. Sci. Petersb. **26**: 371. — "Amu-Darja Gebiet. Dohrandt" (record only) (*C. picicornis* Mor.)  
 1893. Radoszkowski, Bull. Soc. Imp. Nat. Moscou, n.s. **7**: 167-168 (♂ only!), pl. 4 fig. 6 a-c, i, k, & o (♂ structures). — ♂ Transcaspie (*C. ashabadensis* Rad., nec ♀).  
 1921. Meyer, Archiv f. Naturgesch. **87A**: 100 (orig. descr. quoted; not seen) (*C. picicornis* Mor.)  
 ?1967. Popov, Trudi Zool. Inst. Moscou **38**: 103, 305-306 (host and flower records) (*T. ashabadensis* Rad.)

Material. — U S S R: ♂ (dissected), labelled: Djulek Syr Darja Geb. [Kazakhstan], L. Wollmann (print), *C. picicornis* Mor. ♂, det. Wollmann (ZIL).

The present example was sent to me by the late Miss Ponomareva for the purpose of dissecting out the terminalia and comparison with related species. The authoress had compared it already with the type and one topotype, both of them males, from Kizilkum (S. Kazakhstan). The form of the scutellum in Wollmann's bee corresponds very nearly with that of the typical specimens, outline sketches of these parts made by Ponomareva having been included in her letter. Moreover, I was informed that "there are no differences between the type specimen and the one from Kazakhstan." The type locality of *T. picicornis* is given as "Steppe of Kizilkum near Korzum, 14 May, 800 feet" (in Russian), also in Kazakhstan.

*T. picicornis* appears to be another near relative of *T. ramosus*, differing from the latter only in details of structure. It is almost certainly the same

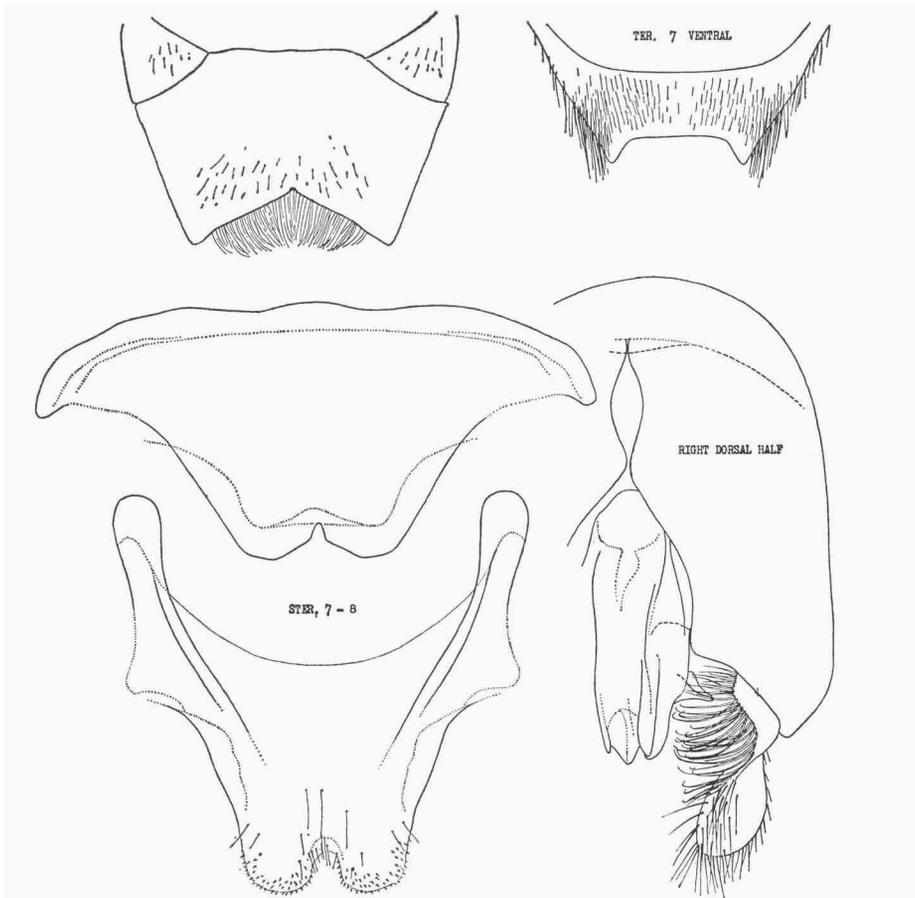


Fig. 34. *Thyreus picicornis* (Mor.), ♂ from Syr Darja (Kazakhstan) Scutellum and terminalia.

species as the one treated and figured by Radoszkowski as the supposed male of *T. ashabadensis* Rad. (= *ramosus* Lep.) and, consequently, may well coincide with the bee interpreted as *T. ashabadensis* by Popov in one or more of his papers (e.g., 1967). If so, *Amegilla nigricornis* (Mor.) would be its host.

The most important character separating the two is found in the shape of the 7th gastral sternite (fig. 34). The ratio between the interocellar and ocellorbital distances is as 10 : 6.5, the lateral ocelli thus appearing more widely spaced than in *ramosus* (about 10 : 7.5). No females corresponding with the male were found in our extensive series of *T. ramosus*.

Distribution. — Kazakhstan.

### **Thyreus hyalinatus** (Vachal) (fig. 35)

- 1903 Vachal, Ann. Soc. ent. France **72**: 381. — ♂ d'Obock (Congo français) [rect. Somalia!] (*C. hyalinata* nov.)  
 1905 Friese, Verh. zool.-bot. Ges. Wien **55**: 174 (list; 177, key ♂). — Africa (*C. hyalinata* Vach.)  
 1921. Meyer, Archiv f. Naturgesch. **87A**: 78 (key ♂), 101-102. — ♂ ♀ Ägypten; ♂ Asia Minor (*C. hyalinata* Vach.)  
 1922. Meyer, Ann. Mus. Nat. Hung. **19**: 183. — ♂ Eritrea (*C. hyalinata* Vach.)  
 1926. Alfken, Senckenbergiana **8**: 103. — Egypt; "Kongo, Erythraea, Ägypten und Kleinasien" (*C. hyalinata* Vach.)  
 1933. Cockerell, Stylops **2**: 33 (notes; no localities) (*C. hyalinata* Vach.)  
 1934. Alfken, Bull. Soc. R. Ent. d'Égypte **18** (1-2): 165, 168 (key ♀ ♂), 173 (notes). — Egypt; "Congo und Erythraea" (*C. hyalinata* Vach.)

Type material. — French Somalia: ♂, lectotype *Crocisa hyalinata* Vachal, by present designation, labelled: Obock/Fairmaire (print), Type (red cadre), *hyalinata* Vach. ♂ (Vachal's writing) (IRSN); ♂, paralectotype, Obock (Fairmaire erased), remaining labels as in lectotype (IRSN).

Further material. — Arabia: 7 ♂ (6 diss.), Jidda, iv.1934, G. L. Bates (BM); ♀, Arabia, Lahej, v.1894, C. G. Nurse (BM). Series ♂♀, Arabia, Jedda (Buraiman) (BM). 5 ♂ 6 ♀, Arabia, Djedda, Botta 288-39 (MP). — Eritrea: ♂, Africa or., Katona, Assab 1907, *C. hyalinata* Vach., det. R. Meyer (MBUD). — Sudan: 2 ♂, Dongola, Mus. Ber. (ML). — Egypt: ♂ (diss.), Aegypten, Ehrenberg 700, *C. affinis*, det. H. Friese 1904 (ZMB). ♂, Aegypt 700, *C. major* var., det. Friese 1896 (ZMB). ♀, Aegypten, Ehrenberg, *C. hyalinata* Vach., det. R. Meyer (ZMB). ♀, Borgash, 7.ix.1924, *C. hyalinata* Vach., det. J. D. Alfken (ZMB). 4 ♂ 3 ♀, Egypt (Min. Agric.), Mansouriah, coll. R. Mabrouk, ix.1925, Abu Matamir, 6.vi.1926, and Heliopolis, 8.v.1918, all *C. hyalinata* Vach., det. J. D. Alfken (ZMB). 2 ♂, 1 ♀, Egypt, Gebel Elba, A.II, Burg El Dera, ix.1955 and

Burg Abu Seer, iv.1955, H. Priesner (HP). ♀, Egypt, Giza, 5.ix.1964, on flowers no. 23 (BLU). Series ♂♀, Egypt, Edku Salt Lakes, viii.1944 (BM). ♂ (diss.), Egypt, Saqqara, 29.v.1966, P. M. Marsh (USNM). — I s r a e l: series ♂♀, Bat Jam, 15.x and vii.1944, H. Bytinski-Salz (CBS, ML). — I r a n: ♀, Persia, Fao, vi.1891, C. T. Bingham (BM).

