



Revision of the *ocellatus* species-group of the genus *Plumarius* Philippi 1873 (Hymenoptera, Chrysididae, Plumariidae), with description of three new species from Argentina

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Abstract

This contribution presents the study of species-group of *Plumarius* Philippi 1873, as the result of a survey of the morphological variation in males. The group is characterized by the large ocelli and transverse head. It consists of the following three new species: *P. culminatus* Diez, Fidalgo & Roig-Alsina, **sp. nov.**, *P. ocellatus* Diez, Fidalgo & Roig-Alsina, **sp. nov.**, and *P. stangei* Diez, Fidalgo & Roig-Alsina, **sp. nov.** A characterization of the group, descriptions, and illustrations are provided.

Key words: Chrysididae, Plumariidae, *Plumarius*, taxonomy, Neotropic Region

Introduction

Plumariidae is a small group of wasps within the superfamily Chrysididae. The females are wingless and have subterranean habits, while the males are winged and highly attracted to light at night. These wasps are of particular interest because they represent one of the basal lineages of Hymenoptera Aculeata. The family includes seven genera, four of which are monotypic: *Myrmecopterina* Day 1977, *Maplurius* Roig-Alsina 1994, *Mapluroides* Diez, Fidalgo & Roig-Alsina 2007, and *Pluroides* Diez, Roig-Alsina & Fidalgo 2010. Two other genera have a few described species: *Myrmecopterina* Bischoff 1914 (Enderlein 1914 as *Archihymenidae* Enderlein (Brues 1924)), and *Plumaroides* Brothers 1974 (Diez & Fidalgo 2012), while *Plumarius* Philippi 1873 is a species-rich genus with sixteen described species (Nagy 1973, Perez-D'Angello 1975, Papp 2000, Pentead-Dias & Scatolini 2003, Quintero & Cambra 2010, Diez *et al.* 2012), five of which comprise the *hirticornis* group (Diez *et al.* 2012), and numerous undescribed species.

The genus *Plumarius* is distributed from northeastern Brazil, Ecuador, Peru and Paraguay, to the south of Argentina and Chile (Evans, 1966; Bradley, 1972; Nagy, 1973; Brothers, 1974; Pentead-Dias & Scatolini, 2003; Quintero & Cambra, 2010). These wasps vary considerably in size, with specimens measuring from 2.4 mm to about 13 mm in length. Their color varies from yellowish brown to dark brown and to black.

The present contribution deals with the study of the *ocellatus* species-group, as the result of an extensive survey of the morphological variation present in male *Plumarius*, which has uncovered many useful characters to distinguish between its numerous species.

Methods

All studied specimens are males. Specimens are deposited in: Museo Argentino de Ciencias Naturales “Bernardino Rivadavia”, Buenos Aires, Argentina (MACN); Instituto Argentino de Investigación de Zonas Áridas, Mendoza,

Argentina (IADIZA); Instituto Fundación Miguel Lillo, Tucumán, Argentina (IFML); Museo de La Plata, La Plata, Argentina (MLP). Terminology follows that of previous contributions (Roig-Alsina 1994, Diez *et al.*, 2010; Diez *et al.*, 2012), except as explained below. The height of the head is measured from the upper margin of the head to the apex of the clypeus (Fig. 1A, *a*). The clypeus height is measured from its basal margin to the apex (Fig. 1A, *b*). The nomenclature used for the genitalia is shown in figure 1B.

Systematics

Genus *Plumarius* Philippi, 1873

Plumarius ocellatus species-group

The species-group treated in this contribution comprises three new species described below. The group can be identified by the large ocelli, the lateral ones reaching or surpassing the upper margin of the head, by the supratorular line crossing the median ocellus, and by the transverse head, 1.3 or more times as wide as high. These features exclude from the group all other species of *Plumarius* known to us.

Key to the males of *Plumarius ocellatus* species group

1. Vertex without punctures anteriorly; malar area as long as apical width of first flagellomere; lower area of genal bridge close to mandibular articulation with carinae (Fig. 3B) *P. stangei* sp. nov.
- Vertex moderate to densely punctate anteriorly; malar area longer (1.3–1.5x) than apical width of first flagellomere; lower area of genal bridge close to mandibular articulation smooth, without carinae 2
2. Genal carina absent; area between preoccipital carina and suboral swelling without median longitudinal carina (Fig. 1D); area anterior to pronotal lobe with weak carinae; pronotal lateral carina without lower pocket *P. ocellatus* sp. nov.
- Genal carina present, distinct; area between preoccipital carina and suboral swelling with median longitudinal carina (Fig. 2B); area anterior to, and inferiorly to pronotal lobe with conspicuous carinae; pronotal lateral carina forming lower pocket (Fig. 2D). *P. culminatus* sp. nov.

