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## NEW DATA ON SOLDIER-FLIES OF THE GENUS *WALLACEA* DOLESCHALL

AND RELATED GROUPS

(DIPTERA, STRATIOMYIDAE)

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### ABSTRACT

Description of a new species, *Wallacea meijerei*, from Sumatra, with additional data on *W. albisetata* De Meijere, *Argyrobrithes separatus* (De Meijere) and *A. albopilosus* (De Meijere), based on a study of the holotypes. Some data are also given on *A. argentifer* (Kertész). The paper contains furthermore a key to the oriental species of *Wallacea* Doleschall and *Argyrobrithes*.

### INTRODUCTION

Among the Diptera of the subfamily Pachygastrinae (Stratiomyidae) a rather small and peculiar group of related genera can be distinguished. This group consists of *Wallacea* Doleschall, *Berkshiria* Johnson (incl. *Pseudowallacea* Kertész), *Argyrobrithes* Grünberg, *Sternobrithes* Loew and *Gobertina* Bigot. These genera are characterized by the 3rd joint of the antennae being spindle-shaped, with secondary segmentation, and a scutellum having a thin, wide posterior rim and a row of small teeth along its

apical margin. The representatives of this group of soldier-flies are distributed mainly in the eastern hemisphere. *Berkshiria* is Holarctic. *Gobertina* and *Sternobrithes* occur in various regions of Africa. The species of *Argyrobrithes* are common in Africa and some parts of the Oriental region (James, 1980; Nagatomi, 1975); those of *Wallacea* are typical for the East and have been recorded from an area ranging from the Far East (USSR) and Japan to Indonesia.

Due to the absence of adequate generic characteristics and to the fact that type-species have been insufficiently studied, the systema-

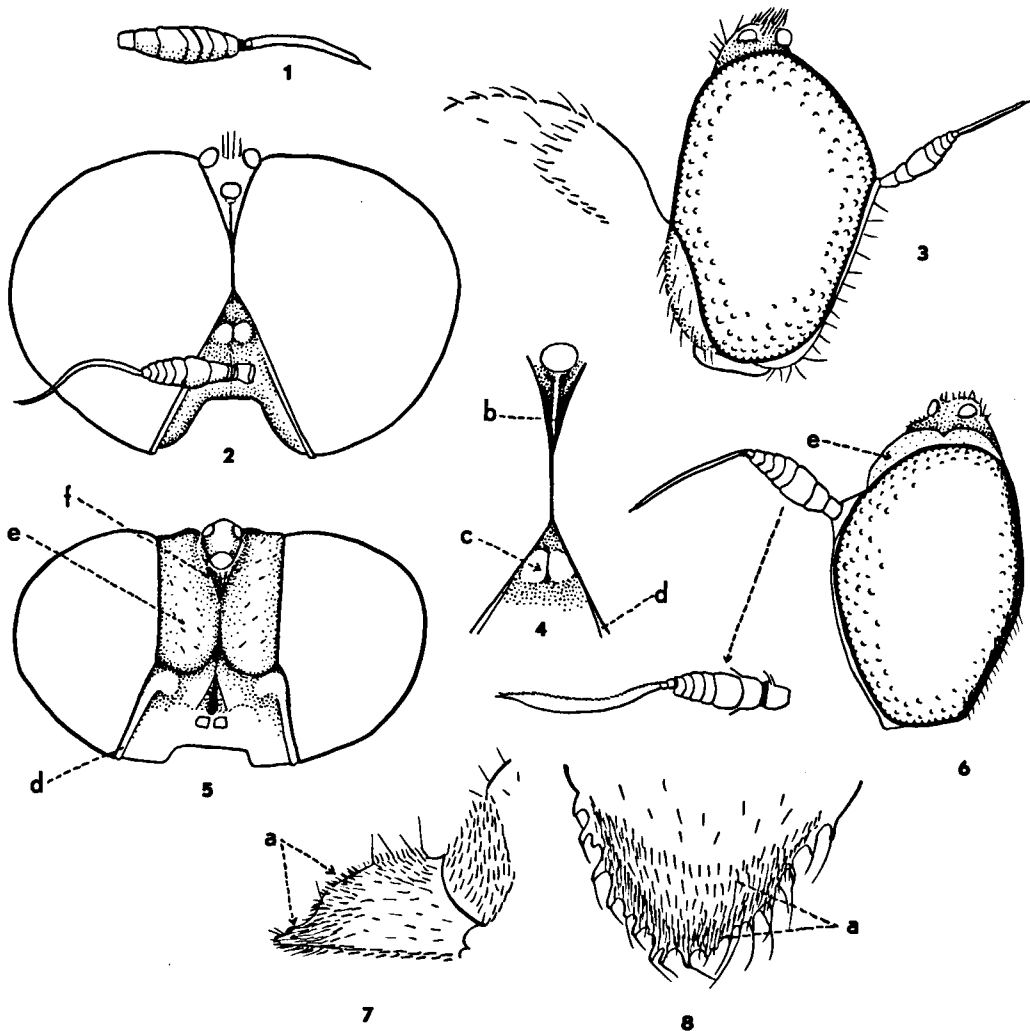
tic position of most of these genera is not yet clarified. For instance, *Gobertina* is treated either as a synonym of *Sternobrithes* (Kertész, 1909) or as a distinct genus (Lindner, 1966). This situation can be easily explained. The diagnostic characters which have been used for defining the genera are actually insignificant. *Gobertina* is characterized by a short arista, equal to half the length of the third joint of the antenna, and *Sternobrithes* by an arista, which equals the third joint.