This is a well characterized species, both sexes being easily known by the clear wings and the omnipresent white parascutellar spots. In Alfken's key (1934) the ventral surface of the abdomen is said to be unspotted, which is only rarely the case, white hair streaks being present in the majority of our

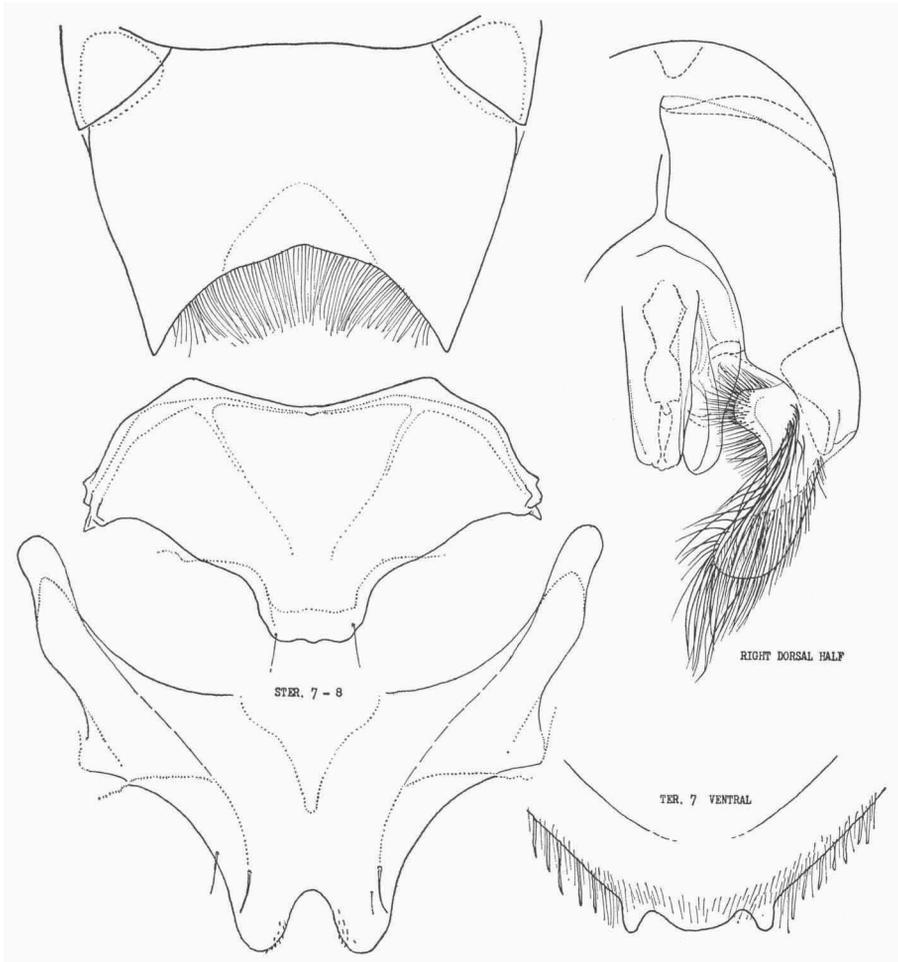


Fig. 35. *Thyreus hyalinatus* (Vachal), ♂ from Egypt (Burg Abu Seer). Scutellum and terminalia.

specimens at the sides of sternites 2-4 or 2-5. The same author wrongly states *C. affinis* var. *minor* Friese to be this species; the latter is, in fact, synonymous with *T. ramosus*.

Another species similar to *T. hyalinatus* and *ramosellus* is *T. abolateralis* (Ckll.), from Peninsular India, discussed in my account of the Austro-Oriental members (Lieftinck, 1962). This has no white parascutellar spots, darker wings, and in the male the impressed area of sternite 6 is shallower than in *hyalinatus*. The male of *abolateralis* can be at once distinguished from both *ramosellus* and *hyalinatus* by the absence of the long external hair comb bordering the apex of the hind tibia.

A dissected male from Saqqara (Sakkara) in Egypt (USNM) differs from the rest in that the apical lobes of the 7th sternite are not in the form of gently tapered blades, as in the specimen from the Burg-Abu Seer road (fig. 35), but rather resembles the Jericho example of *ramosellus* (fig. 37), except that the emargination in our specimen is equal in width to each of the lobes. The general shape of the sternite is, however, quite typical. Also the 8th sternite is as in ordinary specimens of *hyalinatus* save that the hind margin is excised, the incision resembling a wide inverted V.

As Cockerell (1933) rightly says, this is a desert species. It is described by Vachal as having the mesothorax anteriorly covered with white hair, which only applies to the males, the females having the discal spots and median band distinct. I am unable to confirm that the latter, as Cockerell also states, may be marked like the males and that both kinds have been found in the same locality. It seems more likely that two different species were confounded by Cockerell, who failed to substantiate his observation.

Distribution. — From Northeast Africa into Arabia, Iran, Egypt and Israel. Erroneously recorded from Congo.

### **Thyreus priesneri** sp. n. (fig. 36)

Material. — Egypt: ♂ (dissected), Gebel Elba<sup>1</sup>), Egypt, A.28.2.38, Dr. H. Priesner. The specimen is the holotype (HP).

Male. — Resembles *T. ramosus* from the same locality in the arrangement of the white pubescent markings on the gastral segments, the 6th tergite being also spotted. In addition to the characters given in the key, the species can be distinguished from dissected topotypes of *ramosus* by the following peculiarities.

1) Gebel Elba is situated near the Red Sea coast, in southeast Egypt (Halaib Bay), at about 1400 m alt.

Eyes more widely distant: interocellar and ocellorbital distances of equal length, e.g. about 10 : 10 (*ramosus* in the ratio of 10 : 7.5). Dorsum of thorax, especially of the scutellar plates, more convex, whole surface more shining, the punctures much less numerous, all considerably smaller than the interspaces; suture between mesoscutum and scutellum distinctly impressed; *plsa* narrower, incompletely fused with *pls*. Apex of gastral tergite 7 broader, its dorsal surface hollowed out, with bare margin and hinder angles, the emargination obtuse-angulate and shallower than in *ramosus* (fig. 36). Branches of sternite 7 longer, the microsetae more numerous. Genital capsule 1.4 mm long, gonostylus with well developed, strongly setiferous dorsobasal process; apex of gonostylus longer, more swollen and evenly rounded at the tip than in *ramosus*, its surface densely clothed with finely plumose hairs,

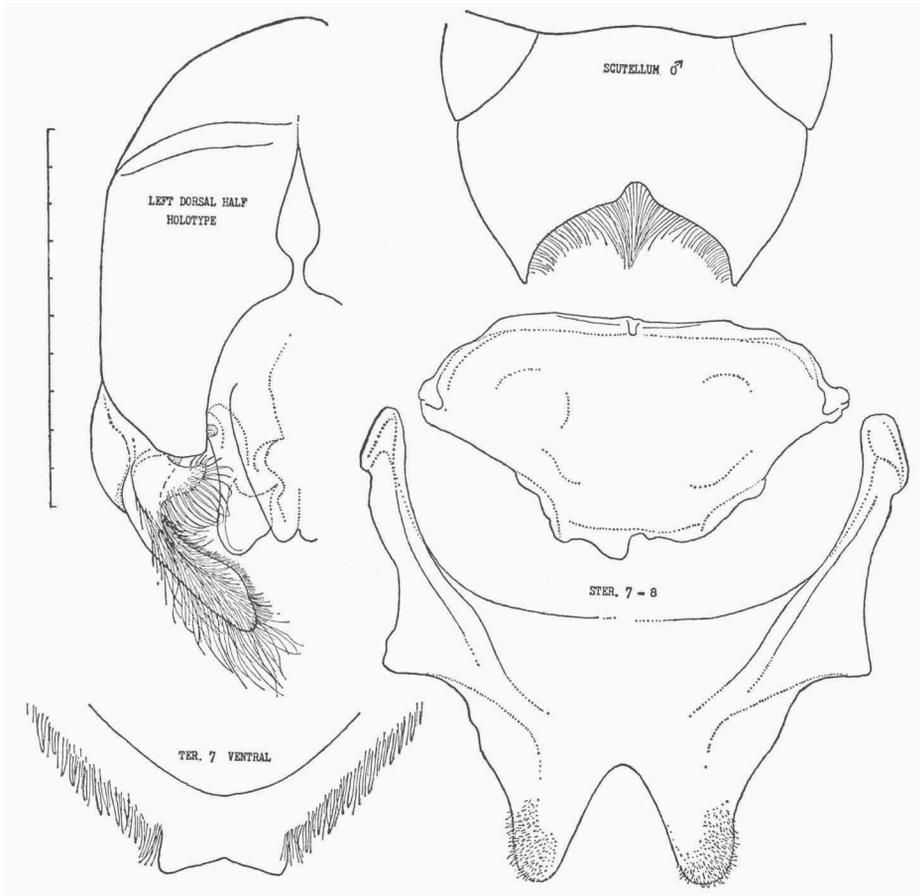


Fig. 36. *Thyreus priesneri* sp.n., ♂ holotype from South Egypt (Gebel Elba). Scutellum and terminalia. Scale-line = 1 mm.

which are much longer than the diameter of gonostylus (*ramosus*: hair short and scanty, much shorter than diameter of gonostylus, cf. fig. 33).

Unfortunately no females were found in our material which could possibly belong to this species. Named in honour of Dr. H. Priesner, who made interesting collections of bees during his sojourn in Egypt.

Distribution. — Egypt (south).

