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Family Plumariidae (Insecta: Hymenoptera) as parasitoids of other arthropods.

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The Plumariidae family belongs to the superfamily Chrysidoidea (Hymenoptera: Aculeata). This family is distributed in arid and semi-arid regions of Southern Africa and South America, with generic diversity being greater in the latter (Figures 1-2) [1-3].

Figure 1. *Myrmecopterinella* Day, 1977. Source: Photographs and map illustration © Simon van Noort (Iziko Museums of South Africa).

Figure 2. Family Plumariidae. Source: Photo 62351763, (c) Geronimo Martin Alonso.

Antennae with 13 (rarely 12) segments, each usually with long erect setae (sometimes short, decumbent setae); pronotum without anterior ridge or very reduced ridge. Extreme sexual dimorphism: macropteran male, vertical pronotum, anterior wing with very thickened pterostigma and a long accessory vein. longitudinal arising from the marginal cell, posterior wing with at least two cells enclosed by tubular veins; female wingless, head prognathous, pronotum horizontal, mesothorax separated from the propodeum metathorax by a deep ventral and lateral constriction (Figures 3-4) [3-6].

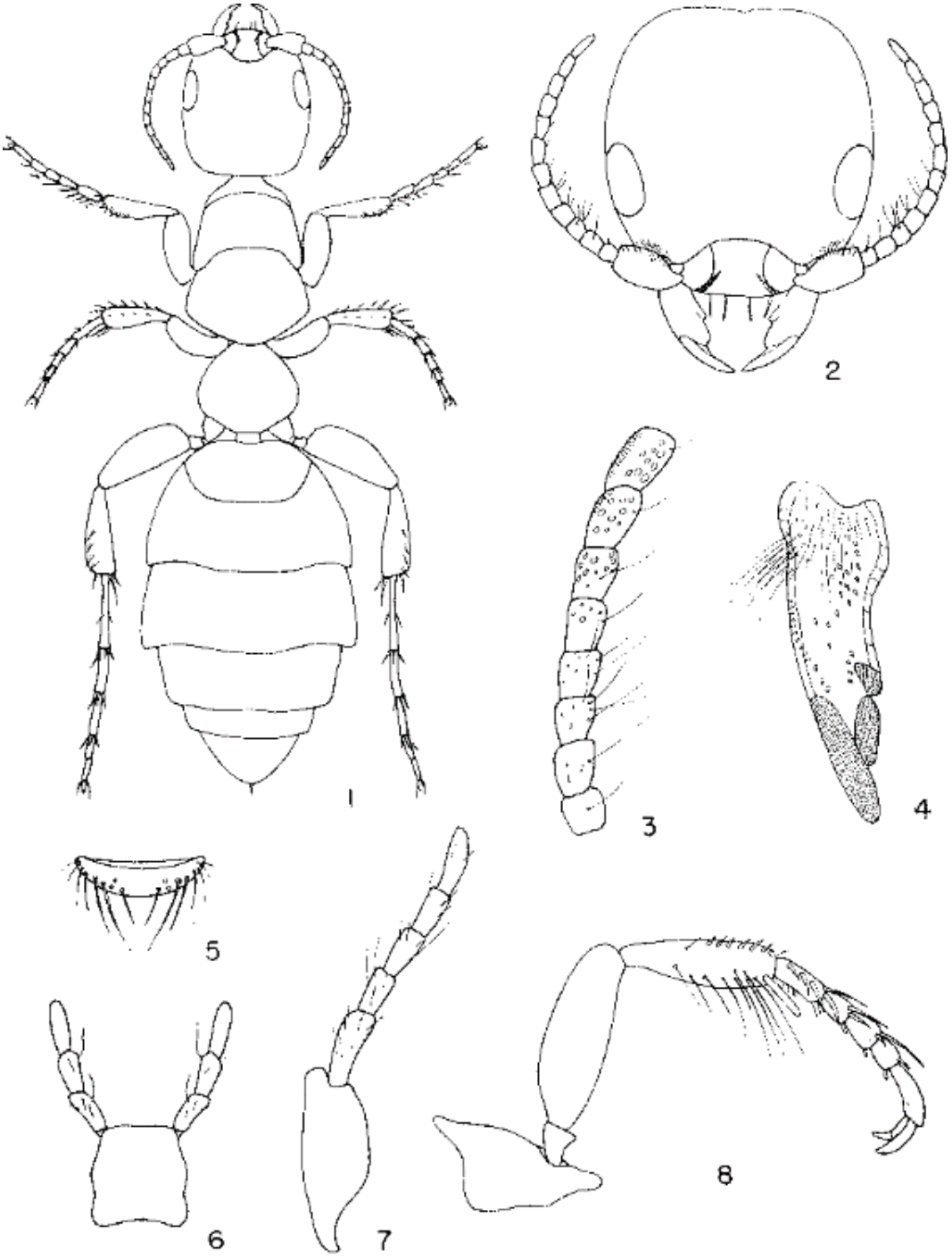
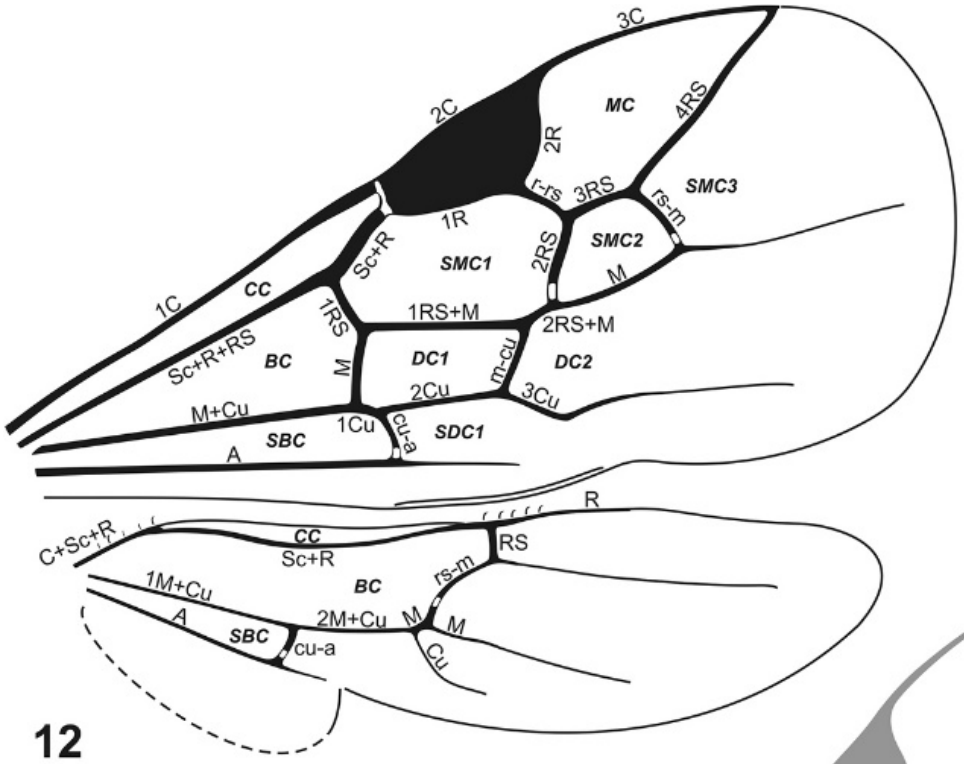