*Wallacea* Doleschall, 1858

This genus at present includes 8 species. The type-species, *W. argentea* Doleschall, was de-

scribed from Amboina, Indonesia. Other species are: *W. dorsalis* James, from the New Hebrides, *W. connectens* James, from the Solomon Is. (James, 1950), *W. edashigei* Nagatomi from Japan, Shikoku Is. (Nagatomi, 1975) and *W. tibialis* Kertész from Taiwan (Kertész, 1909). One species, most common in the Palaearctic, *W. nigrotibialis* Pleske was described from the territory of the USSR (Primorye Territory) (Pleske, 1930).

*W. albiseta* De Meijere, which was originally described from Java, has the widest distribution. According to James (1975), this species has been recorded also from Sumatra, Ceylon, Malaya and Taiwan. Nagatomi (1975) reports on its distribution in Japan. We have examined and identified material of *W. albiseta* from the



Figs. 1-8. *Wallacea meijerei* sp.n. 1, male antenna, lateral aspect; 2-3, male head, frontal and lateral aspects; 4, male front; 5-6, female head, frontal and lateral aspects; 7-8, scutellum of male, lateral and dorsal aspects. a, part of scutellum with golden hairs; b, rib; c, silvery spots; d, silvery eye margin; e, front; f, small triangular depression.

following localities: Taiwan, coll. Sauter, det. Kertész (R. Frey collection, Zoological Museum, Helsinki); Ceylon, coll. S. Nietner; China, Canton, 10.III.1912, S.V. Mell (Museum für Naturkunde, Berlin); India, Deradun, II. 1974, coll. B. Mamaev; USSR, Primorye Territory, IX.1968, coll. N. Krivosheina [collection of the A.N. Severtzov Institute of Evolutionary Animal Morphology and Ecology, Academy of Sciences of the USSR, Moscow]. These data confirm the wide range of the species: it covers an area from the South Primorye and China to India, Ceylon and Indonesia, including also Japan and Taiwan.

*W. tsudai* (Ouchi) from China was referred to *Wallacea* by Nagatomi (1975). Originally its material was identified as *W. argentea* by Ouchi (1938), but later it was described as a new species in the genus *Pseudowallacea* Kertész (Ouchi, 1940).

*Wallacea* is most closely related to *Argyrobrithes* Grünberg but the limits of these two genera have not yet been accurately determined. They differ only in the shape of their arista, *Argyrobrithes* having a broad and flattened arista, whereas in *Wallacea* the arista is bristle-like or stick-like. Two species originally referred to *Wallacea* (*albopilosa* De Meijere and *argentifer* Kertész) on account of their broad lamelliform antennae, were transferred, and probably correctly so, to *Argyrobrithes* by Kertész.

The systematic position of *W. separata* De Meijere has not yet been established satisfactorily. Until recently, this species was included in *Wallacea* (Lindner, 1955; Nagatomi, 1975; James, 1975) although Kertész (1921) had pointed out, that, according to the form of its arista, this species together with *albopilosa* and *argentifer* had to be transferred to *Argyrobrithes*.

*W. separata* De Meijere is rather distinctive, differing from most *Wallacea* species studied in the shape of its eyes, frons, and antennae. On the other hand, it resembles the type species, *W. argentea*, with regard to the shape of the scutellum and the frons and the pubescence of the abdomen (as far as can be judged from the literature (Kertész, 1909; 1921). *W. separata* differs from the species of *Argyrobrithes* in many characters.