### **Thyreus ramosellus** (Cockerell) (figs. 37-38)

1919. Cockerell, Ann. Mag. Nat. Hist. (9) **3**: 191. — ♀ Chittoor, Madras Pres. (*Crocisa ramosella*, sp.n.)  
 1935. Alfken, Veröffentl. D. Kol. Uebersee-Mus. **1**: 174-175 (addit. descr.). — ♂ Jericho, Israel (*C. erythraeensis* Meyer)  
 1938. Alfken, Deutsch. Ent.Z. **1938**: 425. — ♀ Jericho (*C. erythraeensis* Meyer)  
 1962. Lieftinck, Zool. Verhand. Leiden **53**: 17-21 (type & both sexes descr.; references, synonymy), 163 (key ♂), fig. 4 & 6 (♂ ♀ struct.). — ♂ ♀ India; ♂ Iraq.

Material. — I s r a e l: ♂ (diss.), Palästina, Jericho, 19-26.4.34, Dr. Enslin, *C. erythraeensis* R. Meyer, det. J. D. Alfken (ZMB). ♂ (diss.), Palestine, El Ghor, Jericho, Elisaquelle, 7-8.vii.1928, A. Mueller (ZMB). 4 ♂ (3 diss.) 6 ♀, Palestine, Ejn Geddi, 22.6 (2 ♀), Tiberias, 3.9.1946 (3 ♂ 2 ♀), Jericho, 18.7.1941 (♀) & 20.7.1946 (♂ diss.), and Dead Sea, South End, Ajn Bedda, 5.8.1939 (♀), all H. Bytinski-Salz (CBS, ML). 2 ♀, Palestine, Jerusalem, 27.8.30, and Jericho, 15.10.30, leg. Bodenheimer, one with *C. erythraeensis* R. M., det. J. D. Alfken (ZMB). ♀, Palestine, Jericho Plain, Wadi el Kelt, 11.vi.1918, Major E. E. Austin 1919-52 (BM). — E t h i o p i a: ♀, Abessinien, Dire Daoua, 3.6.1936, leg. Uhlenhuth (ZMB).

I have described both sexes after specimens from South India and Iraq and believe not to go wrong when attributing the above females from Israel and Abyssinia to *T. ramosellus* as well. The males from Israel are nearly identical structurally with those from India (fig. 37), but to show the variation I am taking this opportunity to supply also figures of the terminalia of the former (fig. 38). In regard to body size, wing colour and white markings, both sexes exhibit so much variation that some, at least, of the females are indistinguishable from those of *ramosus*. Several of these have the scutellum less deeply emarginate and marked with a crescent-shaped apical patch above the notch, thus differing from typical *ramosellus*; it must be said, however, that quite similar examples of that sex do occur in populations of *ramosus*.

N.B. — *Crocisa erythraeensis* R. Meyer, 1921, is a nondescript species. I have not seen the type, which is apparently lost, but the diagnosis of the female — the sex first described by the author and hence the lectotype —

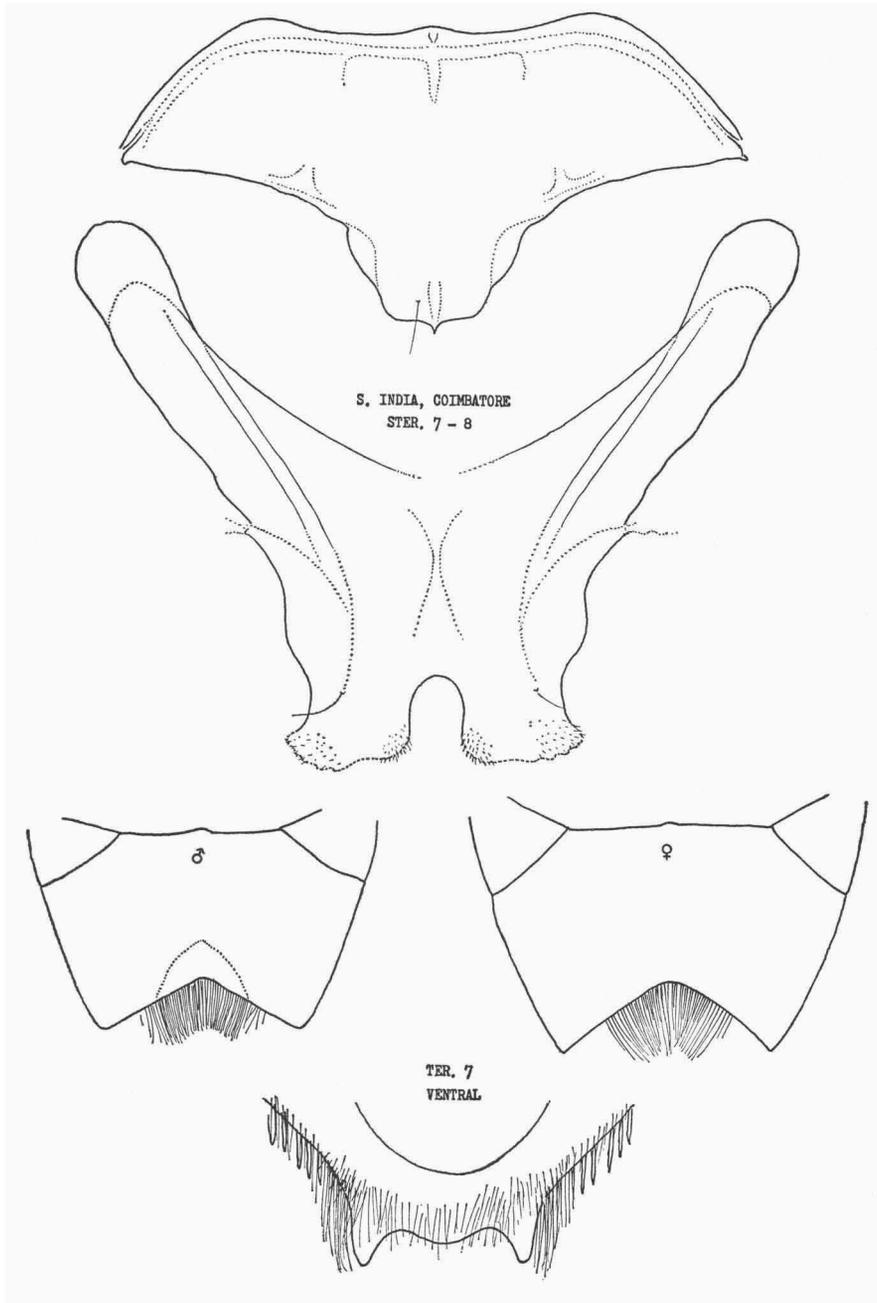


Fig. 37. *Thyreus ramosellus* (Ckll.), from South India (Coimbatore). Scutella and ♂ terminalia (after Lieftinck, 1962).

would apply to any of the *T. ramosus* group having pure white markings. The male is probably not conspecific and may well be identical with *T. fallibilis* (Kohl, 1906) from Arabia (see p. 95). Its markings are said to be bluish and the parascutella show traces of light spots. Both sexes were originally described from Asmara, Eritrea.

Distribution. — Probably widespread from Peninsular India to the eastern Mediterranean and northeast Africa.

***Thyreus plurinotatus* (Meyer) = *T. macleayi* (Ckll.)**

1907. Cockerell, Bull. Amer. Mus. Nat. Hist. **23**: 232-233 (incl. key.) — ♀ N. S. Wales (*C. macleayi* sp. nov.)

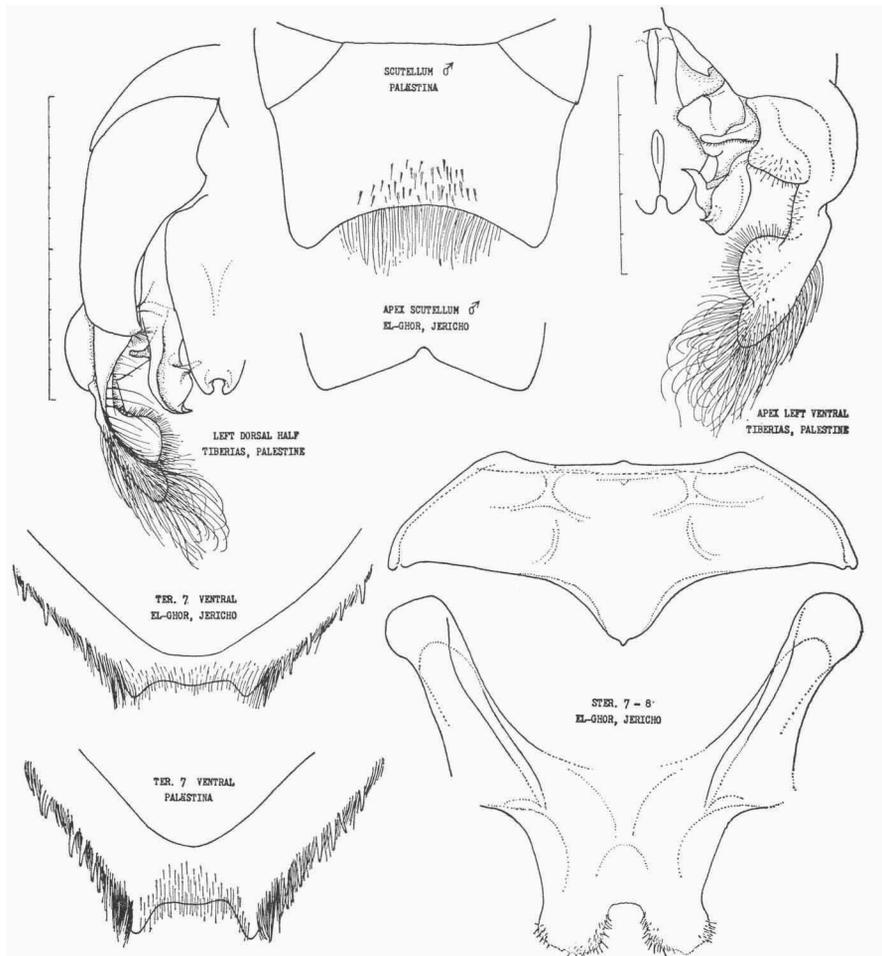


Fig. 38. *Thyreus ramosellus* (Ckll.), from Israel. Scutella and ♂ terminalia. Scale-lines = 1 mm (left) and 0.5 mm (right).