Plumarius ocellatus Diez, Fidalgo & Roig-Alsina, sp. nov.

(Figs 1A–G)

Diagnosis. Clypeus pale brown, torulus surrounded by pale spot, area between preoccipital carina and suboral swelling without median longitudinal carina, genal carina absent, forebasitarsus with six outer lateral spines.

Description. Holotype male. Length of holotype 7.5 mm (paratypes 5.9–7.5 mm). Color. Pale brown with darker head; torulus surrounded by pale spot; antenna, clypeus and mouthparts yellowish brown, mandible, with dark brown tip.

Head: 1.4 × as wide as high in frontal view; as wide as scutum between tegulae (65:65). Inner margin of orbits converging ventrally. Ocellocular distance 1.0 × diameter of lateral ocellus; postocellar distance 1.5 × ocellocular distance. Antennocular distance 0.6 × diameter of torulus; interantennal distance 4.0 × antennocular distance. Vertex medially with punctures separated by 1.5 × puncture diameter, behind lateral ocellus punctures separated by 1.0 × puncture diameter. Torulus closer to lateral ocellus than to clypeus (6:16). Lateral ocelli in frontal view reaching upper margin of head. Median ocellus crossed by supra-torular line (Fig. 1C). Genal carina absent. Area between preoccipital carina and suboral swelling without median longitudinal carina, its length shorter than length of swelling (6.0:11.0) (Fig. 1D); lower area of genal bridge close to mandibular articulation smooth, without carinae. Malar area longer than apical width of first flagellomere (60:40), weakly striate anteriorly. Supraclypeal area in frontal view with weak lateral striae extending to above upper level of torulus, medially with rounded elevation with striae and punctate, in lateral view gibbous. Epistomal suture evident. Clypeus 1.5 × wider than high with lateral striae; with apico-lateral area scarcely bent forwards; in lateral view convex medially (Fig. 1E). Ratios of segments of maxillary palp, from base to apex: 5:6:8:9:10:11. Scape cylindrical, without basal swellings or projections. First flagellomere 3.6 × as long as apical width, its length subequal to sum of lengths of scape and pedicel (22:23).

Mesosoma. Area anterior to pronotal lobe with weak carinae; pronotal lateral carina distinct, without lower pocket. Notaulus distinct, as long as admedian line; anterior surface of scutum densely punctate. Metapostnotum with fine longitudinal striae reaching posterior margin. Propodeum transverse. Forewing: marginal cell with anterior margin $2.4 \times$ as long as posterior margin; vein *Rs*3 shorter than *Rs*4 (17:25); vein *M* separated from *cu-a* by $0.3 \times$ length of *cu-a*; medial cell rectangular. Hing wing: vein *cu-a* postfurcal to vein *M*. Forebasitarsus with 6 outer lateral spines. Hind trochanter with ventral setose area; middle basitarsus shorter than hind basitarsus (45:66); inner hind tibial spur $1.3 \times$ as long as outer spur.

Metasoma. Seventh tergum rounded at apex. Genitalia as in Fig. 1B, F, G, aedeagus with apical lateral spines.