As *W. separata* was transferred to *Argyrobrithes* by Kertész (1921), it is treated under that generic name in the present paper. But the final conclusion concerning its systematic position and the status of *Wallacea* and *Argyrobrithes*, can be drawn only on the basis of a study of the type-species, especially *W. argentea* (the location of the latter is unknown to me).

The larvae of *Wallacea* which have been studied are typical xylobionts. They develop under the bark of leaf-bearing trees and are saprophagous (Krivosheina, 1969).

#### KEY TO THE ORIENTAL SPECIES OF *WALLACEA* AND *ARGYROBRITHES*

1. Antenna with black flattened arista, covered with dense microscopic pubescence; width of arista not less than the width of the fifth ring of antennal segment 3. (Genus *Argyrobrithes* Grünberg).... 2
- Arista pale, bristle-like or rod-like, slender, bare or with dense pubescence, but never flattened. Width of arista less than the width of the 5th ring of antennal segment 3. (Genus *Wallacea* Doleschall) 5
2. Cornicles of scutellum small, mainly blunt, almost equal in size..... 3
- Cornicles of scutellum relatively large; their size increases towards the apex of the scutellum..... 4
3. Mesonotum and scutellum with dense silvery pile. Frons strongly broadened in the lower part above antennae; its surface bare, shining. Tibia pale; 3rd tergite with transversal band of dense silvery hairs..... *A. argentifer* Kertész
- Mesonotum and scutellum with black pile; mesonotum also with scattered silvery scale-like hairs. Frons moderately broadened above antennae; with scattered hairs. Basal portion of tibia darkened. The terga of the 3rd abdominal segment with distinct lateral patches of dense silvery hairs (female only).....  
..... *A. insularis* Kertész
4. Scutellum with numerous sharpened marginal cornicles, gradually increasing in size towards the apex. The 5th abdominal tergite with a broad median stripe of dense silvery hairs. Eyes of male holoptic..... *A. albopilosus* (De Meijere)
- Scutellum with minute cornicles along the whole margin and two distinct larger apical cornicles. Tergum 5 of abdomen with bare median longitudinal stripe and dense silvery hairs laterally. Eyes of male, as well as of female, widely separated.....  
..... *A. separatus* (De Meijere)
5. Scutellum with two well developed large apical cornicles. Tergum 5 of abdomen

- with a broad median longitudinal stripe, which is bare. Dense silvery hairs only near lateral margin. The fore tibiae darkened. Eyes of male and female separated. Mesonotum in male with dense adjacent silvery pile..... *W. argentea* Doleschall
- Scutellum with numerous cornicles, gradually increasing in size towards the apex. Tergum 5 of abdomen with median longitudinal stripe of silvery hairs. The fore tibiae notably more pale than femora. Mesonotum in male with scattered pale pile..... 6
6. The hind tibiae black or dark-brown. Mesonotum and basal part of scutellum with golden pile, interrupted in some portions of mesothorax (only female) ..... *W. tibialis* Kertész
- Legs distinctly bicolourous, femur dark-brown of black, tibiae and tarsal segments much paler (pale-brown or yellowish). If bases or apices of tibiae are slightly darkened, than mesonotum with scattered silvery pile. Eyes of male contiguous..... 7
7. Mesonotum and scutellum with dark and silvery pile, more dense in male. Basal portion of male scutellum with silvery pile. .... *W. albiseta* De Meijere
- Mesonotum and scutellum with dark and golden pile. In male mesothorax before scutellum with distinct golden spot; scutellum with dense golden pubescence apically. .... *W. meijerei* sp.n.

*Wallacea meijerei* sp.n.

(Figs. 1-8)

Material.-

Holotype ♂ with label: Fort de Kock (Sumatra) 920 m, 1924, leg. E. Jacobson. "Wallacea albiseta de Meijere", De Meijere det. 1926.

Paratypes: ♀ with same label as holotype, without identification label; 3 ♀♀ E. Jacobson, Fort de Kock, Sumatra, X.1913, specimens No. 56/09, 56/29, 55/88; 1 ♀ Java, Jacobson (Zoological Museum, Amsterdam).