1921. Meyer, Archiv f. Naturgesch. **87A**: 77 (key ♀), 97. — ♀ Turkestan (*C. plurinotata* Friese in litt., sp. nov.)  
 1962. Lieftinck, Zool. Verhand. Leiden **53**: 172 (key), 196-200 (descr. & full synonymies), fig. 70-71 (*macleayi*) and fig. 72 (*plurinotatus*).

Type material. — ♀, holotype *Crocisa plurinotata* Meyer, labelled: Turkestan 189 (print), *Crocisa* (print) *plurinotata* Fr./Turk.n. (large cadre, H. Friese's writing), Type (print on dark red) (ZMB).

This is the enigmatic bee from "Turkestan", described by Meyer and Friese as *Crocisa plurinotata* Meyer, 1921. For a discussion of the status of that species, of which I had seen other mislabelled specimens, see Lieftinck (1962). After examining the type of *C. plurinotata* (which was supposed to have been lost), and comparing it with authentic examples of *T. macleayi* from Australia, I can only confirm the conclusion arrived at earlier, namely, that the two are identical species. There can be no question but that the present specimen, like two others in the Paris Museum from "Turkestan" and "Mindanao", were all of them erroneously labelled.

Distribution. — Australia.

## VI. Species incertae sedis

### **Thyreus aberrans** (Morawitz)

1875. Morawitz, in Fedtsch. Reise Turk. Mellif. I, Mem. Imp. Anthropol. & Ethnogr. **19** (2): 143-144. — ♀ Samarkand (*C. aberrans* nov. sp.).  
 1876. Morawitz, Ibid. **21** (3), pl. Mellifera II fig. 28 (♀ type *aberrans*, coloured) (*C. aberrans* Mor.)  
 ?1893. Radoszkowski, Bull. Soc. Imp. Nat. Moscou, n.s. **7**: 165, pl. IV fig. 2a-c, i, o & s ♂ structures). — ♂ "Astrakhan, Caucase, Taschkend" (*C. aberrans* Mor.)  
 1921. Meyer, Archiv f. Naturgesch. **87A**: 77-78 (key ♀ ♂), 84 (orig. descr. quoted) (*C. aberrans* Mor.).

An enigmatic species, the type of which (from Uzbekistan) I have not been able to recover. It appears that both Radoszkowski and Meyer have overlooked the first sentence preceding the original description on p. 143, where the author emphasizes the following peculiar feature as a group character of *T. aberrans*: "II. Scutellum margine postico fere truncato, apice medio lobatim producto." Provided that no mistake has been made, *C. aberrans* cannot even be included in *Thyreus* on the basis of this observation. Although the white body markings strongly suggest *T. scutellaris* or *affinis*, unfortunately neither the description nor the nice coloured picture of this bee give any indication about its proper assignment.

Distribution. — Turkestan.

**Thyreus biseriatus** (Morawitz)

1888. Morawitz, Horae Soc. Ent. Ross. **22**: 29-30. — ♀ Sibiria, Osnatschennaja (*Crocisa biseriata* nob.).

1921. Meyer, Archiv f. Naturgesch. **87A**: 77 (key ♀), 96 (not seen; orig. descr. quoted) (*Crocisa biseriata* Mor.)

Original description: "F e m i n a. Nigra, capite thoraceque modice pilis albidis variegatis; antennarum articulo tertio quarto longiore, pectore mesopleurisque creberrime rugosis; scutello emarginato angulis posticis fere obtusiusculis; abdominis segmentis 4° et 5° utrinque macula, 2° et 3° macula punctoque laterali (e pilis niveis composita) ornatis.

Long. 13 mm.

Habitat in Sibiria (Osnatschennaja).

Von dieser ansehnlichen Art ist nur ein *W e i b c h e n* gesammelt worden, welches fast grösser ist als *Cr. major* Mor. und sich von derselben leicht unterscheidet, indem bei dieser das 3-te und 4-te Fühlerglied fast gleich lang sind, die Brust sehr sparsam punctirt und glänzend ist, das Schildchen mitten am hinteren Rande mit einem kleinen dreieckigen Ausschnitte versehen ist und auf dem 2-ten und 3-ten Abdominalsegmente nur eine Makel jederseits vorhanden ist. Aehnlich ist auch noch *Cr. orbata* Lepel.; bei dieser sind aber die Seitenlappen des Schildchens scharf zugespitzt und das 2-te Abdominalsegment beiderseits am Endrande mit einem breiten, aus weissen Haaren zusammengesetzten Streifen versehen, von welchem noch ein fast den vorderen Rand des Segmentes erreichender Ast abgeht.

Der Kopf und der Thorax sind fast wie bei der *C. major* Mor. bekleidet. Das erste Hinterleibssegment ist am Endrande beiderseits schneeweiss behaart; die Haarmakel sendet einen linienförmigen weissen Streifen zum vorderen Rande des Segmentes ab; der 2-te und der 3-te Hinterleibsringe haben jederseits am Endrande 2 Haarmakeln, die kleinere steht dicht am Seitenrande, die grössere weiter von demselben entfernt. Auf dem 4-ten und 5-ten Segmente stehen jederseits die Makeln am Grunde; auf den Ventralringen sind keine weissen Flecken vorhanden. Die Beine sind schwarz, an den vordersten die Schienen aussen vollständig, an den übrigen nur am Grunde schneeweiss behaart".

Whereabouts of the type unknown. From the description alone it is impossible to reconstruct the facies of this bee. Only the Latin diagnosis and the last caption apply to *biseriatus*, the first sentences dealing with characters of *histrionicus* and *orbatus*, from which it is said to differ. I would suggest relationship with *T. altaicus* (Rad., 1893), or *T. praevalens* (Kohl, 1905).

Distribution. — Siberia.

**Thyreus intrudens** (F. Smith)

- 1878 Smith, Scient. Res. 2nd Yarkand Miss.: 6, pl. fig. 8. — ♀ Yarkand (*Crocisa intrudens* nov. spec.)  
 1921. Meyer, Archiv f. Naturgesch. **87A**: 83 (orig. descr.; not seen) (*C. intrudens* Sm.)

The type and only specimen is lost. Meyer (loc. cit.) is probably right in considering it synonymous with *T. laevicrus* (Mor.), which itself may be only a variety of *T. elegans* (Mor.). See under *T. laevicrus* in the present paper.

Distribution. — West China (Sinkiang).

**Thyreus laevicrus** (Morawitz) (fig. 10)

1887. Morawitz, Horae Soc. Ent. Ross. **20**: 222-223. — ♂ Oasis Nia, Tibet (*Crocisa laevicrus* nov. sp.)  
 1921. Meyer, Archiv f. Naturgesch. **87A**: 78 (key ♂), 83-84 (♀ Chin. Turkestan; pars, record only) (*C. laevicrus* Mor.).

Material. — U S S R: ♀, labelled: Sibirien, F. Morawitz (written), *Crocisa histrio* F. Morawitz, and *Crocisa laevicrus* F. Mor. (two labels), det. J. D. Alfken (ZMB). — China: Chin. Turkestan, Chotan, 1200 m, 22.6.90, leg. Conradt, *C. laevicrus* Mor., det. R. Meyer (ZMB).

The holotype male of this bee could not be retraced in any museum and may have been lost while the female has never been described. Meyer (loc. cit.) suggests that *T. laevicrus* is the same species as *Crocisa intrudens* F. Smith, 1878, from Yarkand (near Kashgar), also in Chinese Turkestan, figured in Smith's work. However, the female holotype of the latter species is probably not more in existence either (ex Indian Museum, Calcutta?). In the structure of the antennae and scutellum the two specimens now before me agree with a pair of unquestionable *T. elegans* from Akrotiri Bay (S. Cyprus), identified with *laevicrus* Mor. by Alfken. The Central Asian females can, however, be distinguished from *elegans* by the more slender form of the pygidial plate (fig. 10) and also by the extent of the white abdominal bands. Like those of *intrudens*, shown in Smith's picture, these bands on all segments are more broadly interrupted in the median line and in the Siberian example are separated by a distance about equal to the breadth of the spots themselves; otherwise they are quite similar to those of typical *elegans*, the anterior and posterior parts of the spots being broadly fused together laterally. One of the specimens further differs from all *elegans* I have seen, by the entirely black-haired (not white) hind basitarsus

and the reduction of white ventral spots, which are present only on sternites 2 and 3. For these reasons I prefer to keep *laevicrus* apart from *elegans*, the still unknown male perhaps giving the clue to its proper status. Seeing how variable the body markings of *T. elegans* really are, I am nevertheless inclined to consider *laevicrus* a mere variety of *elegans*.