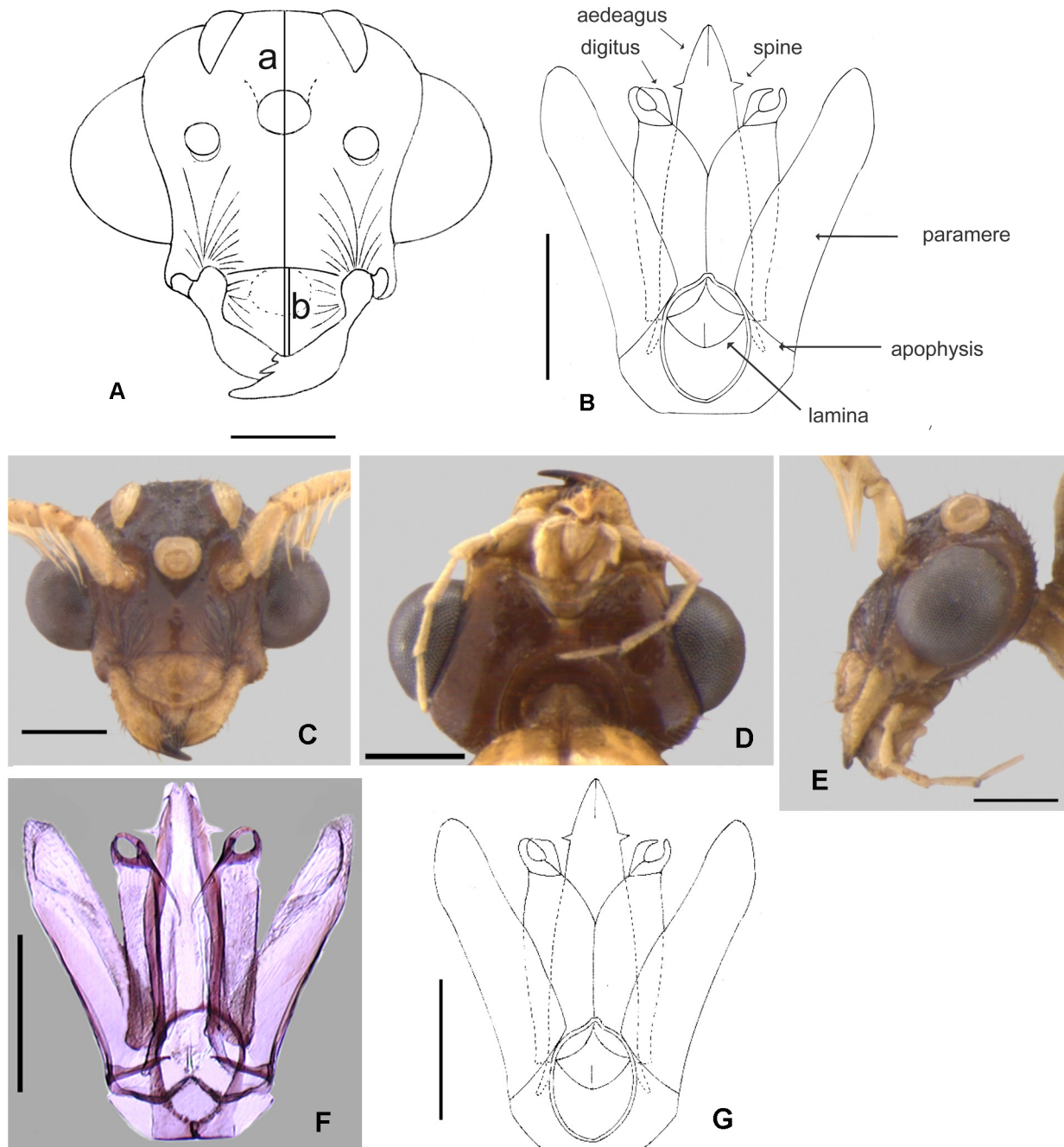


FIGURE 1. *Plumarius ocellatus* Diez, Fidalgo & Roig-Alsina, **sp. nov.**, ♂. A. Head, frontal view (*a*, height of head; *b*, height of clypeus); B, F, G. Genital capsule, dorsal view; C. Head, frontal view; D. Head, ventral view; E. Head, lateral view. Scale bars = 0.5 mm.

Type material. Holotype ♂: Argentina, province of Chubut, Pto. Pirámides, P. Valdez, 17.I.1968, Stange (IFML). Paratypes: 3 ♂, same data as holotype (IFML). Province of Buenos Aires, 1 ♂, San Blas, 32287 (MACN).

Variation. The specimen from San Blas (Buenos Aires) has a slightly darker body and the seventh tergum is basally wider than in specimens from Chubut.

Distribution. Argentina (Buenos Aires, Chubut).

Comments. The forebasitarsus in this species bears six spines on the outer side. The other two species in the group also have spines, but with a smaller number, two in *P. culminatus* and three in *P. stangei*.

Etymology. The specific epithet is Latin adjective *ocellatus* with referring to the ocelli, marked with spots.

