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## NOTES ON ASTATA LATREILLE (HYMENOPTERA SPHECOIDEA)

by

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### I. Grouping of European species of the genus *Astata* Latr.

It is not my intention to anticipate in this paper a subgeneric division of the genus *Astata* <sup>1)</sup>. For the purpose of such division, it would be necessary to investigate more non-European material than at present is at my disposal. But at first view it seems to me that the European species may be divided into four distinct groups, which may be separated with the key given below.

Two of the proposed groups (the *stigma*-group and the *tricolor*-group) form part of the subgenus *Dryudella* Spinola, as this subgenus has generally been understood; nevertheless, the differences between these two groups, namely in the shape of the clypeus and, in the females, in the habitus, seem to justify separating them; although, investigation of allied non-European species might make it necessary to adapt or to modify the key to the groups.

Eventually, the possibility that non-European intermediate forms will make the separations untenable cannot be absolutely excluded. A decision about the taxonomic rank of the proposed groups, therefore, must be postponed.

Spinola (1843, p. 135), erecting the genus or subgenus *Dryudella* ("une nouvelle coupe, qu'on appellera genre ou sous-genre, selon les principes qu'on aura adoptés dans la nomenclature binominale"), based the "nouvelle coupe" on the wing venation of "*Dimorpha cincta* Perris" and separated it from

<sup>1)</sup> *Astata* Latreille, 1796, with genotype *Tiphia abdominalis* Panz., 1798 = *Astata boops* (Schrank, 1781), monobasic, since Latreille included a single species in 1802.

"*Dimorpha*"<sup>1)</sup> "par la troisième cubitale, lunulée comme dans les "*Lyrops*"<sup>2)</sup> et par la première nervure récurrente, qui s'anastomose avec la nervure transversale qui sépare la première de la seconde cubitale". However, in these critical features, Spinola was incorrect in several respects. Even excluding *stigma* and its near allies from *Dryudella* (Spinola himself never included *stigma*, which was apparently unknown to him), the difference between the third cubital cells of *Dryudella* and *Dimorpha* (*Astata* s. str.) is by no means adequate. In *Astata* (*Astata*) *costai* Picc. ♀ the third cubital cell is not different from that of *Dryudella* s. str. Furthermore, the third cubital cell in *Dryudella* is by no means produced along the cubitus (lunulée?) as in *Tachysphex* or *Tachytes*.

On the other hand, the *stigma*-group, which by authors (excluded Spinola himself) generally has been included in *Dryudella*, is only partly covered by the characters of wing-venation given by Spinola, inasmuch as, as far as noticed, only in *A. pinguis* Dahlb. (the smallest European species of the *stigma*-group) the first recurrent vein happens to be interstitial with the first transverse cubital vein.

The segregation of subgenera or groups in *Astata* s. l. is not possible on base of wing-venation, and, since the erection of *Dryudella* has to be considered as valid<sup>3)</sup>, *Dryudella* must be isolated on base of the actual characters of its genotypical species only.

Even for segregation of species in *Astata* s. l. the wing-venation is hardly usable, because of its variability within the species.

The genotype of *Dryudella* will be discussed in part II of this paper. If my conclusions, there proposed, should be accepted, *Astata tricolor* Lind. will be the genotype of *Dryudella* Spin. If the proposed groups prove to deserve subgeneric rank, the subgenus *Dryudella* would cover my *tricolor*-group.

The four groups of European species in *Astata* s. l. may be separated with the following key.

1) *Dimorpha* Panzer, 1806 = isogenotypic with *Astata* Latreille, 1796.

2) *Lyrops* Illiger, 1807 = congeneric with *Tachytes* Panzer, 1806, but, in the sense of Spinola, *Lyrops* includes *Tachysphex* Kohl, 1883, as well.

3) In modern conception (art. 25 of the Règles) the validity of the generic or subgeneric name *Dryudella* is indisputable. In this connexion, it is interesting to read Kohl (1884, p. 432, footnote): "Die Unbeständigkeit im Verlauf der Discoidalqueradern war die Ursache, welche zur Aufstellung der Gattung *Dryudella* Spin. geführt hat. Dass diese ausschliesslich auf den Verlauf der Discoidalqueradern gegründete Gattung ebenso wenig als die in ganz analoger Weise aufgestellte Gattung *Pisonitus* länger fortbestehen kann, ist selbstverständlich."

European groups of *Astata* Latr.

♀♀ and ♂♂

1. Dorsum of propodeum very distinctly striate and/or reticulate, fairly shining between the rugae. The sculpture of the mesopleurae never finely coriaceous and always different from the sculpture on the dorsum of propodeum.

In the ♀♀: Vertex and frons shining and always very distinctly (irregularly and more or less coarsely) punctured. Lateral margins of pygidial plate externally fringed with backward curved setae (if not completely rubbed off in small specimens).

In the ♂♂: Malar space narrow, its average width much smaller than half the base of the mandible . . . . . 2.

- Dorsum of propodeum very finely coriaceous, dull or feebly shining, without or with subtle and dispersed striae and/or reticulations (more or less disappearing in the delicate sculpture).

In the ♀♀: Vertex and frons coriaceously dull or microscopically sculptured and more or less shining, sparsely and shallowly punctured. Pygidial plate externally without distinct, curved fimbriae, at the most the margins externally provided with a few bristles.

In the ♂♂: Malar space considerable, about two thirds of the base of the mandible . . . . . 3.

2. Pronotal tubercles somewhat swollen, very shining, most often with a few punctures. Mesopleurae very shining, coarsely punctured on the disk; the punctures well defined and sharply cut.

In the ♀♀: Anterior margin of clypeus with a little tooth at either side of the central process (as in *stigma*-group: fig. 1). Under side of the anterior femora with dark short setae, not longer than the flagellum is thick.