Distribution. — Tibet.

### **Thyreus piceus** (Meyer)

1921. Meyer, Archiv f. Naturgesch. **87A**: 77 (key ♀), 99-100. — ♀ Poros (*Crocisa picea* n. spec.).

1934. Alfken, Bull. Soc. R. Ent. d'Egypte **18** (1-2): 175 (addit. notes) (*C. picea* Meyer).

The type could not be traced in the Berlin Museum and may have been lost. In his key the author states that the scutellum is flat and that the markings are pure white. The description runs as follows:

“♀. Länge 9 mm. Der *Cr. ramosa* Lep. nahestehend, aber in folgendem verschieden: Der ganze Körper dunkelrotbraun, der Thorax schwarzbraun, die Zeichnung blendend weiss, der Kopf ganz weiss behaart, die Behaarung auf Schildchen und Abdomen rotbraun, auf dem Schildchen 2 weisse Seitenmakeln unterhalb der Seitenstücke. Erstes Segment mit zwei Binden, beide nur schmal unterbrochen und nach der Unterbrechung zu in scharfe Spitzen ausgezogen (bei *ramosa* breit unterbrochen, die Binde des Endrandes breit gerundet oder abgestutzt unterbrochen). Der Endrand der letzten Segmente in grösserer Ausdehnung glatt. Beine rotbraun. Antennenglied 3 etwas länger als 4.

1 ♀ Poros. (Type in meiner Sammlung.)”.

Alfken (loc. cit.) seems to have seen this example for he supplies the following additional observations, none of which aids much to the recognition of this bee:

“Die rotbraune Körperfarbe des Tieres scheint durch Tötungsmittel verursacht worden zu sein. Im frischen Zustand wird es schwarz gefärbt sein. Das 2. Geiszelglied der Fühler ist m. M. nach nicht etwas länger als das 3., sondern diesem gleich lang. Seiten des Mesonotum mit durchgehender weisser Haarstrieme. Auffallend sind die dünnen weissen Haarflecke an den Seiten des Schildchens unterhalb des Nebenschildchens. Schildchen ziemlich grob punktiert, Hinterrand geschweift, Hinterecken stumpf. Ich würde nicht sagen, dass die 1. Rückenplatte des Hinterleibs 2 Binden hat, sondern dass sie mit je einem Seitenflecken versehen ist, der nach innen in 2 spitze Aeste ausläuft, von denen der untere den Hinterrand der Platte

nicht erreicht. Bauchplatten 2 und 3 seitlich mit Spuren weisser Haare. Ich finde nicht, dass die Hinterränder der Rückenplatten in groszer Ausdehnung glatt sind, wenigstens zeigt sich dies nicht auffälliger als bei manchen anderen Arten.”.

Distribution. — Greece.

### **Thyreus plumatus** (Meyer)

1921. Meyer, Archiv f. Naturgesch. **87A**: 78 (key ♂), 102. — ♂ Mailand (*Crocisa plumata* n. spec.)

Type possibly lost (not in the Berlin Museum). Original description: “Eine Art mit ganz hellblauer Zeichnung, die bisher für das paläarktische Gebiet einzig dasteht.

♂. Länge 10 mm. Die Behaarung im Gesicht über den Fühlern rein weiss, sonst mit bläulichem Scheine, auf dem Thorax und Abdomen mit bläulichem Schein. Mesothorax und Schildchen fein punktiert, auf dem Mesothorax mit der gewöhnlichen Zeichnung, die Haare jedoch sehr lang, stark gefiedert, so dass die Zeichnung verschwommen ist. Auch die Seitenstücke des Schildchens mit langer bläulicher Behaarung, Schildchen ganz schwarz behaart, die Seiten des Ausschnittes schwach S-förmig geschwungen, der Ausschnitt selber sehr flach. Segment 1 mit 2 Binden, die erste nur verschmälert, kaum unterbrochen, die zweite und die Binden der folgenden Segmente breit unterbrochen, die zweite an den Seiten mit rechtwinkliger Verlängerung, die aber nicht die Basis des Segmentes erreicht. Analsegment abgestutzt. Bauch schwarz, Segment 5 mit dichter langer schwarzer Haarfranse, Segment 6 mit flacher Grube. Schienen und Tarsenglied 1 zum grössten Teil blauweiss behaart. Fühlerglied 3 gleich 4.

1 ♂ Mailand (Type in meiner Sammlung).”.

Distribution. — Italy.

### **Thyreus ruficornis** (Alfken)

1934. Alfken, Bull. Soc. R. Ent. d’Egypte **18** (1-2): 167 (key), 170-171, 174. — ♂ Egypte (*Crocisa ruficornis* sp.n.).

The type, a unique specimen in the collection of the Ministry of Agriculture at Cairo, is from Benha, 30 July 1914. The description runs as follows:

“♂. 6 mm. lang. Schwarz. Kopfschild ziemlich stark vorgezogen, fein und ziemlich dicht punktiert. Fühler rot gefärbt, 2. Geiszelglied ein wenig kürzer als das 3. Seitenränder des Schildchens am Grunde ein wenig ein-

gebogen, vor der Spitze nach auszen gebogen; Hinterwinkel spitz, Hinterrand stark bogig ausgerandet, unter der Mitte mit weiszem Haarbüschel; Oberfläche, wie die des Nebenschildchens, ohne weisse Behaarung. 2.-6. Rückenplatte des Hinterleibs seitlich mit weissen Filzflecken, die der 1. Platte etwa U-förmig, die der 2. nach vorn ein wenig verlängert, die der übrigen querlänglich. Endplatte am Hinterrande flach rundlich ausgerandet. 2.-4. Bauchplatte seitlich mit kleinen, weissen Haarflecken. Schenkel unten und Kniee rotbraun gefärbt. Schienen und Fersen auszen weisz befilzt. Flügel schwach getrübt, Adern, Mal und Schüppchen rotbraun gefärbt.

An den rot gefärbten Fühlern und den teilweise rotbraun gefärbten Beinen kenntlich.”

From this insignificant description *T. ruficornis* would seem to be an immature example of *T. ramosus*, or one of its nearest allies.

Distribution. — Egypt.

### **Thyreus unicolor** (Hedicke)

1940. Hedicke, Sitzber. Ges. Naturf. Freunde Berlin 1939, Okt-Dez. III: 348-349. — ♂ [Chin. Tibet], Tal des Yangtse, ca. 2800 m (*Crocisa unicolor* n. sp.).

Type lost.

#### Original description:

“♂. 11 mm. Schwarz, Flügelschüppchen bräunlich durchscheinend, Rückenplatten des Hinterleibes schwach stahlblau glänzend. Kopf und Thorax überall abstehend locker weiss behaart mit einzelnen, undeutlich abgegrenzten kahlen Stellen, die Mitte des Mesonotums und das Schildchen mit einigen wenigen weissen Haaren besetzt.

Kopf oberhalb der Fühler kräftig und mässig dicht, unterhalb derselben sehr fein und dicht punktiert. Fühler mässig lang und dick, 2. Geisselglied deutlich kürzer als das 3., dieses und die folgenden etwas länger als dick. Thoraxrücken und Schildchen mässig dicht und kräftig punktiert, glänzend. Schildchen gewölbt, sein Hinterrand bogig ausgerandet, in der Mitte mit kleinem Ausschnitt, unter dem Hinterrand mit einer langen weissen Haarfranse. Flügel in der Aussenhälfte stark schwarzbraun getrübt mit unscharfen Fensterflecken in den Cubitalzellen. Ausser den Grundzellen bleibt auch die Brachialzelle glashell, sodass die Trübung nur die Radialzelle, die 3 Cubitalzellen, die 2 Discoidalzellen und den Flügelaussenrand, sowie die Randzone der nach dem Flügelgrunde anstossenden Zellen umfasst. Beine locker weisslich behaart, Aussenseite der Schienen, der Fersen und ± der Fussglieder weiss befilzt.

Hinterleib fast ohne abstehende Behaarung, 1-5. Rückenplatte am End-

rand mit dicht anliegenden, aber kaum filzartigen weissen Haarbinden, die auf der 1. vollständig, auf den übrigen mitten unterbrochen sind. 1. Platte seitlich und am Grunde nur mit einzelnen hellen Härchen, auf der 2. Platte zieht sich die Haarbinde seitwärts bis zum Vorderrand der Platte hinauf. Endplatte geradlinig abgestutzt, die Ecken kaum merklich hervortretend. Bauchplatten mit undeutlich begrenzten, lockeren, weissen Haarbinden.

Die Art gehört in die Gruppe der *C. scutellaris* F. Sie unterscheidet sich durch die nicht unterbrochene Endrandbinde des 1. Segments und die auffallende Färbung der Flügel von allen Verwandten. R. MEYERS Tabelle (1921) führt auf Ziffer 6: *scutellaris*, *major* und *praevalens*, die alle abweichend gezeichnet sind."