Description.-

Male: The species differs considerably from *W. albiseta* by dense adjacent golden tomentum on the apical part of scutellum and by thicker stick-like arista (not bristle-like) (figs. 2, 3). Eyes contiguous for a distance equal to the length of upper frons (figs. 2, 4). Upper frons concave, dull with median narrow rib reaching the base of ocellar triangle. Width of frons just above antennae greater than that at median ocellus. Frontal triangle (lower frons) with two contiguous rounded spots of silvery pile,

separated from eyes and antennae (fig. 4c). Face below antennae slightly convex with scarce darkish pile. Eye margin narrow, silvery (fig. 4d). Eyes with sparse short microscopical pile.

Antennae (fig. 1) brownish, arista white, darkened at the base. Its width (due to tomentum) equal to that of apical secondary segment of 3rd joint. Arista as long as all 3 antennal joints.

Thorax rather short (its width equal to length), almost black, covered with short relatively dense adjacent brown pile and with more scarce dark long hairs. The same dark tomentum on other parts of thorax, including sternites. Prescutellar area with dense adjacent bright-golden pile, forming a distinct rectangle. Its width 2.5-2.7 times its length. More scarce golden pile forms a band between scutellum and wing base.

Scutellum (figs. 7, 8a) with rather long flattened apex. Apical third of scutellum with dense adjacent golden pile, reaching margin of scutellum and concealing marginal dentulae. Basal part of scutellum with dark tomentum and pile as in mesonotum.

Abdomen with brownish tomentum on first two tergites and medial part of the 3rd. The 4th segment with medial spot of short and sparse hairs and with more dense tomentum on lateral areas. Pale silvery tomentum forms a distinct longitudinal stripe on 5th segment. Sternites with sparse short hairs.

Legs bicolourous: femur brown, tibia and tarsus pale. Dorsal side of tibia slightly brownish, tarsus yellowish, but with darkened apical joints.

Wings hyaline, slightly brownish. Stem of halteres dark, knob brownish above, white below.

Body: 3.5 mm; wings: 3.4 mm.

Female: Frons (fig. 5e) wide, 1/3 as wide as head, with small triangular depression just below median ocellus. Its surface slightly rugose. Medial area of frons distinctly prominent (fig. 6e). Frons with sparse short erect pile. Silvery eye margin (fig. 5d) at the level of antennae not narrowed, rather wide (as wide as base of arista). Eyes with small sparse hairs as in male.

Antennae (fig. 6) red, arista white, slightly flattened, a bit thicker than that of male,

slightly wider than the half of 5th secondary segment of 3rd joint.

Thorax dark brown. Mesonotum and scutellum with brownish tomentum and with more long dense golden adjacent hairs lacking only on a small area of mesonotum between humeri and on lateral parts of transverse suture. Pleurites and sternites covered with rather long pale hairs. Metanotum with dense pale pollination. Metapleurites with pale tomentum of rather long pile.

Abdomen brown. Brown pollination on 1st (largely), 2nd and 3rd (partially) tergites. Pale hairs form a medial stripe on 5th tergite and a less distinct medial spot on 4th. Sometimes shorter pile in the center of the spot seem dark. Lateral parts of 3rd and 4th tergites with pale silvery hairs.

Legs as in male, but tibia paler. Halteres pale, stem yellow, knob snow-white. Wings brownish.

Body: 3.5 mm.

Remarks.-

*W. meijerei* is relatively close to *W. tibialis* Kertész, 1909, having a "fadenform" arista (Kertész, 1921) and characterized as follows: "Das Toment des Schildchens ist an der Basis viel dichter als an den übrigen Theilen. Beine schwarz, Knie, Vorderschienen, Basis und Spitze der Mittel- und Hinterschienen gelbbraun" (Kertész, 1909). *W. meijerei* differs distinctly from *W. tibialis* Kertész, having a densely tomentose apical part of the scutellum and a pale tibia.

*Wallacea albiseta* De Meijere

(Figs. 9-17)

Material.-

Type ♂, Java, II.III.06, Semarang, Jacobson; a series of ♂♂ and ♀♀ from Sumatra and Java, collected by E. Jacobson, J.B. Corporaal, W.M. Docters van Leeuwen, Zoological Museum, Amsterdam.

Description.-

In comparison with the foregoing species, the male of *W. albiseta* is characterized by having a slender, bristle-like arista (fig. 15). The eyes meet in one point (fig. 12),

where the frons is one facet wide. Upper frons with median rib not reaching the eye (fig. 12b); area below median ocellus shining, convex. Frons above antennae intensely silvery (fig. 12c) and considerable less wide than at median ocellus. Arista somewhat longer than the remaining part of the antenna.