Figure 3. figs. 1-8. Structure of female *Plumarius* Philippi, 1873 from locality 22 miles N of Pativilea, Peru. Fig. 1. Dorsal view of body. Fig. 2. Frontal view of head. Fig. 3. Detail of antennal segments 2-9. Fig. 4. Mandible. Fig. 5. Labrum. Fig. 6. Labium. Fig. 7. Maxilla. Fig. 8. Front leg. Source: DOI:10.1155/1966/31937 and Corpus ID: 86754895.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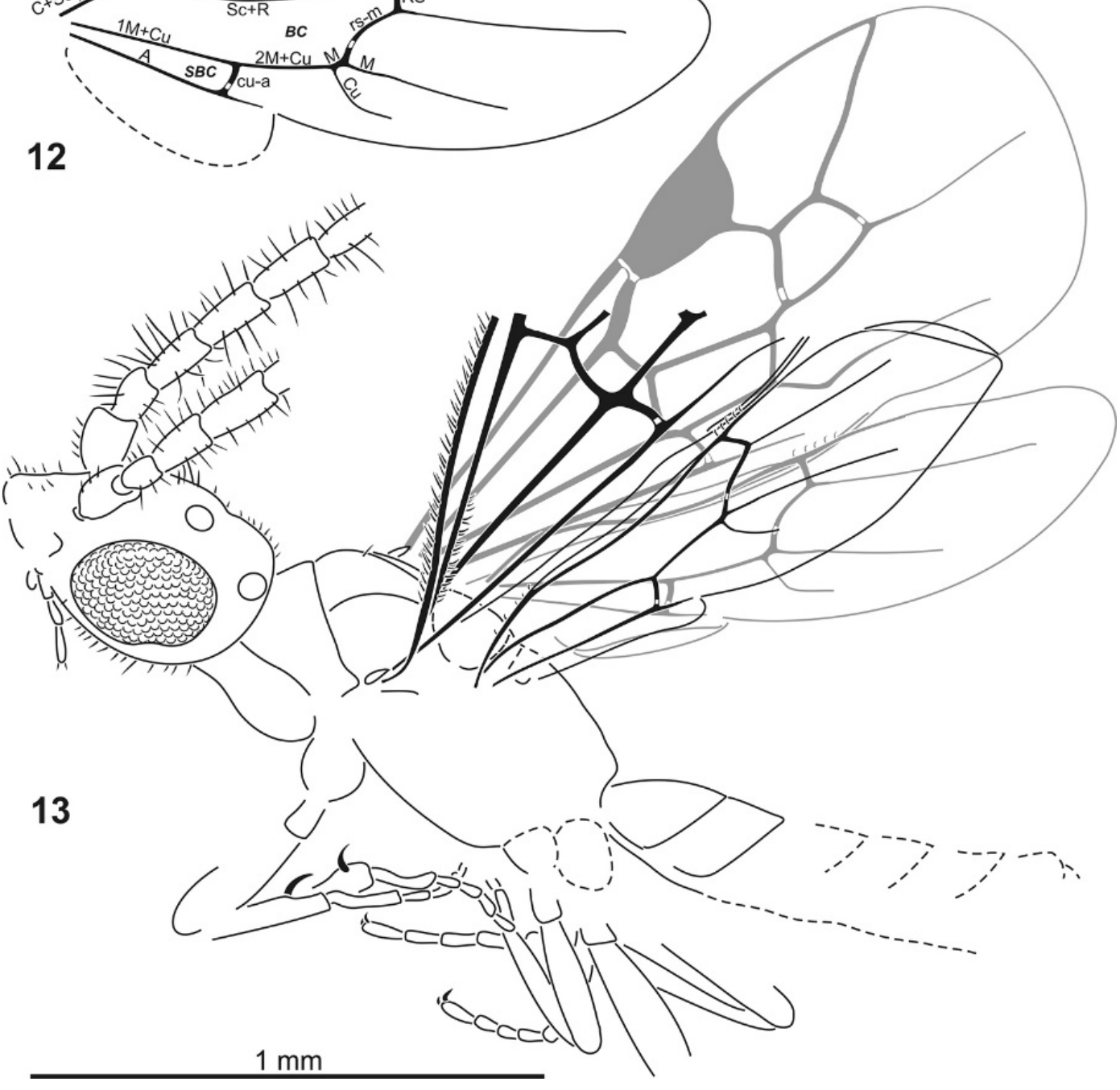

13

1 mm

Figure 4. figs 12–13. *Plumalexius rasnitsyni* sp. nov. 12 Wings, based on both specimens 13 Paratype, dorsolateral view, right wings in grey. Abbreviations. Wing veins: A = anal, C = costa, Cu = cubitus, M = media, R = radius, RS = radial sector, Sc = subcosta (numerals indicate abscissae, all lower-case indicates crossveins); cells: BC = basal cell (cell R), CC = costal cell (cell C), DC = discal cell (cells 1M, 2M), MC = marginal cell (cell 2R1), SBC = subbasal cell (cell 1Cu), SDC = subdiscal cell (cell 2Cu), SMC = submarginal cell (cells 1R1, 1Rs, 2Rs). Source: https://zookeys.pensoft.net/articles.php?id=2720.