In the ♂♂: Anterior surface of mandibles near their base angular, subparallel to the base of the mandible, more prominent below and resulting in a distinct angle of the inferior margin of the mandible. First tergite and middle femora behind, coarsely and densely punctate. Pilosity on sternites evenly distributed, without densely pilose patches . . . . . group *miegii* (*Astata miegii* Dufour, 1861).

- Pronotal tubercles normally convex, more or less finely sculptured, dull. Mesopleurae variously sculptured, but not as in the *miegii*-group.

In the ♀♀: Anterior margin of clypeus without a little tooth at either side of the central process. Anterior femora with long hairs: the longest longer than the flagellum is thick.

In the ♂♂: Anterior surface of mandibles flat and the inferior margin not angular near the base of the mandible. First tergite and middle femora behind not or indistinctly punctate. Apart from the normally distributed hairs on the sternites, there are limited patches of conspicuous dense pilosity . . . . .

group *boops* (*Astata boops* (Schrank, 1781)).

3. Species of 6-11 mm. Habitus of *boops*-group.

In the ♀♀: Anterior margin of clypeus with a more or less projected central lobe and a little tooth at either side of the lobe (fig. 1).

In the ♂♂: Clypeus with a similar central process, but without the attending little teeth. . . . . group *stigma* (*Astata stigma* (Panz., 1809)).

- Species of 5-7 mm.

In the ♀♀: Habitus more slender and fragile. Pronotum somewhat longer, about as long as wide at the base, laterally more or less compressed and its inclination before the mesonotum in profile mostly more convex than in the *stigma*-group. Clypeus transverse, without a central lobe (centrally not produced into a free and

flat appendage); the slightly depressed anterior margin narrow, laterally reaching the outer tangent of the antennal sockets.

In the ♂♂: Clypeus without actual central lobe (not produced into a free and flat appendage) and probably of various character; in *tricolor* Lind. the clypeus is centrally bidentate and bent backwards between the slightly truncated teeth.

group *tricolor* (*Astata* (*Dryudella*) *tricolor* Lind., 1829)

## II. Genotype of (the subgenus) *Dryudella* Spinola.

Pate (1937, p. 24) suggests that *Dryudella* Spinola, 1843, is monobasic with *Dryudella ghilianii* Spinola, 1843, as genotype.

Maidl & Klima (1939, p. 24) suggest that the genotype of *Dryudella* is *Dimorpha cincta* (Perris MS) Spinola, 1843, by original designation.

It seems to me that both suggestions are incorrect.

Pate (1937) apparently considered "*Dimorpha cincta* Perris" (in Spinola 1843) as a nomen nudum and *Dryudella ghilianii* as the only included species. But, since Perris never described a species under the name "*Dimorpha cincta*", the description given by Spinola, short and imperfect as it may be, is sufficient to validate the name "*cincta*" with Spinola as its author. To my opinion, therefore, Spinola (1843) included two species, *cincta* and *ghilianii* (which fact will not be affected if *cincta* and *ghilianii* prove to be conspecific).

Maidl & Klima (1939), though probably accepting two included species, considered Spinola having designated *cincta* as genotype, apparently because Spinola first erects the "nouvelle coupe" on base of (the wing-venation of) *cincta* and, after that, adds a new species: *ghilianii*. However, article 30 a of the Règles requires a definite designation, and, therefore, no "original designation" took place.

Inasmuch as the erroneous suggestions by Pate (1937) and Maidl & Klima (1939) cannot be considered as actual genotype designations<sup>1)</sup>, I select herewith *Dryudella ghilianii* Spinola, 1843, as Genotypus (by subsequent designation) of (the subgenus) *Dryudella* Spinola, 1843.

The identity of *Dryudella cincta* and *ghilianii* will be discussed in part III of this paper, with the result that the genotype of the subgenus *Dryudella* is: *Dryudella ghilianii* Spinola, 1843 = *Astata tricolor* Van der Linden, 1829 = *Astata* (*Dryudella*) *tricolor* Van der Linden, 1829.

## III. *Astata tricolor* Lind., *Dryudella cincta* and *ghilianii* Spin.

According to information kindly given by A. Crèvecoeur (Brussels), and

1) H. Townes (Hymenoptera of America North of Mexico (Synoptic Catalog), U. S. Dept. of Agriculture, Washington, April 1951, p. 940) is incorrect when stating that Pate (1937) actually designated *ghilianii* Spin. as genotype of *Dryudella* Spin.

Prof. Dr. H. Bischoff (Berlin), the type of *Astata tricolor* Van der Linden, 1829, does not exist in either the museums of Brussels and Berlin. Van der Linden described his species from a specimen "d'Espagne; collection de M. le comte Déjean", while, as far as known, only Spinola obtained hymenopterous material out of that collection. But Dr. J. de Beaumont (Lausanne) found no specimen in Spinola's collection at Torino which possibly could be identified as the original specimen referred to in Van der Linden's description.

Considering: 1. that the original type specimen of *Astata tricolor* Lind., 1821 (♂) is lost; 2. that it is desirable to fix the identity of that species: I select herewith as its Neotypus: a male specimen (antennae partly missing), collected by me near Setubal in Portugal on July 28, 1950, agreeing with Van der Linden's description and the usual interpretation of the species, which species is not uncommon in the South of France and on the Iberian Peninsula. This neotype, with my label: "*Astata tricolor* | v. d. Linden 1829! Neotypus", will be deposited in the Zoological Museum of Lausanne (Switzerland).

De Beaumont kindly allowed me to publish here the results of his examination of Spinola's original material of *Dryudella cincta* and *ghiliani*, which is preserved in the museum of Torino (Italy).