Mesonotum with dense brownish tomentum with scattered adjacent silvery and erect brown pile on it. Silvery pile forms a spot immediately behind humeri, between wing base and scutellum and in front of scutellum. Pleurites in front of base of wing with a strip of dense pale hairs. Basal part of scutellum with dense silvery adjacent pile.

Abdomen black. First three segments with brown pollination in the middle. Lateral part of 3rd segment with pale scarce pile; medial and lateral parts of 4th segment and lateral part of 5th with more dense pile; middle of 5th segment with very dense pile forming a strip.

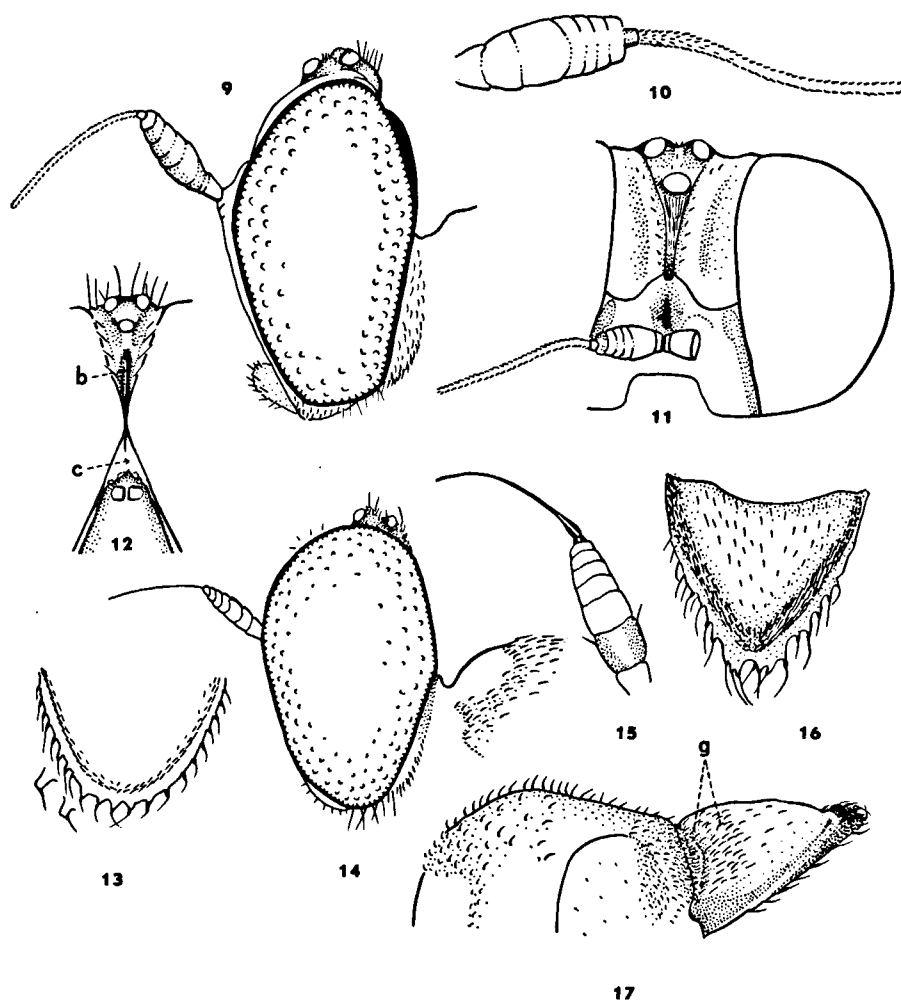
Legs: femur brown, tibia brown in the middle paler at apical and basal ends. Tarsus pale, whitish but with blackish apical joints. Stem of halteres dark, knob yellow, blackish at the base.

*Argyrobrithes* Grünberg, 1915

This genus is characterized by the following features: 5th secondary segment of 3rd antennal joint (figs. 25, 31) as wide as 4th, but a little longer than it. Arista wide, considerably flattened; its width at the medial part almost reaches the width of 5th segment of the 3rd joint never wider than the 2nd.

*Argyrobrithes* Grünberg includes 7 species. *A. argenteus* Grünberg, *A. crinitus* Lindner, and *A. zernyi* Lindner are distributed in Africa. The other four are recorded from the Oriental region: *A. albopilosus* (De Meijere) and *A. separatus* (De Meijere) are described from Java, they are known also from Ceylon; *A. argentifer* Kertész is described from Malaya; *A. insularis* Kertész from Waigeu, Indonesia.