Plumarius culminatus Diez, Fidalgo & Roig-Alsina, sp. nov.

(Figs 2A–F)

Diagnosis. Vertex densely punctate; clypeus rather flat in lateral view, pronotal lateral carina forming lower pocket, pronotum with evident carinae in front of and below pronotal lobe.

Description. Holotype male. Length of holotype 8.6 mm (paratypes 6.7–9.8 mm). Color. Dark brown with head evidently darker, and the following areas lighter: mandible except apex, antenna, legs, and metasoma.

Head: 1.3 × as wide as high in frontal view; in dorsal view subequal to width of scutum between tegulae (74:75). Inner margin of orbits converging ventrally. Ocellular distance 1.1 × diameter of lateral ocellus; postocellar distance 1.4 × ocellular distance. Antennocular distance 0.6 × diameter of torulus; interantennal distance 5.5 × antennocular distance. Vertex densely punctate, medially punctures separated by 0.5 × puncture diameter, behind lateral ocellus punctures separated by 0.4 × puncture diameter. Torulus closer to lateral ocellus than to clypeus (11:20). Lateral ocelli in frontal view reaching upper margin of head. Median ocellus crossed by supra-torular line (Fig. 2A). Genal carina present, distinct. Length of area between preoccipital carina and suboral swelling subequal to length of swelling (0.9:1.0); this area with median longitudinal carina (Fig. 2B); lower area of genal bridge close to mandibular articulation smooth, without carinae. Malar area longer than apical width of first flagellomere (20:15), striate anteriorly. Supraclypeal area in frontal view with lateral striae extending to above upper level of torulus; medially with rounded elevation with striae and punctate, in lateral view convex (Fig. 2C). Epistomal suture evident. Clypeus 1.2 × wider than high, with lateral striae; apico-lateral area scarcely bent forwards. Clypeus in lateral view rather flat (Fig. 2C). Ratios of segments of maxillary palp, from base to apex: 11:10:17:19:15:15. Scape cylindrical, without basal swellings or projections. First flagellomere 4.3 × as long as apical width, its length longer than sum of lengths of scape and pedicel (65:62).

Mesosoma. Area anterior to, and inferiorly to pronotal lobe with conspicuous carinae; pronotal lateral carina distinct, forming lower pocket (Fig. 2D). Notaulus distinct, as long as admedian line; anterior surface of scutum punctate, more densely around notauli. Metapostnotum with longitudinal striae reaching posterior margin. Propodeum transverse. Forewing: marginal cell with anterior margin 2.0 × as long as posterior margin; vein *Rs*3 shorter than *Rs*4 (26:32); vein *M* separated from *cu-a* by 0.4 × length of *cu-a*; medial cell rectangular. Hind wing: vein *cu-a* postfurcal to vein *M*. Forebasitarsus with 2 outer lateral spines. Hind trochanter with ventral setose area; middle basitarsus shorter than hind basitarsus (40:60); inner hind tibial spur 1.2 × as long as outer spur.

Metasoma. Seventh tergum sharply pointed. Genitalia as Fig. 2F, G, aedeagus with apical lateral spines.

Type material. Holotype ♂: Argentina, province of Catamarca, Medanitos, 9.IV.2005, Fidalgo P. (MACN). Paratype males: 2 ♂, same data as holotype (MACN; IFML); 3 ♂, Campo El Arenal, 14.I.1981, Roig-Alsina (MACN); 1 ♂ Santa María, 7.II.1965 (IFML); 1 ♂, ca Saujil, 23.XI.2005, Porter, Fidalgo P., Diez (MACN). Provincia de La Rioja: 2 ♂, 5 km S Udpinango, 3.XII.2005, Fidalgo G., Fidalgo P. (MACN).

Variation. One specimen from Campo El Arenal (Catamarca) and one specimen from Santa María (Catamarca) have weak carinae on the area anterior to the pronotal lobe. One specimen from Medanitos (Catamarca) has the supraclypeal area weakly rounded in profile, and another specimen from the same locality has the clypeus with striae that cross it completely as opposed to lateral striae.

Distribution. Argentina (Catamarca, La Rioja).

Comments. Some specimens of *P. stangei* sp. nov. may also have carinae in front of the pronotal lobe as in *P. culminatus*, but these carinae are weak.