In Spinola's collection exists a separate label with the following text: "*Dryudella cincta* (*Astata*) Perris ♀♂ | *Astata tricolor* Dahlb. | Coll. Latreille et M. Dufour | Fr. mérid." with four accessory specimens, viz., four males. Two of them (one with attached label: "♀") belong to *Astata tricolor* Lind. as interpreted above (teste De Beaumont) and must be considered the original specimens to which Spinola referred when he wrote: "*Dimorpha cincta*, Perris; dont M. Dufour m'a communiqué les deux sexes". The two other males, presumably "retrouvés dans l'ancienne collection Latreille", belong to a similar but different species of unknown identity and patria, and may, therefore, be best disregarded.

I select herewith the above mentioned male of *Astata tricolor* Lind., which is not labelled with: "♀", as Holotypus of *Dryudella cincta* Spin. De Beaumont attached my label: "*Dryudella cincta* | Spinola 1843 | Lectoholotypus" to the specimen.

In Spinola's collection exists no specimen indicated with the name "*Ghiliani*", but there is a separate label with the following text: "*Dryudella baetica* n. sp. ? ♀ | *Astata stigma* Dahlb. ? | *D. Ghiliani* — Andalousie" with two accessory specimens, viz., two females. One of them, with attached label: "♀", belongs to *Astata tricolor* Lind. as interpreted above (teste De Beaumont), and must be the actual specimen referred to in the original text:

"Une femelle". Spinola apparently preferred to name the species "*ghiliani*", to honour the naturalist Vittore Ghiliani, instead of "*baetica*". The other specimen, presumably added afterwards to the collection and in bad condition, belongs to a similar but different species of unknown identity and patria, and must be disregarded.

*Dryudella ghiliani* Spin. is based on the above mentioned single female specimen of *Astata tricolor* Lind. labelled with: "♀", which, therefore, is ipso facto the Holotypus of the species. De Beaumont kindly attached my label: "*Dryudella ghiliani* | Spinola 1843 | Holotypus" to the specimen.

When Spinola, in his description, compared *cincta* with *ghiliani* and stated that the colouring of these two forms is very different, it has to be realized, that Spinola compared his *ghiliani*-female with *cincta*-males, mistaking one of the latter for a female.

Conclusion: *Astata (Dryudella) cincta* and *ghiliani* Spinola, 1843, are synonyms of *Astata (Dryudella) tricolor* Lind., 1829, which species is identified as one not uncommon in the South of France, Spain and Portugal, and which is generally called by the latter name.

Apart from the above discussion, it may be observed that no closely allied species is known from the mentioned areas so far, so that the above identifications can scarcely disagree with the intentions of Van der Linden and Spinola.

#### IV. *Astata stigma* (Panz.) and *A. pinguis* (Dahlb.) hitherto confounded.

Revising Dutch material of *Astata stigma* auct., two distinct species proved to be concealed under that name, one of them on the average being smaller than the other. Trying to find out which of them has to bear the name *stigma* Panzer, Prof. Dr. H. Bischoff (Berlin) had the kindness to answer my questions and to inform me as follows: "Panzer sagt ausdrücklich: "Habitat Berolini. Dr. Klug." Danach hat ihm also Klug, der damals am hiesigen Museum war, das für die Abbildung als Grundlage dienende Stück zugeschickt. Da hier aber kein Stück mit der Bemerkung "Sturm pinx." vorliegt, dürfte Klug eines von mehreren an Panzer selbst abgegeben haben. Wo dieses Originalstück geblieben ist, kann ich nicht sagen. Man müsste also, wenn man die Art deuten will, auf die hiesigen Klug'schen Exemplare zurückgreifen. Davon existiert hier nur ein Männchen. Es gehört der in Mitteleuropa allgemein verbreiteten, häufigen Art an. Weder Gussakovskij noch De Beaumont scheinen aber erkannt zu haben, dass daneben noch eine weitere ähnliche, im Durchschnitt kleinere Art vorkommt, die allerdings ein mehr nördliches Verbreitungsgebiet zu besitzen scheint und wohl den Namen *pinguis* Dahlbom führen müsste."

Gladly I admit that Prof. Bischoff discovered these facts before I did. After request for further details about Klug's male specimen, Bischoff wrote me as follows: "In unserm alten Museumkatalog aus dem Jahre 1853 findet sich unter Nr. 4069 folgender Hinweis: "*Astata stigma* Kl. Panz. 6. Europa." Von diesen sechs Exemplaren liegen vier mit der gleichen Nummer vor, darunter 1 Stück mit der gedruckten Nummer, die anderen mit handschriftlicher. Jeweils das erste Stück einer Reihe wurde damals mit der gedruckten Ziffer versehen. Von diesen vier Stücken aus der alten Serie gehören zwei zu *stigma* und zwei zu *pinguis*, aber nur eines ist ein Männchen; dieses Stück trägt ausserdem die gedruckte Nummer 4069 und es ist eine *stigma*. Von besonderer Bedeutung ist auch, dass es einen von Klug geschriebenen vierzeiligen Zettel trägt: "*stigma* | Kl. Panz. | ♀ *Larra pinguis* | Dahlb." Dazu kommt an der gleichen Nadel noch der gedruckte Fundortzettel: "Europa". Das Stück ist tadellos erhalten".

Dr. W. Forster, custodian of the entomological division of the "Zoologische Sammlung des Bayerischen Staates" at Munich, kindly informed me that by this time no type of *Dimorpha stigma* Panzer exists in the Munich Museum and that such type has probably been lost with the partial destruction of Sturm's collection in 1944.

Considering: 1. that Panzer's type is apparently lost; 2. that the above mentioned male of Klug's collection agrees with description, size and figure given by Panzer (size and, in the figure, the distinctly marked considerable bilobate spot on the face and the apical infuscation of the fore-wings fairly distinguish Panzer's species from *pinguis* Dahlbom, whereas the type locality excludes any other allied species); 3. that the above mentioned male presumably forms part of the same series as the original specimen from which Panzer's description and figure were drawn up; 4. that it is desirable to fix the identity of *Dimorpha stigma* Panzer, 1809: I select herewith the above mentioned Klug's male specimen, which is preserved in the Berlin Museum with attached printed number 4069, as Neotypus of *Dimorpha stigma* Panzer, 1809.