The mode of life of the larvae of *Argyrobrithes* is unknown.



Figs. 9-17. *Wallacea albiseta* De Meijere. 9, female head, lateral aspect; 10, female antenna; 11, front and face of female; 12, male front; 13, scutellum of female, dorsal aspect; 14, male head, lateral aspect; 15, male antenna; 16, scutellum of male, dorsal aspect; 17, mesonotum and scutellum of male, lateral aspect. g, silvery hairs, other designations as in figs. 1-8.

*Argyrobrithes separatus* (De Meijere, 1907)  
(Figs. 18-24)

Material.-

Type ♂, Java, I.06, Semarang, Jacobson (without flagellum); ♂ Java, Jacobson; ♂, E. Jacobson, Batavia, Java, III.1908; ♀, Java, Semarang, Jacobson (Zoological Museum, Amsterdam).

Description.-

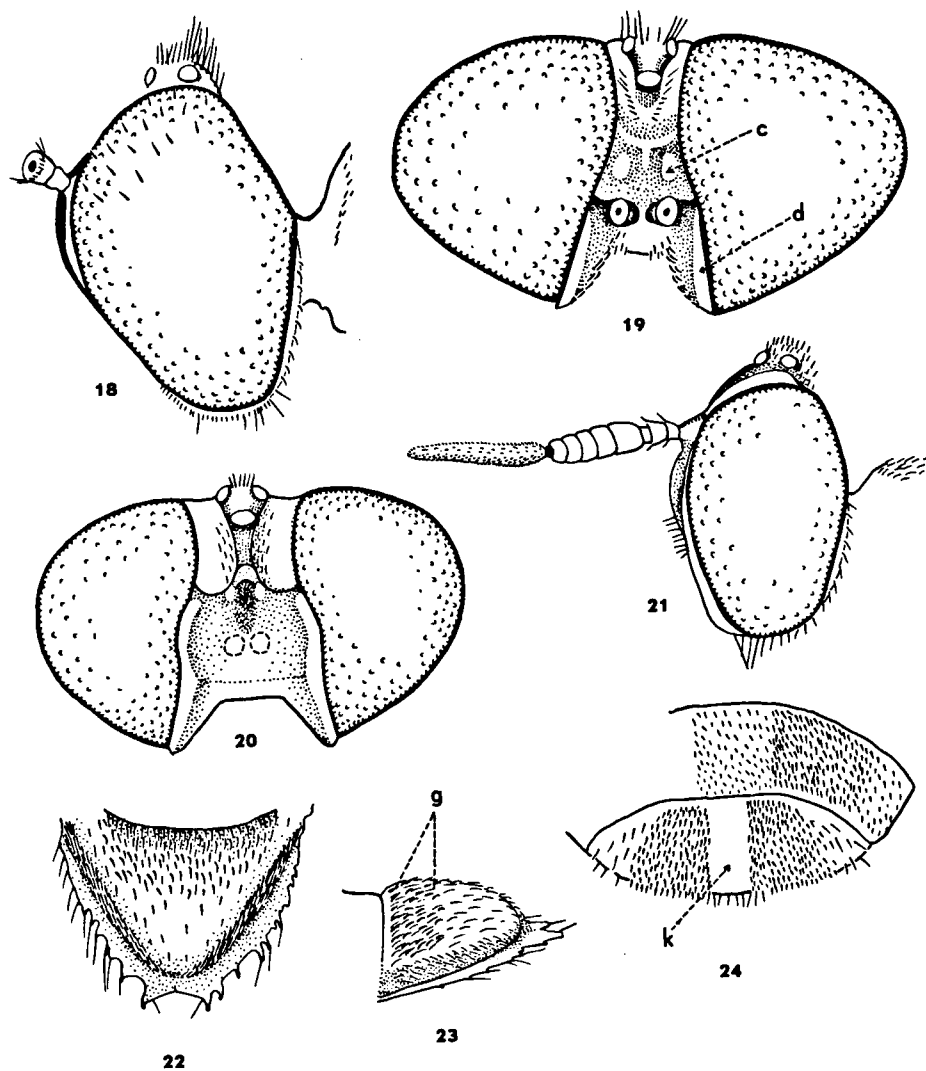
Male. Eyes widely separated (fig. 19), frons at median ocellus  $1/8$  width of head. Frons somewhat narrowed in the middle and dilatated above antennae. Thin silvery pile below median ocellus. Two separated silvery spots above antennae (fig. 19c). Wide silvery eye margin

reaches only to the base of the antennae, and is absent in front (fig. 19d). Eyes with scattered hairs.