Etymology. The name of the species refers to the position of the lateral ocelli, on top of the head and originates from Latin (*culminis*: top).

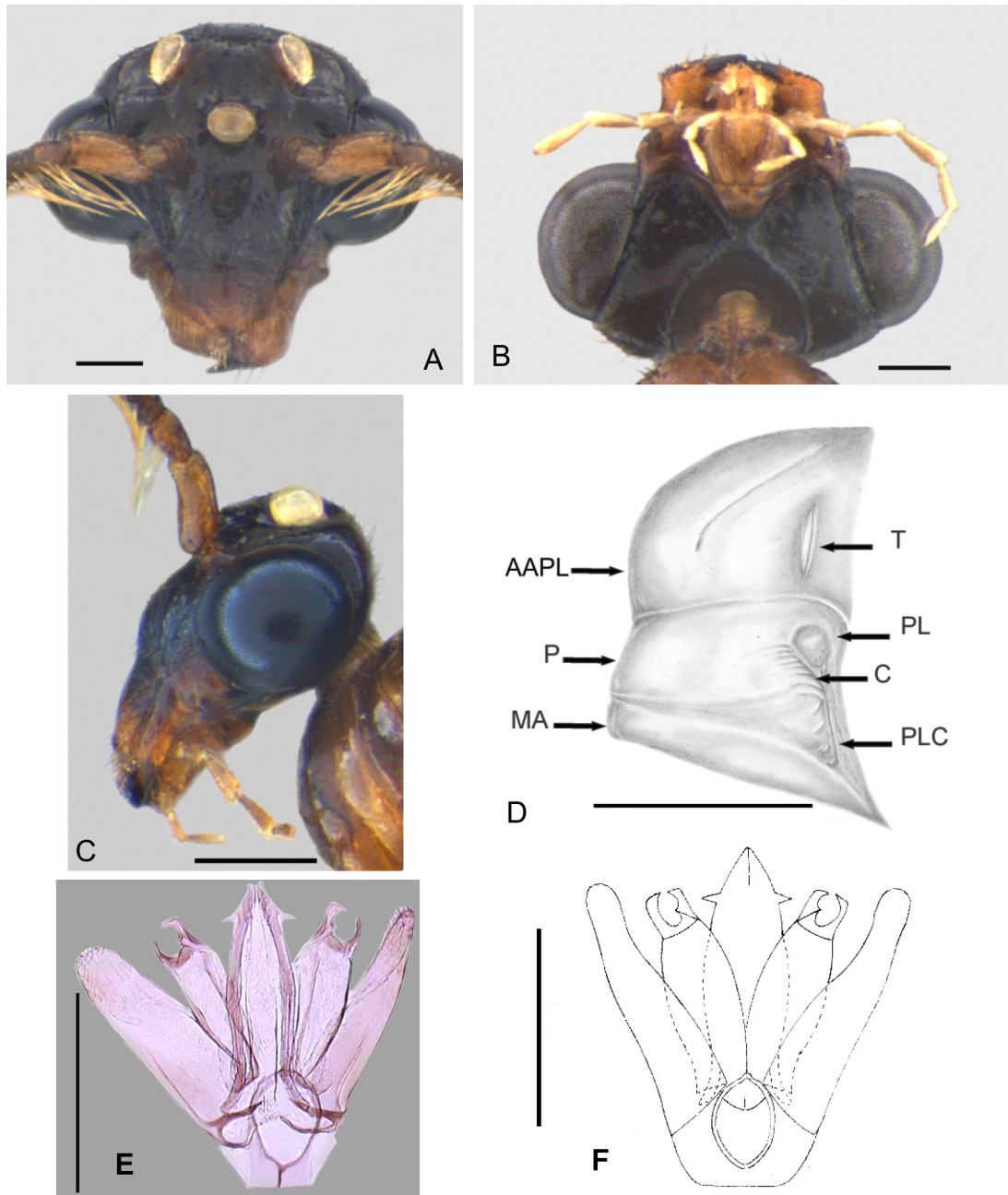


FIGURE 2. *Plumarius culminatus* Diez, Fidalgo & Roig-Alsina, sp. nov., ♂. A. Head, frontal view; B. Head, ventral view; C. Head, lateral view; D. Anterior part of mesosoma, lateral view; E, F. Genital capsule, dorsal view. *AACL*, anterior area pronotal lobe; *C*, carinae; *MA*, membranous area; *P*, pronotum; *PL*, pronotal lobe; *PLC*, pronotal lateral carina; *T*, tegula. Scale bars = 0.5 mm.