Professor Bischoff attached my label: "*Dimorpha stigma* Panzer | Neotypus" to the specimen. Moreover, he kindly examined and returned to me two Dutch males with his labels: "*Ast. stigma* Pz. | mit Neotypus verglichen | det. Bischoff '51", now in my collection.

Owing to the kindness of Docent K. Ander (Lund, Sweden), I was able to examine the *Astata*-material from the Dahlbom and Zetterstedt collections preserved in the Lund Museum. Ander informed me that Zetterstedt kept up three collections: the "collectio Lapponica", a (middle- and south-) Swedish collection, and an exotic collection, of which the two latter were

put at Dahlbom's disposal when Dahlbom seriously commenced with his work in aculeates.

Dahlbom published *Larra pinguis* in his *Exercitationes Hymenopterologicae* in 1832 and added: "Abdomen nitidissimum quasi vernice vel liquore pingui obductum; hinc nomen specificum *pinguis* quocum haec species in museo Dom. Professoris Zetterstedt designata extat."

The material from the Dahlbom collection contained no specimens labelled with *pinguis* or with a date before 1832 in the handwriting of the author; but it contained one abdomenless female, labelled "*L. pinguis* Zett. ♀" in Zetterstedt's handwriting, which was taken on the island Öland and which must be the specimen mentioned in Dahlbom's text quoted above. It is, therefore, the only traceable specimen of the original material and I select herewith that specimen as Holotypus of the species. I attached my label: "*Larra pinguis* | Dahlbom 1832 | Lectoholotypus" to the specimen.

Zetterstedt published his *Larra pinguis* in 1838 (*Insecta Lapponica* I, sectio 2), though the text was apparently prepared much earlier (the introduction to part Hymenoptera dating 1832), without referring to Dahlbom's *Exercitationes*. The material of Zetterstedt contained an undamaged (but fragile) female labelled: "*L. pinguis* | ♀ Calix" in Zetterstedt's handwriting. It must be the specimen, or one of the specimens, referred to by Zetterstedt: "*Lapponica; Botnia borealis ad Calix*" and, therefore, it belongs to the original material from which Zetterstedt drew up his description. I select herewith this specimen as Holotypus of *Larra pinguis* Zetterstedt. I attached my label: "*Larra pinguis* | Zetterstedt 1838 | Lectoholotypus" to the specimen.

*Larra pinguis* Zett. is a homonym of *Larra pinguis* Dahlb., and, being conspecific with it, a synonym at the same time.

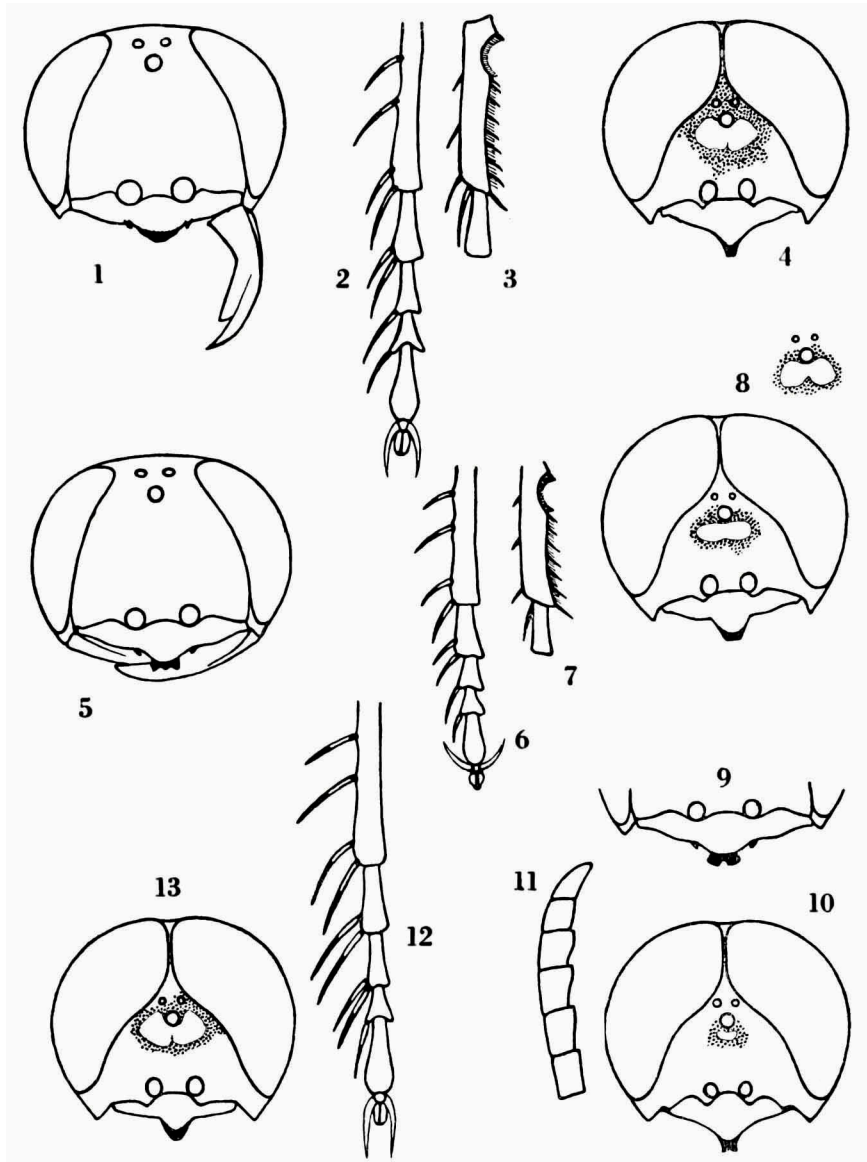
*Astata stigma* (Panz.) and *Astata pinguis* (Dahlb.) are distinct species both occurring in the Netherlands; they can be identified with the key given in part V of this paper. The two species were confounded by authors under the name "*stigma* Panzer" since Dahlbom himself treated his *pinguis* as a synonym of *stigma* Panzer in his *Hymenoptera Europaea* in 1843.

