

A revision of the West-Palaearctic *Podagrion* (Hymenoptera: Torymidae), with the description of *Podagrion bouceki* sp. nov.

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Abstract. The West Palaearctic species of *Podagrion* Spinola, 1811 are revised and keyed out. *Podagrion bouceki* sp. nov. is described. *Podagrion pachymerum* var. *gibba* Bernard, 1938 is treated as a valid species. *Podagrion pachymerum* var. *rufiventre* Giraud, 1863 and *Cleptimorpha binotata* Walker, 1872 are synonymized with *Podagrion pachymerum* (Walker, 1833), *Podagrion meridionale* Masi, 1935 and *Podagrion enei* Bakkendorf, 1960 with *Podagrion klugianum* (Westwood, 1847). *Priomerus insidiosus* Coquerel, 1856, *Podagrion armigerum* Masi, 1940, *Podagrion tarachodesi* Risbec, 1951 are treated as subspecies of *P. klugianum* (Westwood, 1847). Neotypes are selected for *Podagrion splendens* Spinola, 1811, the type species of the genus, for *Priomerus insidiosus* Coquerel, 1856 and *Cleptimorpha binotata* Walker, 1872. Lectotypes are designated for *Podagrion pachymerum* var. *rufiventre* Giraud, 1863, *P. meridionale* Masi, 1935, *P. armigerum* Masi, 1940, *P. pachymerum* var. *gibba* Bernard, 1938 and *P. tarachodesi* Risbec, 1951.

Taxonomy, new species, lectotype designation, neotype, key, distribution, Hymenoptera, Chalcidoidea, Torymidae, *Podagrion*, mantid hosts, Europe, Mediterranean Basin, Palaearctic region

INTRODUCTION

Species of *Podagrion* Spinola, 1811 are well known parasitoids of mantids egg-cases (Chopard 1922, Parker 1926, Picard 1933, 1936, Sellenschlo 1984, Grissell 1995). Available keys for the west palaearctic species (Nikol'skaya 1952, Zerova & Seryogina 1999) deal only with two species as does Bou ek (1976). However the examination of European material and from the Southern part of the Mediterranean Basin revealed that the biodiversity of *Podagrion* is greater. The general aim of this study is to revise the euro-mediterranean species of *Podagrion* and provide morphological features to distinguish the species. Unfortunately most of the species are very similar, if not sibling. I therefore previously investigated the possibility of using quantitative characters to separate the putative species (Delvare 2002). Because I did not initially know the range of intraspecific and allometric variation, especially that correlated with environmental factors, I also screened the influence of the mantid host on the morphology of the parasitoids in order to better select discriminant characters for species segregation. The possibility that the putative species found in southern France to interbreed was also studied through crossing tests and detailed observations of their courtship behaviour (Delvare 2002). This latter study showed that *P. pachymerum* var. *gibba* should be recognized a valid species based on its morphology and apparent reproductive isolation from *P. pachymerum*. The species treated in Delvare (2002) as *Podagrion* sp. is a common and widely distributed undescribed species; a clear barrier exists in its sexual behaviour relative to *P. pachymerum* and *P. splendens*. The present revision of regional species takes into account the results of Delvare (2002) as well as the examination of type material and recent samples

collected in Europe and the Mediterranean Basin to revise the regional species. This study is a part of a more extensive project concerning the World Podagrionini which includes a phylogenetic reassessment of the tribe, a revision of the afrotropical species, and morphometric and biological studies.

MATERIAL AND METHODS

Material

All available types were examined and neotypes were selected when it was confirmed that the typical material was lost; this selection agrees with the present rules of the code of nomenclature (ICZN 1999). Several hundreds of specimens were examined during this revision with sampling more extensive in the western mediterranean basin than in the eastern part of the region. A significant proportion of these parasitoids were reared from known hosts. Each culture strain started with one female and successive rearing on different hosts enabled an appreciation of the range of morphological variation, including structural characters (coloration) and quantitative characters (size and form). It was further possible, from careful examination of adults collected in the field to infer the identity of the hosts from which they emerged.

Equipment

Scanning electron micrograph were taken with a JEOL JSM-6300 F scanning enlectron microscope.