***Plumarius stangei* Diez, Fidalgo & Roig-Alsina, sp. nov.**
(Figs 3A–E)

Diagnosis. Clypeus in lateral view rounded medially; carinae present on lower area of genal bridge close to mandibular articulation; vertex without punctures anteriorly, and weakly punctate behind lateral ocellus.

Description. Holotype male. Length of holotype 7.9 mm. (paratypes 6.3–8.3 mm). Color. Head, pronotum, scutum, scutellum, propleuron and mesopleuron dark brown; mandible except apex, mesothorax, metathorax and gaster pale brown.

Head. 1.3 × as wide as high in frontal view; in dorsal view subequal to width of scutum between tegulae

(35:37). Inner margin of orbits converging ventrally. Ocellocular distance equal to diameter of lateral ocellus; postocellar distance $1.3 \times$ ocellocular distance. Antennocular distance $0.7 \times$ diameter of torulus; interantennal distance $4.8 \times$ antennocular distance. Vertex without punctures anteriorly, behind lateral ocellus punctures separated by $1.0 \times$ puncture diameter. Torulus closer to lateral ocellus than to clypeus (12:25). Lateral ocelli in frontal view reaching upper margin of head. Median ocellus crossed by supra-torular line (Fig. 3A). Genal carina present, distinct. Length of area between preoccipital carina and suboral swelling equal to length of swelling; this area with median longitudinal carina; lower area of genal bridge close to mandibular articulation with carinae (Fig. 3B). Malar area as long as apical width of first flagellomere; striate anteriorly. Supraclypeal area in frontal view with lateral striae extending to above upper level of torulus; medially with rounded elevation, without striae or punctures. Epistomal suture evident. Clypeus $1.4 \times$ wider than high, with lateral striae; in lateral view rounded medially (Fig. 3C). Ratios of segments of maxillary palp, from base to apex: 8:8:14:15:12:14. Scape cylindrical, without basal swellings or projections. First flagellomere $4.0 \times$ as long as apical width, its length longer than to sum of lengths of scape and pedicel (34:30).

Mesosoma. Area anterior to pronotal lobe with weak carinae, pronotal lateral carina distinct, without lower pocket. Notaulus distinctive, as long as admedian line; anterior surface of scutum punctate, more densely around notauli. Metapostnotum with longitudinal striae reaching posterior margin. Propodeum transverse. Forewing: marginal cell with anterior margin $2.0 \times$ as long as posterior margin; vein *Rs3* shorter than *Rs4* (14:21); vein *M* separated from *cu-a* by $3.6 \times$ length of *cu-a*; medial cell rectangular. Hing wing: vein *cu-a* postfurcal to vein *M*. Forebasitarsus with 3 outer lateral spines. Hind trochanter with ventral setose area; middle basitarsus shorter than hind basitarsus (20:27); inner hind tibial spur $1.4 \times$ as long as outer spur.

Metasoma. Seventh tergum triangular. Genitalia as Fig. 3D, E, aedeagus with apical lateral spines.