#### V. The European species of the *stigma*-group.

##### Key to the ♀♀.

1. 6-8 mm. Antennae shorter: third joint about three times as long as wide at the apex, slightly shorter than scape and second joint together; sixth joint about twice as long as wide. Tarsal comb of fore-legs less developed (fig. 6); anterior metatarsus shorter (fig. 7). Pilosity on lower part of face above lateral parts of the clypeus and on lower part of temples (if not entirely rubbed off) poorly developed. Lateral margins of pygidium little or not at all raised; pygidial area at the apex often





Figs. 1-4. *Astata stigma* (Panz.). 1, head of ♀; 2, fore-tarsi of ♀; 3, fore-metatarsus and second joint of ♀ from inner side; 4, head of ♂.

Figs. 5-8. *Astata pinguis* (Dahlb.). 5, head of ♀; 6, fore-tarsi of ♀; 7, fore-metatarsus and second joint of ♀ from inner side; 8, head of ♂ and variation of spot on face.

Figs. 9-11. *Astata femoralis* Mocs. 9, clypeus of ♀; 10, head of ♂; 11, apical joints of antenna of ♂.

Figs. 12-13. *Astata freygessneri* Carl. 12, fore-tarsi of ♀; 13, head of ♂.

- almost smooth and more shining, at the base without or with only a few little scattered and shallow punctures . . . . . 2.
- 7-11 mm. Antennae longer: third joint at least four times as long as wide at the apex, about as long as scape and second joint together or slightly longer; sixth joint about two and a half times as long as wide. Tarsal comb of fore-legs well developed (figs. 2 and 12); anterior metatarsus longer (fig. 3). Legs dark; tibiae and tarsi of fore-legs more or less ferruginous. Pilosity on lower half of face and lower part of temples (if not rubbed off) more developed, abundant in fresh specimens. Lateral margins of apical half of pygidium sharply raised; pygidial area finely sculptured, fairly shining, distinctly and remotely punctured at the base. First recurrent vein in fore-wings received by the second cubital cell (never interstitial with the first transverse cubital vein). . . . . 3.
2. 6-8 mm. Apical lobe of clypeus bilobate (fig. 9). Femora black with extreme apices ferruginous; tibiae and tarsi ferruginous, contrasting with dark femora; knees more or less flavo-ferruginous. Erect hairs between ocelli yellowish grey, not dark; pilosity on anterior inclination of mesonotum grey. First recurrent vein in forewings received by the second cubital cell (never interstitial with the first transverse cubital vein). . . . . 3. *femoralis* Mocs.
- 6-7½ mm. Apical lobe of clypeus with parallel sides; the anterior margin truncate, distinctly tridentate in fresh specimens (fig. 5). Legs all black or fusco-ferruginous; the inner side of tibiae and tarsi of fore-legs more or less ferruginous. Erect hairs between ocelli (if not rubbed off) dark brown; grey pilosity on anterior inclination of mesonotum intermixed with brown hairs. First recurrent vein in fore-wings sub-interstitial and received by the second cubital cell, rarely interstitial with the first transverse cubital vein. Fore-wings evenly and very faintly fusco-hyaline. . . . . 2. *pinguis* Dahlb.
3. 7-10 mm. Apical lobe of clypeus (like in *pinguis*: fig. 5) with parallel sides; anterior margin truncate, distinctly tridentate in fresh specimens. The rectangular area at the under side of the lobe before the clypeo-labral suture (only visible with opened mandibles) is transversely concave. Tarsal comb of fore-legs more developed; apical spine of second joint overreaches the third joint considerably; third joint with two apical spines (fig. 12). . . . . 4. *frejgessneri* Carl.
- 7-11 mm. Apical lobe of clypeus rounded at the corners, not dentate (fig. 1). The rectangular area at the under side of the lobe projects a little less before the clypeo-labral suture than in *frejgessneri*. The lobe is thickened at the base underneath and has a centrally divided transverse impression (which can be very slight) under the apex (as in *boops* Schrank). Tarsal comb of fore-legs less developed; apical spine of second joint about as long as third joint; the latter with only one apical spine (fig. 2). Fore-wings faintly fusco-hyaline, apically distinctly infusate in fresh specimens. . . . . 1. *stigma* Panz.

#### Key to the ♂♂.

1. 6-9 mm. Yellowish spot just below the anterior ocellus (presumably always present) small: its surface about equal to the surface of the ocellus (fig. 10). Penultimate joint of the antennae slightly longer than wide, at the most, however rarely, almost half as long again as wide. Joints 8-11 distinctly dilated towards the apex (fig. 11). Femora black with extreme apices ferruginous; tibiae and tarsi vivid ferruginous, strikingly contrasting with dark femora; fore and middle-knees more or less flavo-ferruginous. Pilosity on inferior and exterior sides of hind-femora very poorly developed and very short. Lobe of clypeus truncate at the apex, shallowly emarginate in fresh specimens; side margins of clypeus from the apex of the lobe