Thorax and scutellum with brown pollination and dense brown pile. Mesonotum between humeri and scutellum without pollination, shining, with scarce black and silvery pile. Basal part of scutellum with scattered silvery pile.

The 4th and 5th abdominal segments, their medial parts excepted, with dense adjacent silvery pile; 5th segment with medial longitudinal bare stripe (fig. 24k).

Female (figs. 20-23). Frons  $1/4$  width of head. Silvery eye margin reaches middle of front. Basal part of scutellum with silvery tomentum. Tomentum on abdomen less distinct.



Figs. 18-24. *Argyrobrithes separatus* (De Meijere). 18-19, male head, lateral and frontal aspects; 20-21, female head, frontal and lateral aspects; 22-23, scutellum of female, dorsal and lateral aspects; 24, male abdomen, dorsal aspect. k, medial longitudinal bare stripe; other designations as in figs. 1-8.

Remarks.-

Kertész (1921) has pointed out that according to the structure of the antennae *W. separata* should be included in *Argyrobrithes* Grünberg, but subsequently in the same paper (Kertész, 1921, p. 166, 167) he did not include it either in *Wallacea* or in *Argyrobrithes*.

*Argyrobrithes albopilosus* (De Meijere, 1907)  
(Figs. 25-31)

Material.-

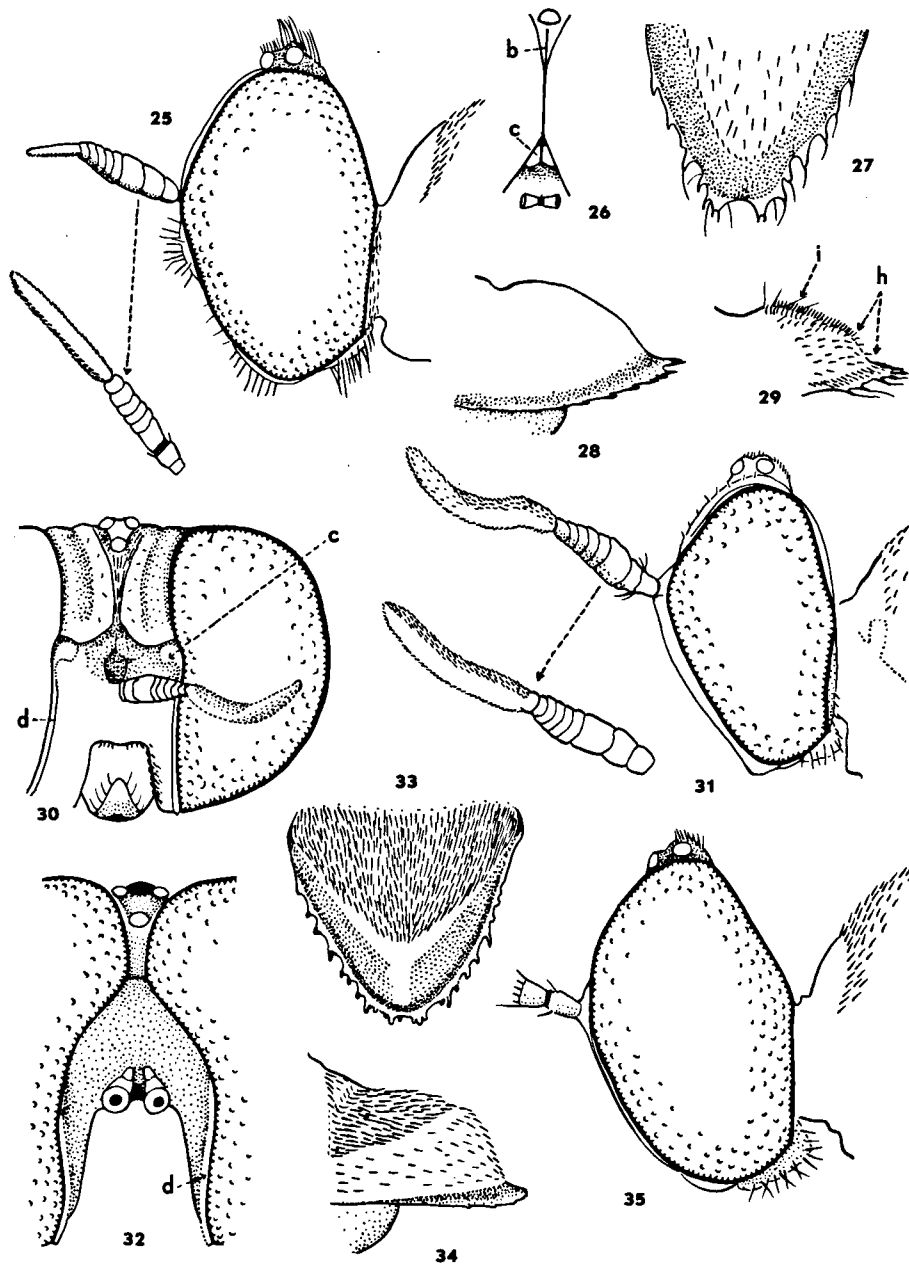
Type ♀ Semarang, Java, I.06. Jacobson: 1 ♂, 1 ♀, Java, Jacobson (without data); 3 ♀♀: Sema-