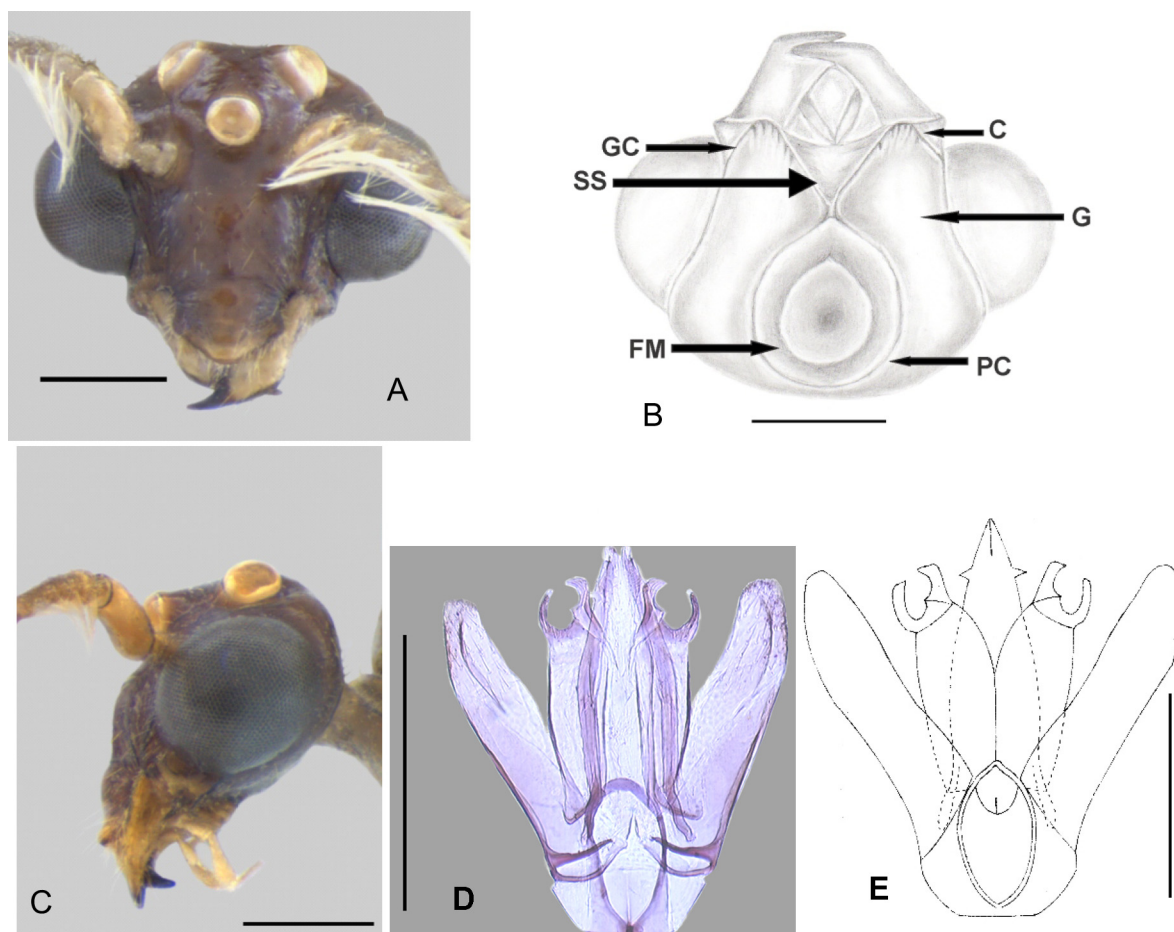


FIGURE 3. *Plumarius stangei* Diez, Fidalgo & Roig-Alsina, sp. nov., ♂. A. Head, frontal view; B. Head, ventral view; C. Head, lateral view; D, E. Genital capsule, dorsal view. C, carinae; FM, foramen magnum; G, gena; GC, genal carina; PC, preoccipital carina; SS, suboral swelling. Scale bars = 0.5 mm.

Type material. Holotype ♂: Argentina, province of Mendoza, Lavalle, Las Catitas, 10.XII.1979, Roig-Alsina (MACN). Paratypes: province of Mendoza, 5 ♂, Lavalle, Telteca, 26.III, 25.IX, and 3.XII.1996, G. Flores and S. Roig (IADIZA); 1 ♂, Malargüe, Pto Agua de los Ciegos, 28.I.1979, Roig-Alsina (MACN)). Province of Catamarca, 1 ♂, 6 km N Belén, 16–31.VII.1969, Malaise trap, Willink, Terán, Stange (IFML). Province of La Rioja, 1 ♂, Catinzaco, 18.XII.1979, Roig-Alsina (MACN); 2 ♂, Anguiñan, Chilecito, 16–31.VII.1969, Malaise trap, Willink, Terán, Stange (IFML).

Distribution. Argentina (Catamarca, La Rioja, and Mendoza).

Variation. The specimens from 6 km north of Belén (Catamarca), Catinzaco (La Rioja) and one specimen from Anguiñan (La Rioja) have a lighter brown body. The specimens from 6 km north of Belén (Catamarca) and one specimen from Catinzaco (La Rioja) have the striae of the area anterior to the pronotal lobe very weak.

Etymology. This species is named after Dr. Lionel Stange, who collected numerous plumariids in Argentina.

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