- gradually diverging to the base of the mandible (fig. 10). First recurrent vein in fore-wings never interstitial with first transverse cubital vein. 3. *femoralis* Mocs.
- Yellowish or whitish spot on face bigger, bilobed or more or less transverse. Penultimate joint of the antennae about half as long again as wide or longer. Joints 8-11 not or less obviously dilated. The slightly bristly pilosity on the hind-femora more developed and longer. . . . . 2.
2. 8-10 mm. Hind-femora vivid ferruginous (except extreme base, which is black), strikingly contrasting with dark fore and middle-femora; tibiae and tarsi fusco-ferruginous varying to vivid ferruginous; fore-knees more or less flavo-ferruginous. Whitish spot on mesopleurae just behind pronotal tubercles mostly present (De Beaumont, in litt., reports that two out of fifteen ♂ lack this mesopleural spot). Lobe of clypeus rounded at the apex; whitish spot on face considerable and bilobed (fig. 13). First recurrent vein in fore-wings never interstitial with first transverse cubital vein. . . . . 4. *freygessneri* Carl.
- Hind-femora without a contrasting ferruginous area. Legs black or more or less fusco-ferruginous; tibiae and tarsi of fore and middle-legs more or less vivid ferruginous or even anterior tibiae streaked with yellow at inner sides. Mesopleurae never with light coloured spot. . . . . 3.
3. (6)7-10 mm. Antennae slightly longer: sixth joint (at broadest side) slightly longer than twice the average width. Joints 9-11 not dilated towards the apex. Anterior margin of apical lobe of clypeus narrowly truncate in fresh specimens; the anterior margins of clypeus from the apex of the lobe more gradually diverging to the base of the mandibles (fig. 4) than in *pinguis*. Yellowish spot on face considerable, mostly distinctly bilobed (fig. 4). First recurrent vein in fore-wings never interstitial with first transverse cubital vein. . . . . 1. *stigma* Panz.
- 6-8 mm. Antennae slightly shorter: sixth joint (at broadest side) slightly shorter than twice the width. Joints 8-11 somewhat dilated towards the apex (less obviously than in *femoralis*). Anterior margin of apical lobe of clypeus truncate in fresh specimens; the anterior margins of clypeus from the apex of the lobe diverging to the base of the mandible with a distinct angle (fig. 8). Yellowish spot on face smaller, with the superior margin more transverse, sometimes feebly bilobed against the anterior ocellus (fig. 8). First recurrent vein in fore-wings sub-interstitial and received by the second cubital cell, rarely interstitial with the first transverse cubital vein. . . . . 2. *pinguis* Dahlb.

### 1. *Astata stigma* (Panzer)

*Dimorpha stigma* Panzer, 1809, Fn. Ins. Germ., Heft 107, Tab. 13 ♂ 1).

Ad type vide part IV of this paper.

*Astata intermedia* Dahlbom, 1843, Hym. Europ., I, p. 140, n. 71 ♀.

"2<sup>3</sup>/<sub>4</sub> lin. Mas ignotus. Habitat in Germania Silesica, ubi ad Glocaviam Cl. Zeller unicum feminam d. 17 Juli 1841 detegit et nobis amica mente dedit. Femina valde affinis *A. stigmatis* ♀, at notis allatis satis diversa."

The type of *Astata intermedia* is preserved in the Dahlbom collection at Lund and has been kindly lent by Docent Ander. It is a female of *Astata stigma* (Panz.), agreeing with the original description and bearing three labels in Dahlbom's handwriting: 1: 17.7.41; 2: Zeller Glogau; 3: *Ast. intermedia* Dlbm. Glogau Zeller. I attached my label: "*Astata intermedia* / Dahlbom 1843 / Holotypus" to the specimen.

Dahlbom omitted to recapitulate *intermedia* in the analytical "Tabula" in 1845 (Hym.

1) According to E. Saunders: Index to Panzer's Fauna Insectorum Germaniae (London, 1888), Heft 107 was published in 1809.

Europ. I, p. 472), presumably finally considering his *intermedia* conspecific with *stigma* (sensu Dahlbom = *pinguis*!). Since that time *intermedia* has been treated continually as a synonym of *stigma* (auct.!).

"*Astata stigma* (Panz.)", Kohl, 1884, p. 440, n. 6 ♂ ♀ (partim: excluding *pinguis* Dahlb. and *femoralis* Mocs.).

"*Astata* (*Dryudella*) *stigma* (Panz.)", Gussakovskij, 1927, p. 278, n. 7 ♀ ♂ (partim: excl. *frejgessneri* Carl).

"Habitat in Europa boreali et centrali, Sibiria usque ad Mongoliam et Tibetiam."

"*Astata stigma* (Panz.)", Van der Vecht, 1928, De Levende Natuur, vol. 33, p. 93.

"Bij Loosduinen vond ik als prooi van deze soort larven van *Sciocoris terreus*, een Pentatomide, die ook in Meyendel voorkomt."

The original material of Van der Vecht, captured at Loosduinen, is preserved in the Rijksmuseum van Natuurlijke Historie at Leiden, consisting of 7 ♀ ♀ and 8 ♂ ♂ of *Astata stigma* (no specimens of *pinguis*), one ♀ bearing a label: "prooi: *Sciocoris terreus* juv."

"*Astata* (*Dryudella*) *stigma* (Panz.)", Maidl & Klima, 1939, p. 25 (partim: excl. *pinguis* Dahlb. and *frejgessneri* Carl).

"*Astata stigma* (Panz.) forma *major*", Grönblom, 1946, Ann. Ent. Fenn., vol. 12 (fasc. 1, published 31.5.1946), p. 40 (n. syn.).

"Dir. Th. Grönblom legte eine Reihe von Exemplaren einer seltsamen, ausserordentlich stattlichen Rasse (f. *major* n. f.) der Grabwespe *Astata stigma* Panz. vor, die er i. J. 1938 zusammen mit Mag. phil. A. K. Merisuo auf der im Finnischen Meerbusen gelegenen Insel Seiskari (EK) erbeutet hatte. In Verbindung mit dem Fund konnte die Beobachtung gemacht werden, dass die Wespe dort statt der ihr gewöhnlich als Nestbeute dienenden kleinen Wanzenart *Trapezonotus agrestis* Fall. die fast dreimal so grosse Wanze *Phimodera humeralis* Dalm. angriff. Es handelt sich also um eine offenbare ernährungsphysiologische Rasse."