rang Java, I.06. Jacobson; Batavia, IX.1908, E. Jacobson; Batavia, VIII.1908, E. Jacobson (Zoological Museum, Amsterdam).

Description.-

Male. Eyes scarcely pilous. Upper frons with median rib reaching median ocellus (fig. 26b). Silvery spots (fig. 26c) not large, widely separated from eyes and antennae. Eye margin narrow, silvery; it never enters frontal triangle. Antennal joints dark-brown; arista black.

Thorax black with black erect pile. Scattered pale silvery pile form extensive spots behind humeri and strip between base of wing and scutellum, scutellum with similar pile on apex



Figs. 25-31. *Argyrobrithes albopilosus* (De Meijere). 25, male head, lateral aspect; 26, male front; 27-28, scutellum of female, dorsal and lateral aspects; 29, scutellum of male, lateral aspect; 30-31, female head, frontal and lateral aspects.  
 Figs. 32-35. *A. ? argentifer* (Kertész). 32, male head, frontal aspect; 33-34, scutellum, dorsal and lateral aspects; 35, head, lateral aspect. h, scattered pale silvery pile, i, black dense pile; other designations as in figs. 1-8.

(fig. 29i) (as on the thorax). Pleurites with pale hairs near wing base.

Abdomen with brown pollination on first three segments (1st entirely, 2nd and 3rd mainly in the centre). Silvery pile forms a wide medial Y-shaped strip on 4th and 5th segments. Pale hairs along lateral margins of 3rd and 4th

segments rather dense, but not forming distinct spots.

Female (figs. 27, 28, 30, 31). Pale hairs on abdomen less dense than in male. Front very short, wider than long (fig. 30). Silvery spots above antennae present; silvery eye margin not interrupted (fig. 30d). Most of the surface of



mesonotum, scutellum and pleurites with scarce silvery pile; prescutellar area with similar but somewhat more dense pile.

Remarks.-

The species is included in *Argyrobrithes* Grünberg by Kertész (1921).

*Argyrobrithes ? argentifer* (Kertész, 1914)

(Figs. 32-25)

Material.-

♂, E. Jacobson, Batavia, VIII.1908 (Zoological Museum, Amsterdam). Labeled in handwriting of De Meijere: "*Wallacea argentifer* Kert. maar scheen geel" (= but tibia yellow).

Description.-

This specimen differs greatly from all the species of the genus. Eyes almost bare. Frons below median ocellus narrow, 1/20 of width of head and strongly broadened above antennae. Frons black, with metallic shine smooth, uniformly concave. Silvery eye margin reaches only base of antennae (fig. 32d). Mesonotum and scutellum with dense silvery pile from above (figs. 33, 34), the pile forming very dense cover. Scutellum convex (fig. 34) with scattered dark tomentum on lateral parts. Scutellar margin distinct, narrow, bare, shining, with small dentulae.

Abdomen with silvery tomentum. 3rd segment with wide transversal band of silvery pile. On 4th segment small spots on lateral part of the 4th segment and distinct medial longitudinal stripe on the 5th segment.

Remarks.-

This species was referred to *Argyrobrithes* by Kertész (1921). Unfortunately the specimen studied was lacking the 3rd joint of antenna. All other characters of the specimen correspond with those given for *argentifer* by Kertész (1914).

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