Distribution. — Central West China (Yunnan?).

#### VII. Addenda

After this paper had been sent to the press, fresh consignments of regional specimens of *Thyreus* requiring closer attention were received. Moreover, I have had the opportunity to verify a number of previous identifications and records of specimens preserved in the collections of the Zoological Institute of the Academy of Sciences, Leningrad. As these investigations have contributed to our knowledge in some way or other, the following comments can here be given on species of interest.

#### **Thyreus dimidiatipuncta bidentatus** (Kirby), p. 42

Material. — U S S R: ♀, Turkmenia, labelled: Pul-i-Chatun, *Crocisa valida* F. Morawitz ♀ (in Morawitz' writing), evidently the holotype of that species (ZIL). — ♀, with partly illegible written label: Imam-Baba, Mervenegro (?) area, 5.v.1931, leg. Frolova (transl. from Russian), *Crocisa valida* F. Mor., det. Popov 1957 (ZIL).

These two specimens, studied by me recently, correspond closely with the original description of *C. valida* and are undoubtedly conspecific with Kirby's *C. bidentata*, so that the above synonymy seems to be well established.

The pygidial plate of the type of *C. valida* is broadly triangular, sharply longitudinally carinate, the apex being bluntly pointed.

#### **Thyreus hellenicus** Lieft., p. 71

Material. — Greece: ♂ (diss.), labelled: Parnass[us] (print), *Pseudo-melecta Baeri* ?? (unknown hand, MBUD).

Quite similar to the males described and figured previously. Apart from the genitalic characters, the bracket-shaped scutellar emargination with its white hair-fringe is a helpful recognition mark of this species.

**Thyreus hirtus** (de Beaumont), p. 89

Material. — S p a i n: ♀, Castilia, Soria, 16-22.vi.1964, W. Linsenmaier (CL).

**Thyreus picaron** Lieft., p. 92

Material. — U S S R: 2 ♂ (diss.), Stalinabad [Tadzhikistan], Bot. Garden, 2.viii.1943 and 23.vi.1944, on *Vitex agnus castus*, V. Popov leg. (transl. from Russian), under drawer-label *Crocisa ashabadensis* Rad. (ZIL).

These Stalinabad specimens form part of a long series of either sex, collected simultaneously with a still greater number of *T. ramosus* (Lep.), most (if not all) having been taken on flowers of *Vitex*. The two series, though looking extraordinary alike in general appearance and size, were recognised as different taxa and kept separate as such by the late Dr. Popov, who identified them as *T. ramosa* and “*ashabadensis*”. Popov obviously had noted the difference in the male genitalia (the much longer hairs at the gonostylus of his “*ashabadensis*” distinguishing the latter from *ramosus*) but failed to examine the apical sternal plates. The peculiar shape of the apical lobes of the 7th sternite of this “*ashabadensis*” now definitely proves the species to be *picaron*. Hence it is evident that three different species are involved in Popov's conception of *Crocisa ashabadensis*, viz. *T. ramosus* (Lep.), *picicornis* (Mor.) and *picaron* Lieft.

**Thyreus praevalens** (Kohl), p. 69

Material. — A s i a M i n o r (Turkey): ♂ (diss.), with three labels: Amasia 1885/723b/14, and *Melecta* n.sp. (unknown hand, MBUD).

This example is of particular interest on account of the rich admixture of white feathery hairs that covers the frontal area and basal half of the clypeus. By having this pubescence white instead of mainly black, this male more nearly resembles the same sex of *T. altaicus* (Rad.) and *hellenicus* m. (see footnote in the specific key, p. 17). The scutellum is a little shorter than in the other male from Amasia but the hair fringe projecting from beneath the scutellar emargination is black, as in all other males. Otherwise the present individual is quite typical and fairly easily distinguished from its nearest allies by the structural characters.

**Thyreus ramosus** (Lep.), p. 112

Material. — A s i a M i n o r (Turkey): ♂ (diss.), Ismir, Kusadasi and Efes, 19-21.vii.1967; ♂ (diss.), Denizli, Pamukkale, 15.vii.1967; ♀, Antalya, Selale, 21.vii.1966; all J. Leclercq (FAG). — W. P a k i s t a n: ♂ (diss.), Rawalpindi, 15-30.v.1967 (FAG).

C — CATALOGUE OF PALEARCTIC SPECIES OF *THYREUS* PANZER AND INDEX, arranged in alphabetical order and with indication of original type locality and page reference to the present article. (Valid names are printed in **bold** or normal type, synonyms in *italics*). Species of which no authentic material was examined, are marked with an asterisk (\*).

- \***aberrans** (Morawitz, 1875) — Samarkand, 129  
**affinis** (Morawitz, 1874) — Derbent. Bacu, 28, 47  
*C. portchinski* Radoszkowski, 1893 — Caucase, 47  
*C. transcaspica* Radoszkowski, 1893 — Transcaspie, 47  
*C. tunensis* Pérez, 1895, syn. nov. — Sine patria, 48  
*C. villosa* Meyer, 1921 — Ashabad, 48  
*albociliata* Meyer, 1921, see ramosus, 113  
*alboscuteolata* Meyer, 1921, see histrionicus, 84  
**altaicus** (Radoszkowski, 1893) — Minusinsk, 24, 65  
*ashabadensis* Radoszkowski, 1893, see ramosus, 113  
**bidentata** Kirby, 1889, see dimidiatipuncta bidentatus, 16, 42, 135  
**bimaculatus** (Radoszkowski, 1893) — Chine, 25, 108  
\***biseriata** (Morawitz, 1888) — Sibiria, 130  
*brezzii* Guiglia, 1933, see elegans, 58  
*caucasica* Radoszkowski, 1893, see ramosus, 113  
*circulata* Alfken, 1927, see ramosus, 113  
*crassicornis* Morawitz, 1890, see scutellaris, 45  
*curviscutum* Alfken, 1934, see truncatus, 98  
**dimidiatipuncta bidentatus** (Kirby, 1889) comb. nov. — Hari-rud valley, 16, 42, 135  
*C. valida* Morawitz, 1895, syn. nov. — Pul-i-Chatun, 43  
**dimidiatipuncta dimidiatipuncta** (Spinola, 1838) stat. nov. — Egypte, 15, 35  
*C. gibba* Meyer, 1921, syn. nov. — Ägypten, 35  
*divisa* Pérez, 1905, see histrionicus, 83  
**elegans** (Morawitz, 1877) — Caucasus, 27, 58  
*C. brezzii* Guiglia, 1933, syn. nov. — Cyrenaica, 58  
*C. quadridentata* Saunders, 1908, syn. nov. — Algeria, 58  
**fallibilis** (Kohl, 1906) — Makalla, 31, 95  
*gibba* Meyer, 1921, see dimidiatipuncta, 35  
**hellenicus** sp. nov. — Greece, 25, 71, 135  
**hirtus** (de Beaumont, 1939) — Suisse, 20, 89, 135  
**histrionicus** (Illiger, 1806) — Südl. Europa, 34, 83  
*C. divisa* Pérez, 1905, syn. nov. — La Garriga (Spain), 83

- C. histrionica* var. *alboscuteolata* Meyer, 1921, syn. nov. — 84  
*C. major* Morawitz, 1875 — Taschkent, 83  
*C. rimosiscutum* Alfken, 1927, syn. nov. — Cyrenaica, 84  
**hyalinatus** (Vachal, 1903) — Obock (Somalia), 30, 122  
**illudens** sp. nov. — China, 21, 82  
**impexus** sp. nov. — China, 22, 77  
**incultus** sp. nov. — China, 22, 80  
**\*intrudens** (Smith, 1878) — Yarkand, 131  
**\*laevicrus** (Morawitz, 1887) — Oasis Nia (Tibet), 131  
**macleayi** Cockerell, 1907, 128  
*major* Morawitz, 1875, see *histrionicus*, 83  
**mauretaniensis** Strand, 1911 — Algier, 22, 76  
**merviensis** Radoszkowski, 1893 — Merv, 15, 44  
*minor* Friese, 1925, see *ramosus*, 113  
*mucorea* Friese 1925, see *truncatus*, 98  
*nadigi* Alfken, 1933, see *truncatus*, 98  
*niveicollis* Friese, 1925, see *tricuspis*, 104  
**nubicus** (Lepeletier, 1841) — Nubie, 29, 106  
**orbatus** (Lepeletier, 1841) — France, 20, 61  
**parthenope** sp. nov. — Arabia, 26, 110  
**paucimaculosus** (Alfken, 1930) — Alai-Pamir, 19, 51  
**picaron** sp. nov. — Jugoslavia, 32, 92, 136  
**\*picea** Meyer, 1921 — Poros, 132  
**picicornis** Morawitz, 1875 — Kizilkum, 32, 120  
**\*plumata** Meyer, 1921, Mailand, 133  
*plurinotata* Meyer, 1921 (= **macleayi** Cockerell 1907), 128  
*portchinski* Radoszkowski, 1893, see *affinis*, 47  
**praevalens** (Kohl, 1905) — Erdschias, 17, 69, 136  
**priesneri**, sp. nov. — Egypt, 31, 124  
**propinquus**, sp. nov. — Korea, 19, 56  
*quadridentata* Saunders, 1908, see *elegans*, 58  
**ramosellus** (Cockerell, 1919) — India, 33, 35, 126  
**ramosus** (Lepeletier, 1841) — France, 34, 35, 112, 136  
*C. albociliata* Meyer, 1921, syn. nov. — Hab. ign., 113  
*C. ashabadensis* Radoszkowski, 1893, syn. nov. — Transcaspie, 113  
*C. caucasica* Radoszkowski, 1893, syn. nov. — Caucase, 113  
*C. circulata* Alfken, 1927, syn. nov. — Cyrenaica, 113  
*C. minor* Friese, 1925, syn. nov. — Kleinasien, 113  
*C. rufa* Radoszkowski, 1886, syn. nov. — Transcaspia, 113  
*rimosiscutum* Alfken, 1927, see *histrionicus*, 84