Owing to the kindness of P. Niemelä (Perniö, Finland), I was able to examine five ♀ ♀ and one ♂ from the original material (Seiskari, leg. Merisuo), which proved to belong to *stigma* Panzer. Three ♀ ♀ were 11 mm, two ♀ ♀ and the ♂ only 9 mm long. Though Dutch specimens show a smaller average, there are intermediates; even Panzer's indication of the length of the ♂ amounts to amply 9 mm. I examined also specimens of large average size from Scandinavia. The area of distribution of *Astata stigma* is covered by that of *Phimodera humeralis* which also occurs in the Netherlands; the *Astata* will not despise this prey where it occurs. In the Netherlands *Astata stigma* has been recorded preying on *Sciocoris terreus*, which Pentatomid is notably smaller than *Phimodera humeralis*, and which also shows a large area of distribution including Scandinavia, but, as far as known, excluding Finland<sup>1</sup>). These facts elucidate the observed variability in the size of *Astata stigma* (Panzer).

The large sized population mentioned by Grönblom is covered by the individual variability of the species *stigma* Panzer and should not be named. The large size of the specimens of *stigma* only struck Grönblom, because he compared them with specimens of *pinguis* misidentified as *stigma*.

Whereas, for the present, the "forma" has no nomenclatorial status, the name may

1) I am indebted to Mr. W. H. Gravestein (Amsterdam), specialist in Heteroptera, for kindly furnishing me with information on distribution, nomenclature, etc., of the preys of *Astata* concerned.

acquire validity after the alterations of the Règles now under consideration. Though published as a nova forma, Grönblom expressly indicates this form as a physiological race, and, therefore, the name *major* probably will acquire the status of a trivial name of a subspecies, in spite of the misidentification of the taxomic unit with which it was compared. Resulting in: *stigma major* Grönblom = *pinguis major* Grönblom = *stigma* Panzer.

"*Astata (Dryudella) stigma* (Panz.)", Snoflak, 1947, p. 62 ♀, p. 64 ♂.

Distribution: Southern Finland and Scandinavia, the Netherlands, Belgium (teste Crèvecoeur) Germany, Czecho-Slovakia (Slovakia: Malacky ♀ 5.7.1936, Zabori ♂ 22.7.1922, leg. Zavadil, my collection) and (according to Gussakovskij, 1927) eastward as far as Siberia.

Prey: *Phimodera humeralis* Dalm. (Grönblom, 1946) and *Sciocoris cursitans* F., 1794 (= *terreus* Schrank, 1801: Van der Vecht, 1928) (Pentatomidae).

## 2. *Astata pinguis* (Dahlbom)

*Larra pinguis* Dahlbom, 1832, Exerc. Hym., fasc. 4, p. 50, n. 2 ♀.

Ad type vide part IV of this paper.

*Larra pinguis* Zetterstedt, 1838, Ins. Lapp. I, sectio 2, p. 436, n. 1 ♀.

Ad type vide part IV of this paper.

"*Astata stigma* (Panz.)", Dahlbom, 1843, Hym. Europ. I, p. 139, n. 69 ♀ ♂.

*Larra pinguis* is placed here in synonymy with *A. stigma*. Dahlbom's descriptions make it fairly clear that only (or at least mainly) *pinguis* specimens were included; the true *stigma* was described under the name *intermedia*.

*Astata jaculator* Smith, 1845, Zoologist, vol. 3, p. 1157 ♀ (n. syn.).

Dr. O. W. Richards (London) compared some of my *stigma* and *pinguis* specimens with British material and the *jaculator*-type and kindly informed me as follows: "The type of *A. jaculator* Smith should be in his collection at Oxford and there is a ♀ there labelled "captured at Weybridge Aug. 22nd 1845", which is probably the type, though not marked as such. It is a ♀ *A. pinguis*." Richards added that all the British (including Jersey) material at his disposal (about 120 specimens!) proved to be *pinguis* and that *A. stigma* is apparently not found in England.

"*Astata stigma* (Panz.)" Smith, 1856, Cat. Hym. Ins. Brit. Mus., pt. IV, p. 309, n. 2. Already in this paper Smith places his *jaculator* in the synonymy of *stigma* Panz.

"*Astata stigma* (Panz.)", Crèvecoeur & Maréchal, 1936, Bull. Ann. Soc. Ent. Belg., vol. 76, p. 252.

Mr. A. Crèvecoeur (Brussels) re-examined two females preserved in his collection under the name "*stigma* Panz." with an extract of the key given above and kindly informed me that one of them, i.e., the specimen recorded from La Panne, 7.7.1935 (leg. Crèvecoeur), proved to belong to *pinguis*, whereas the other specimen, a ♀ from Knokke, 23.6.48, leg. Goetghebuer, was a *stigma* Panz.

Distribution: Scandinavia and Finland (including Lapland), Great Britain (including Jersey), the Netherlands, Belgium and (according to Bischoff, in litt.) Balticum, Pomerania, and one specimen from Berlin.

Prey: *Trapezonotus arenarius* L., 1758 (= *agrestis* Fall., 1807) (Lygaeidae) (Grönblom, 1946, sub. 1. *A. stigma*). Richards gave me permission to mention a so far unpublished record of A. H. Hamm of the prey of *pinguis*: Surrey, Oxshott, 13.6.1920, nymph probably of *Nysius thymi* Wolff (Lygaeidae). Adlerz, 1903, p. 53 recorded *Drymus sylvaticus* F. (Lygaeidae) as the prey of "*Astata stigma* Pz."; considering the small size of this Lygaeid, the correlation with *Astata pinguis* seems doubtless.

### 3. *Astata femoralis* Mocsáry

? "*Astata stigma* (Panz.)", Giraud, 1863; Verh. Zool. Bot. Ges. Wien, vol. 13; p. 14, n. 62.