Special terms

The sulcus separating the axilla from the scutellum is called the **axillar groove** in preference to scuto-scutello suture. The **adpetiolar area** of the propodeum is the median region anterior to the petiolar foramen; it is delimited anteriorly by oblique carinae that together form an inverted V or Y; a **spiracular groove** is visible laterally behind the spiracle.

Use of the keys

When examining *Podagrion* specimens attention must be paid to the nature and orientation of the light in order to properly appraise sculpture. Preferably, a fluorescent light should be used and the specimens examined in a tangential view, from the posterior or latero-posterior end of the body; this is especially true for examination of the notauli and frenal area. Only hereromorph males (see below for their definition) should be used for the identification of species based on this sex. Homeomorph males are often very similar and they are almost impossible to determine to species.

Abbreviations

F1 – first funicular segment; F2 second funicular segment, etc;
OD – ocellar diameter, i. e. the diameter of a lateral ocellus;
OOL – ocellar-ocular distance i. e. the distance between a lateral ocellus and the closest eye;
POL – postocellar distance i. e. the distance between the lateral ocelli.

Acronyms and institutions

CNCI – Canadian National Collection of Insects, Ottawa, Ontario, Canada;
GD – Gérard Delvare personal collection, Montpellier, France;
JYR – Jean-Yves Rasplus personal collection, Montferrier-sur-Lez, France;
MHNG – Muséum d'histoire naturelle, Genève, Switzerland;
MNHN – Muséum national d'Histoire naturelle, Paris, France;
MNM – Museo Nacional de Ciencias Naturales, Madrid, Spain;
MSNG – Museo Civico di Storia Naturale „G. Doria“, Genoa, Italy;
NHM – Natural History Museum, London, United Kingdom;
OUM – Oxford University Museum, Oxford, United Kingdom;
ZMHB – Zoologisches Museum, Humboldt Universität, Berlin, Germany;
ZMUA – Zoologisch Museum, Universiteit van Amsterdam, The Netherlands;
ZMUC – Zoologisk Museum, Universitets Copenhagen, Denmark.

Morphology of the males

The special morphology and polymorphism of *Podagrion* males has already been established by several authors (Chopard 1922, Picard 1936). For the same species several types of males are observed. Some have stronger teeth on their hind femur and a modified hind tibia, relative to the females; they all bear enlarged basitarsi on all legs, the following tarsal segments being very short (Figs 37–41); the ornamentation of the propodeum is also different. Other males are mostly similar to females for these characters. The first type of males are here called

“heteromorph males” whereas the latter are called “homeomorph males”. The culture of isogenotypic strains successively on different hosts revealed that these phenotypes are not inherited but depends only upon the environment, especially the size of the host. Heteromorph males develop upon large or usual hosts for a given *Podagrion* species. Homeomorph males are encountered when reared under unfavourable conditions (e. g., hosts of small size or when competing with another parasitoid). Intermediates between the two morphotypes also often occur.

Biology of *Podagrion*

Grissell (1995) stated that Podagrionini are potential basing his assumption on a sentence in Clausen (1940), mentioned Podagrionini. However Clausen never reared podagrionines and his statement was erroneous because Parker (1926: 360), who studied the pre-imaginal development of *Podagrion pachymerum*, determined that this species was a solitary external parasitoid. My own observations confirm this. When an egg-case is completely parasitized, which often occurs for *Empusa* species (Mantodea : Empusidae), there are as many emerging adult parasitoids as there are egg-cells. Moreover, because the size of the emerging adults depends on the size of the host, it is evident that individuals are solitary parasitoids. Again in the case of *Empusa* egg-cases, it is also physically impossible for the *Podagrion* larvae to move from one egg-cell to another because of the very hard walls that separate them.