Males and females are pale to dark brown. All known species are found in arid regions. das and semiarid. Typically, males are nocturnal. Nothing else is known about their biology, but they are probably parasitoids of other arthropods, perhaps larvae underground beetles. The larva of a parasitoid of *Trachypus* sp. (Crabronidae), was identified as *Plumarius* Philippi, in 1873, but this identification is refutable since the species is, likely, a mutilid. The group's knowledge is mainly based on males, as females are rarely collected. They are nocturnal and show great sexual dimorphism, with wingless females and winged males [6-8].

Pumariidae (Hymenoptera: Chrysidoidea) is a small family of wasps made up of five genera and about 20 species described. In Brazil, only the occurrence of *Plumarius* is recorded. *Plumarius brasiliensis* Penteado-Dias & Scatolini, 2003, was described from specimens from the semi-arid region of the State of Rio Grande do Norte.

Genus: *Plumarius*, *Plumaroides* Brothers, 1974, *Maplurius* Roig-Alsina, 1994, *Mapluroides* Roig-Alsina, 1994, *Myrmecopterina* Bischoff, 1914 and *Myrmecopterinella* Day, 1977 (Figure 5) [8-12].

Figure 5.*Myrmecopterina* Bischoff, 1914. Source: Simon van Noort (Iziko South African Museum).

Classification of Afrotropical Hymenoptera.

Genus: *Myrmecopterina* Bischoff, 1914, *Myrmecopterinella* Day, 1977 and *Parapenesia* Kieffer, 1910.

Distribution: Arid and semi-arid areas in South America (Ecuador to Chile and Argentina) and southern Africa (South Africa to Namibia and Zimbabwe).

Biology: Unknown. Females have been collected under rocks and males are attracted to light.

Diversity: Less than 20 species in five genera.

Species: *Myrmecopterina filicornis* Bischoff, 1914, *Myrmecopterina minor* Brues, 1924, *Myrmecopterina priscus* (Enderlein, 1918) and *Myrmecopterina* species (Figure 6).

Figure 6. *Myrmecopterina minor* Brues, 1924. Source: Simon van Noort (Iziko South African Museum).

Biology: Unknown. Females have been collected under rocks and males are attracted to light.

Species: *Myrmecopterinella okahandja* Day, 1977 and *Myrmecopterinella* species (South Africa) (Figure 7).

Figure 7.*Myrmecopterinella okahandja* Day, 1977. Source: Simon van Noort (Iziko South African Museum).

Distribution: Namibia, South Africa.

Biology: Unknown [8-12].

Specie: *Plumarius brasiliensis* Penteado-Dias & Scatolini, 2003.

Five gold-metallic specimens were photographed in scanning electron microscopy (SEM). The presence of antennas with 13 segments was observed (a characteristic common to almost all known species of the family). Few bristles are found on the scape and radicella; in the pedicel, two transverse rows of sensilla trichodea were observed, which extend across all flagellomeres of both antennae.

Sensillas of the multiporous plate sensilla type were observed from F1 to F10. From F9 to F11, the presence of coeloconic sensilla type sensilla was observed, type 1 and, in F10 and F11, the presence of coeloconic sensilla type 2 sensilla. Additional studies must be carried out, to quantify, locate, and determine the function of such structures. Because the female of this species is unknown, it is impossible to infer whether the structures found in the antennae of males are present in those of females. As the females of some species of this family have a hypogeal habit, it is possible to assume that, at least part of the sensilla present in the antennae of the males, have the function of helping them in the search for females for mating [8-12].

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