"Vallouise." Only record of capture.

*Astata femoralis* Mocsáry, 1877, Term. Füz., vol. 1, p. 89, n. 4 ♂.

"♂, long. 8½ mm. Sculptura metanoti coriacea, tibiis tarsisque rufis. In Hungaria septentrionali, regione subalpina, mense Julio."

Both locus and description agree with the usual interpretation of the species.

"*Astutus stigma* var. *femoralis* Mocs.", Kohl, 1884, p. 440, n. 6.

"*Astata stigma* (Panz.)", Carl, 1920, Mitt. Schw. Ent. Ges., vol. 13 (Heft 2), p. 100.

? "*Astata stigma* (Panz.)", Berland, 1925, Hyménoptères vespiformes I, Faune de France, vol. 10, p. 109.

"Hautes Alpes: le Lautaret, Cervières, Aiguilles (R. Benoist)."

In 1928 (Hym. vesp. II, Fauna de France, vol. 19, p. 177) Berland excludes *A. freygessneri* Carl.

De Beaumont (1942, p. 415) says: "Il est probable, d'après la description et les localités citées, que l'espèce signalée par Berland sous le nom *stigma* Panz. soit en réalité *femoralis* Mocs." However, the description given by Berland is insufficient to give complete certainty about this synonymy.

"*Astutus (Dryudella) femoralis* Mocs.", Gussakovskij, 1927, p. 280, n. 8 ♀ ♂.

"*Astata (Dryudella) femoralis* Mocs.", De Beaumont, 1942, p. 410, n. 7 ♀ ♂.

"*Astata (Dryudella) femoralis* Mocs.", Snoflak, 1947, p. 62, ♀, p. 64, ♂.

Distribution: Central Europe (Alps): ? France (Vallouise, Giraud, 1863; Hautes Alpes: le Lautaret, Cervières, Aiguilles, leg. R. Benoist, Berland, 1925), Switzerland (incl. Jura: St. Cergue, De Beaumont, 1942), Austria (Kohl, 1884), Czecho-Slovakia (Snoflak, 1947; Moravia; ♂, June, 1947, leg. Kocourek, my collection), Northern Hungary (Mocsáry, 1877).

Prey: No record.

### 4. *Astata freygessneri* Carl

"*Astata stigma* (Panz.)", Frey-Gessner, 1913, Mitt. Schw. Ent. Ges., vol. 12 (Heft 4), p. 151.

Record of prey: Vissoye (Valais), 7.8.1901: "eine noch nicht ausgewachsene grüne Beerenwanze, *Cimex (Carpocoris) prasinus* L."

*Astata freygessneri* Carl, 1920, Mitt. Schw. Ent. Ges., vol. 13 (Heft 2), p. 100 ♀ ♂. Carl's description gives an exhaustive definition of the species.

"*Astata (Dryudella) stigma* var. *freygessneri* Carl", De Beaumont, 1942; p. 410, n. 6 ♀ ♂.

"La var. *freygessneri* semble localisée dans le Valais, de Sion à Brigue, et surtout dans les vallées méridionales: Euseigne, Vissoye, Stalden, Bérisal."

Distribution: Switzerland: canton Valais (De Beaumont, 1942).

Prey: *Palomena prasina* L. (= *Cimex prasinus* L.) (Pentatomidae) (Frey-Gessner, 1913). Richards kindly allowed me to record here his capture of *A. freygessneri*: ♀ Saas Fee, Valais, 7.8.1949, with an immature Pentatomid.

#### General distribution of *stigma*-group.

*A. stigma* and *pinguis* are north-eastern, respectively northern European species, while *femoralis* and *freygessneri* live in Central Europe. So far, no species of the *stigma*-group have been recorded from southern Europe nor, supposing Ferton's quotation of *A. stigma* from Algiers (1901; p. 104) to be caused by misidentification, from North Africa.

How far the non-European and non-African species: *similis* Guss., *quadripunctata* Rad., *tegularis* F. Mor., *picticornis* Guss. and *frontalis* Rad., belong to the *stigma*-group, I feel unable to decide from Gussakovskij's text (1927).

#### VI. Species of *Astata* Latr. occurring in the Netherlands.

The list consists of four species:

(Group *boops* :)

1. *Astata boops* (Schrank, 1781). Distribution: widely spread over palaearctic region.

2. *Astata minor* Kohl, 1884. Distribution: widely spread over palaearctic region excluding England and Scandinavia.

(Group *stigma* :)

3. *Astata stigma* (Panzer, 1809). Distribution: vide part V of this paper.

4. *Astata pinguis* (Dahlbom, 1832). Distribution: vide part V of this paper.

These wasps are confined to more or less sandy localities, and, while their area covers all the Netherlands, neither *boops* nor *minor* has so far been recorded from the coast-line dunes. None of the species is abundant in our country.

Bouwman (1927) knew only two species from the Netherlands (*boops* and

*stigma*), but he recorded *minor* as probably occurring in the province of Limburg, since the latter species had been found in Westphalia (Sickmann, 1893, p. 86) and in Belgium (Dubois, 1922, p. 209). In 1943 Benno recorded *minor* as a faunae nova species and in 1946 Van Rossem published his note on the biology of this species (prey: *Sehirus bicolor* L.).

*Astata minor* Kohl has now been recorded from: de Bijvank, east of Arnhem (leg. Benno, Verhoeff); Wageningen (leg. Van Rossem); and Epen (leg. Lindemans, cf. Van Lith, 1947).

I have examined specimens of *Astata pinguis* (Dahlb.) from Bilthoven, Breda (leg. Bouwman); the Hague (leg. Van Vollenhoven); Meyendel (leg. Teunissen); Noordwijk, den Dolder, Hilversum (leg. Verhoeff). From all these localities also *Astata stigma* (Panz.) has been recorded.

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