- rufa* Radoszkowski, 1886, see *ramosus*, 113
- \***ruficornis** Alfken, 1934, Egypt, 133
- scutellaris** (Fabricius, 1781) — Siberia, 28, 45  
*C. crassicornis* Morawitz 1890, syn. nov. — Schuan-Dshin (Mongolia),  
45
- sibiricus** (Radoszkowski, 1893) — Minusinsk, 19, 54
- transcaspica* Radoszkowski, 1893, see *affinis*, 47
- tricuspis** (Pérez, 1883) — Algérienne, 23, 104  
*C. niveicollis* Friese, 1925, syn. nov. — Syria or Egypt, 104
- truncatus** (Pérez, 1883) — Provence et Languedoc, 24, 98  
*C. curviscutum* Alfken, 1934, syn. nov. — Egypte, 98  
*C. mucorea* Friese, 1925, syn. nov. — Egypt, 98  
*C. nadigi* Alfken, 1933, syn. nov. — Marokko, 98
- tunensis* Pérez, 1895, see *affinis*, 48
- \***unicincta** Hedicke, 1940 — Tal des Yangtse (Tibet), 134
- uniformis** (Kirby, 1900) — Sokotra, 16, 97
- valida* Morawitz, 1895, see *dimidiatipuncta bidentatus*, 43
- villosa* Meyer, 1921, see *affinis*, 48

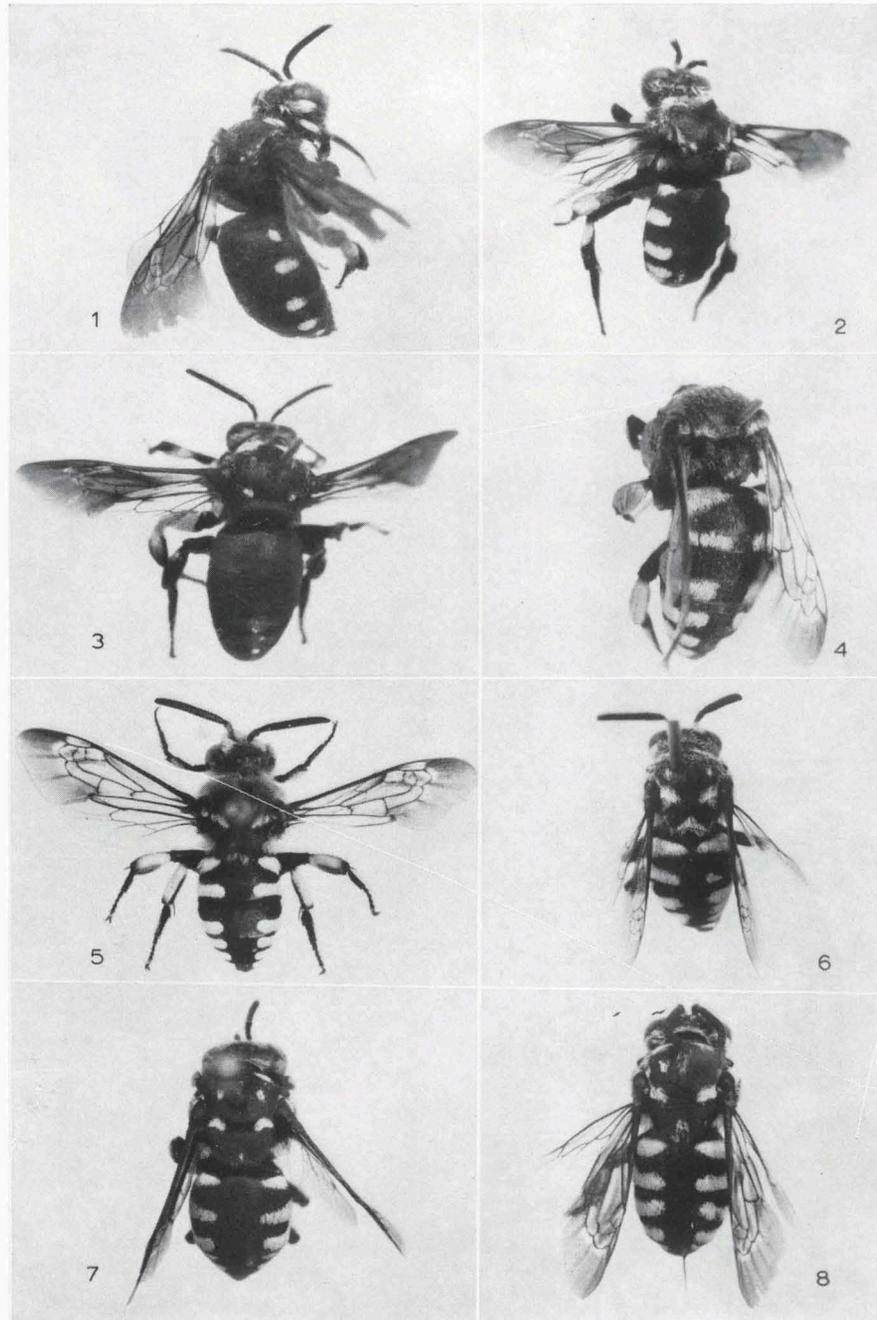


Fig. 1-2. *Thyreus d. dimidiatipuncta* (Spinola), ♀ lectotype (fig. 1) and ♂ allotype (fig. 2) from Egypt. Fig. 3. *T. dimidiatipuncta bidentatus* (Kirby), ♂ lectotype from Hari-rud (Afghanistan). Fig. 4. *T. merviensis* (Rad.), headless ♂ holotype from Merv (Turkmenia). Fig. 5. *T. scutellaris* (F.), ♂ plesiotype from Siberia. Fig. 6. *T. affinis* (Mor.), ♂ holotype *Crocisa affinis* var. *villosa* Meyer, from Askhabad. Fig. 7. *T. affinis* (Mor.), ♀ lectotype *Crocisa portchinski* Rad., from Caucasus. Fig. 8. *T. affinis* (Mor.), ♀ lectotype *Crocisa transcaspica* Rad., from Transcaspia.

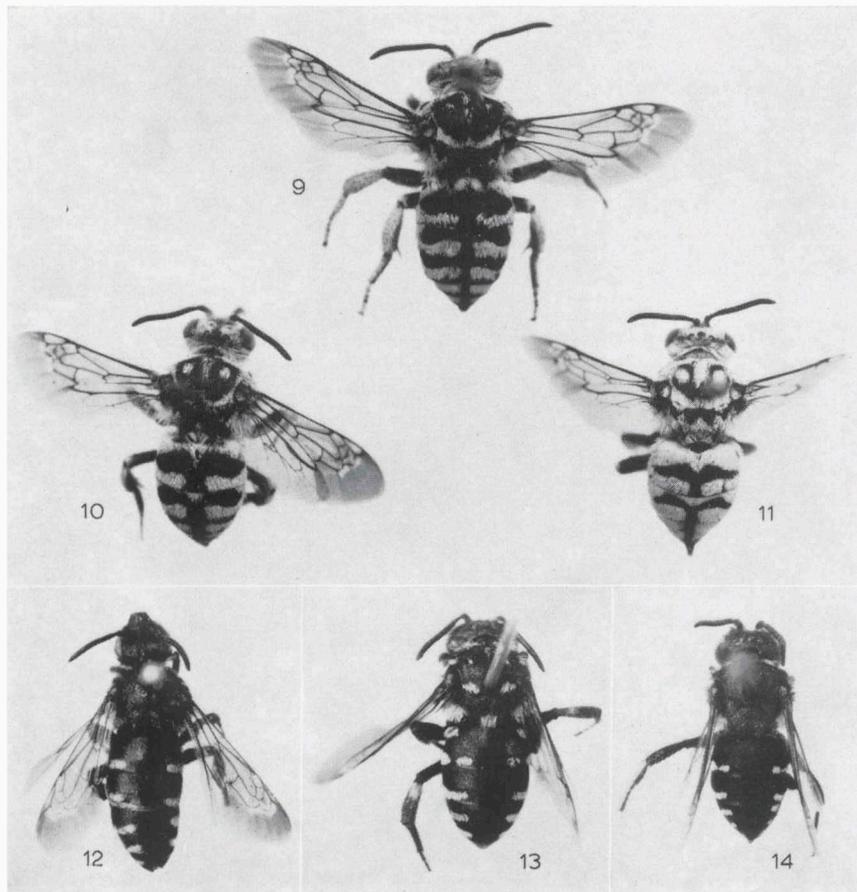


Fig. 9. *Thyrcus elegans* (Mor.), ♀ from Kars Igdır (Asia Minor). Fig. 10. *T. elegans* (Mor.), ♀ from Akrotiri Bay, Cyprus. Fig. 11. *T. elegans* (Mor.), ♀ from Cyrenaica. Fig. 12. *T. propinquus* sp.n., ♂ holotype from Enjōmen (North Korea). Fig. 13. *T. sibiricus* (Rad.), ♀ holotype from Minusinsk (South Siberia). Fig. 14. *T. paucimaculosus* (Alfken), ♀ holotype from Maz (West Pamir).