TAXONOMY

Key to the West Palearctic species of *Podagrion* (females)

- 1 Antennal flagellum relatively long, F1 1.6–1.95 times as long as wide. Pedicel plus flagellum 1.55–1.65 times as long as width of head (Fig. 11). Propodeum with carinae forming an inverted Y, straight (at least on anterior half) and forming together an angle of 70–75° (Fig. 31). Frenal area smooth, well delimited from anterior part of scutellum through abrupt change in sculpture (Fig. 31). Cubital vein setose along the basal cell, bearing 11–20 hairs (Fig. 16). *P. pachymerum* (Walker)
- 1' Antennal flagellum shorter, F1 1.3–1.5 times as long as wide. Pedicel plus flagellum 1.35–1.5 times as long as width of head (Figs 13, 15). Propodeum different, the carinae either forming a more obtuse angle (Figs 28, 32) or curving outwards from base (Figs 22, 26, 30). 2
- 2(1') Cubital vein of fore wing bare or with very sparse hairs (0–3) along basal cell. Frenal area dull, with fine but distinct reticulation (Figs 21–23). Notauli incomplete, not reaching transscutal line (Figs 21, 22). 3
- 2' Cubital vein of the forewing with at least 4–7 hairs along basal cell. Frenal area smooth or very faintly alutaceous medially, distinctly differentiated from anterior part of scutellum, (Figs 26, 30, 32). Notauli complete, reaching transscutal line (Fig. 24). 5
- 3(2) Ovipositor sheaths longer, 1.5–2 times as long as body. Propodeal carinae as an inverted Y, originated from a short median carina, forming a fairly acute angle at base and curving slightly outwards posteriorly (Fig. 27). Axillar grooves narrow throughout. Scutellum uniformly convex. *P. klugianum* (Westwood)
- 3' Ovipositor sheaths shorter, 1–1.4 times as long as body. Propodeal carinae different; either as an inverted V, forming a very acute angle at base and distinctly curving outwards posteriorly (Fig. 22) (in *P. splendens*) or if an inverted Y, then forming together a right angle and straight (in *P. minus*) (Fig. 45). Axillar grooves often broad anteriorly; scutellum not so convex in center. 4
- 4(3') Hind femur dark, showing some metallic reflections and with 7–8 teeth (rarely 6); OOL shorter to very slightly longer than OD ($\times 0.7$ –1.1) (Fig. 10). Propodeal carinae distinctly curving outwards posteriorly; propodeum rugulose-reticulate (Fig. 22); spiracle as long as distance to hind margin of metanotum. Axillar grooves broad anteriorly. *P. splendens* Spinola
- 4' Hind femur reddish and with 5–6 teeth (rarely 7)(Fig. 46). OOL distinctly greater than OD ($\times 1.3$) (Fig. 9). Propodeum entirely reticulate (Figs 23, 45); propodeal carinae straight; spiracle small, shorter than distance to hind margin of metanotum. Axillar grooves narrow anteriorly. *P. minus* Strand
- 5(2') Frenal area somewhat distinct but dull at low magnification ($\times 25$), finely but distinctly reticulate medially at high magnification. Propodeal carinae mostly straight, delimiting an angle of about 70°. Propodeal spiracle very large, its aperture much more longer than distance to hind margin of metanotum; spiracular groove very deep. *P. sp. indet. A*
- 5' Frenal area mostly smooth at low magnification, at most very faintly reticulate medially (Figs 20, 30, 32). Propodeal carinae different, either curving outwards from their junction (Fig. 26) or nearly delimiting a right angle (Fig. 32); propodeal spiracle smaller, its aperture at most slightly longer than distance to hind margin of metanotum; spiracular groove less deep. 6

- 6(5[°]) Carinae forming together, at mid length of propodeum, an obtuse angle (90–110°) and mostly straight (Fig. 32). Cubital vein of the forewing with 5–10 hairs along basal cell (Fig. 17). Frenal area completely smooth (Fig. 32). OOL greater than OD ($\times 1.2$ – 1.4) (Fig. 6). Fronto-vertex without area of delicate sculpture. *P. gibbum* Bernard
- 6[°] Carinae forming together, at mid length of propodeum, an acute angle (70–85°) and curving outwards (Fig. 30). Cubital vein of forewing with 10–15 hairs along basal cell (Fig. 18). Frenal area very faintly reticulate medially (Fig. 26). OOL most often slightly shorter than OD ($\times 0.85$ – 1.1) (Fig. 5). Fronto-vertex with a lateral area of delicate reticulation which is more brightly colored in front of lateral ocelli, along eyes (Fig. 5). *P. bouceki* sp. nov.