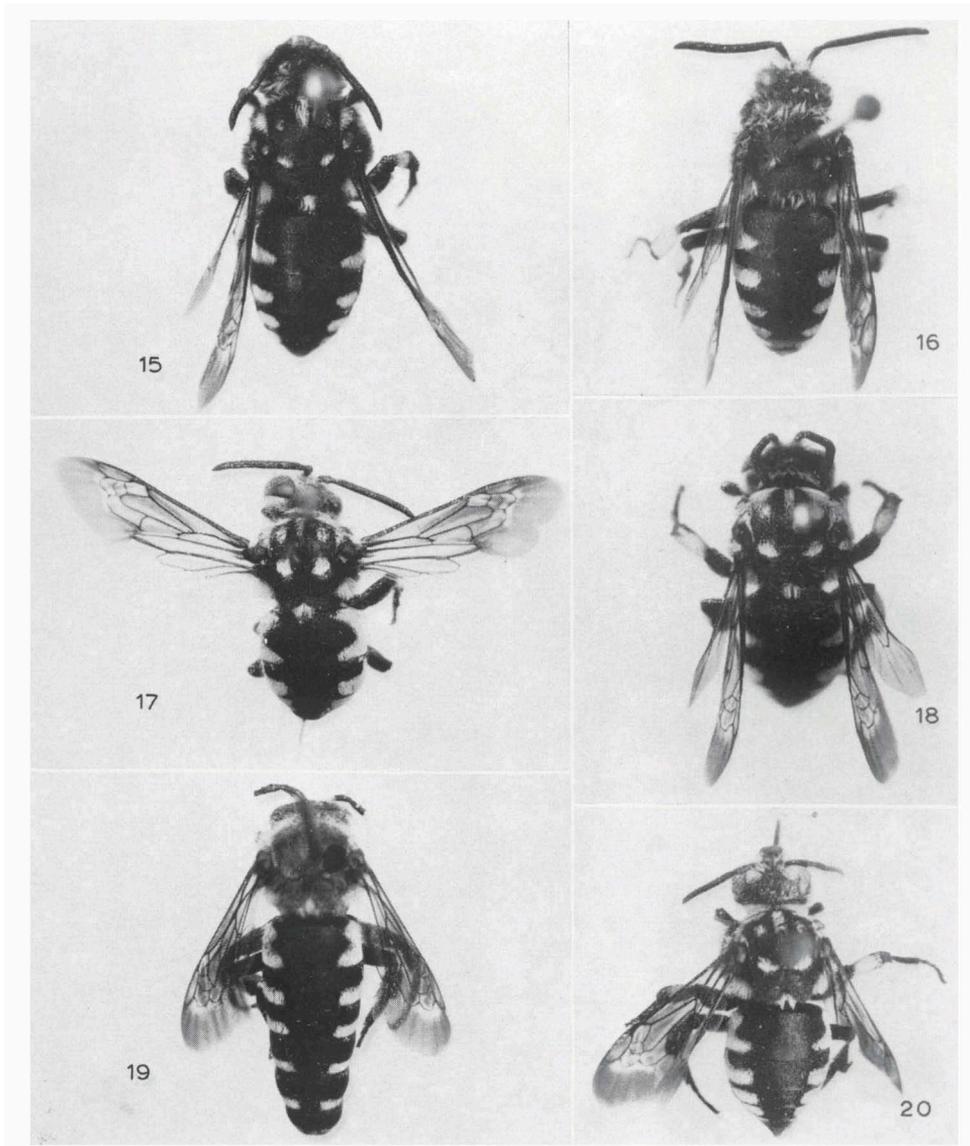


Fig. 15. *Thyreus altaicus* (Rad.), ♀ holotype from Minusinsk (South Siberia). Fig. 16. *T. mauretaniensis* (Strand), ♂ holotype from Algeria. Fig. 17. *T. histrionicus* (Ill.), ♀ lectotype *Crocisa rimosiscutum* Alfken from Derna, Cyrenaica. Fig. 18. *T. truncatus* (J. Pér.), ♀ holotype *Crocisa ramosa* var. *mucorca* Friese, from Heliopolis (Egypt). Fig. 19-20. *T. truncatus* (J. Pér.), ♂ holotype (fig. 19) and ♀ allotype *Crocisa nadigi* Alfken (fig. 20) from El Hajeb, Morocco.

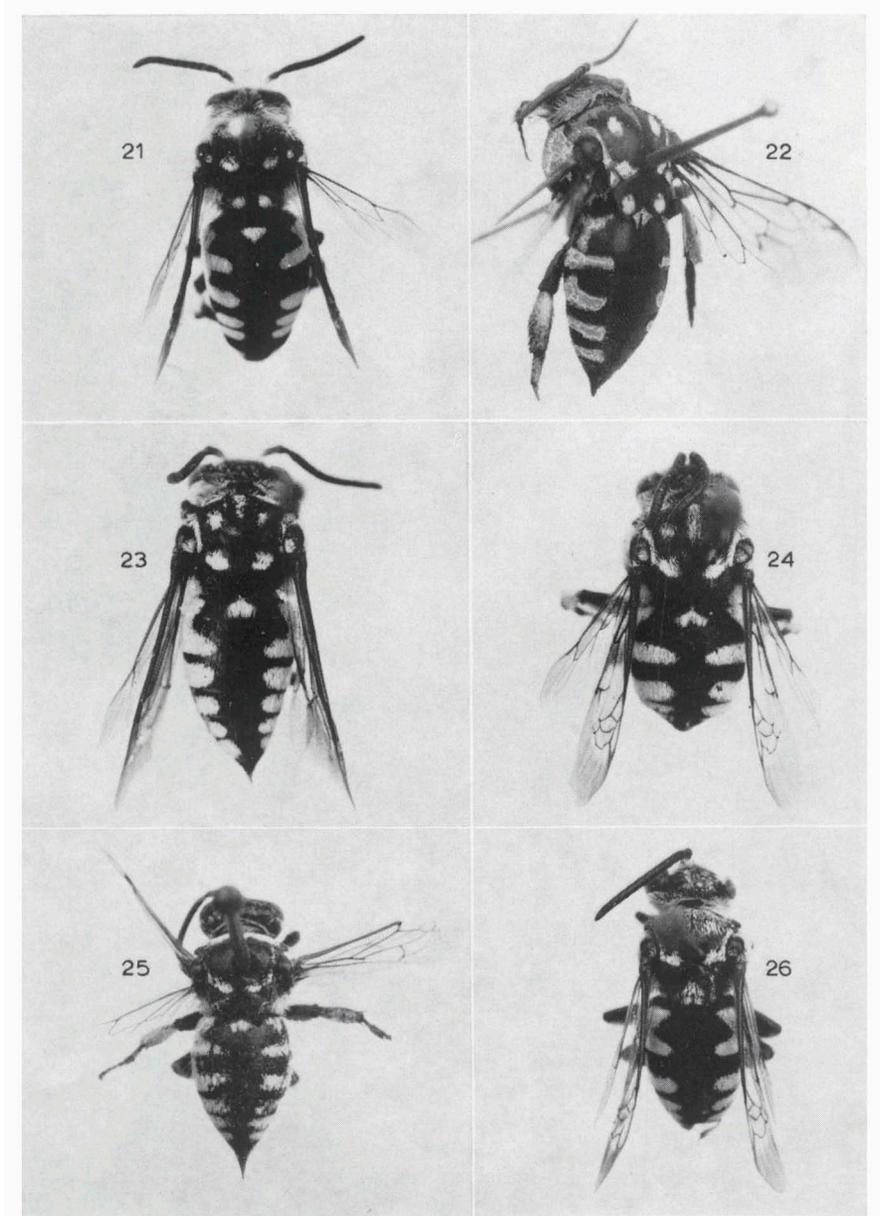


Fig. 21. *Thyreus tricuspis* (J. Pérez), ♂ holotype *Crocisa truncata* var. *niveicollis* Friese, from Syria. Fig. 22. *T. bimaculatus* (Rad.), ♀ holotype from China. Fig. 23. *T. fallibilis* (Kohl), ♀ holotype from Makalla (Arabia). Fig. 24. *T. ramosus* (Lep.), ♀ lectotype *Crocisa ashabadensis* (Rad.), from Transcaspia. Fig. 25. *T. ramosus* (Lep.), ♀ holotype *Crocisa rufa* Rad., from Tashkent. Fig. 26. *T. ramosus* (Lep.), ♂ holotype *Crocisa affinis* var. *minor* Friese, from Asia Minor.