Key to the West Palearctic species of *Podagrion* (males — heteromorph forms)

- 1 Antennal flagellum relatively long, with F1 2–2.4 times as long as wide (Fig. 12). Pedicel plus flagellum 1.7–1.8 times as long as width of head. Cubital vein of fore wing with 12–15 hairs along basal cell. Notauli complete. Propodeal carinae mostly straight (Fig. 36). Frenal area distinct, with fine reticulation. Penultimate tooth of the hind femur partly fused with terminal one, or narrowly separated from it (Fig. 41). *P. pachymerum* (Walker)
- 1[°] Antennal flagellum shorter, with F1 1.45–2 times as long as wide (Fig. 14). Pedicel plus flagellum 1.45–1.65 times as long as width of head. Other characters partly disagreeing: either the last two teeth of the hind femur are quite separated, or the frenal indistinct. 2
- 2(1[°]) Propodeal carinae forming an obtuse angle (90–110°) (Fig. 34). Frenal area set off from anterior part of scutellum through an evident change in sculpture, smooth or very finely reticulate. Notauli complete and evident throughout. Last two teeth of the hind femur separated (Fig. 38). 3
- 2[°] Propodeal carinae forming an acute angle (25–60°) at base and curving outwards (Fig. 33). Frenal area less distinct. Notauli incomplete or hardly visible posteriorly. Hind femur with last two teeth sometimes partly fused (Fig. 37). ... 4
- 3(2) Cubital vein of forewing most often with some (2–7) hairs along the basal cell. OOL larger than OD ($\times 1.1$ – 1.4). Disc of mesonotum and scutellum flat. *P. gibbum* Bernard
- 3[°] Cubital vein of forewing completely bare along basal cell. OOL shorter than OD ($\times 0.75$). When observed laterally dorsal surface of scutellum distinctly convex and mid lobe of mesoscutum slightly so (Fig. 42). *P. lybicum* Masi
- 4(2[°]) Propodeum with carinae forming an inverted Y, the adpetiolar area rugose, contrasting with reticulate sublateral parts; adpetiolar costulae present and strong, delimiting with the carinae a median subpentagonal area; propodeum strongly sloping laterally; spiracle elongate; spiracular groove deep (Fig. 35). Cubital vein of forewing bare or nearly so (0–2 hairs). Scutellum regularly and evidently convex. Frenal area completely indistinct. Notauli incomplete. *P. klugianum* (Westwood)
- 4[°] Propodeum different, adpetiolar area less visible and with less contrasting sculpture relative to rest of surface; adpetiolar costulae sometimes missing. Either cubital vein of forewing with some hairs, or notauli are visible or frenal area fairly distinct. 5
- 5(4[°]) Hind femur with penultimate tooth partly fused with the terminal one (Fig. 37). Propodeum with adpetiolar costulae fine but present (Fig. 33); propodeal spiracle relatively elongate. Notauli more or less distinct posteriorly. Frenal area somewhat distinct, with finer reticulation. Cubital vein of forewing at least with some hairs. *P. bouceki* sp. nov.
- 5[°] Hind femur with penultimate tooth quite separated from the terminal one (Fig. 40). Propodeum with adpetiolar costulae absent or indistinct; propodeal spiracle shorter, oval. Notauli indistinct posteriorly. Scutellum generally less convex, nearly flat on its disc. Frenal area hardly distinct. Cubital vein of forewing sometimes completely bare. 6
- 6(5[°]) Hind femur generally dark, most often black and with 4 strong teeth (Fig. 40). Propodeum rugulose-reticulate and with curving outwards carinae. *P. splendens* Spinola
- 6[°] Hind femur reddish, with 5 shorter teeth (Fig. 39). Propodeum reticulate, and with carinae straight. *P. minus* Strand

REVIEW OF THE SPECIES

Podagrion bouceki sp. nov.

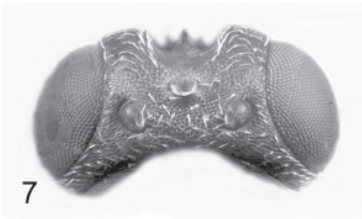
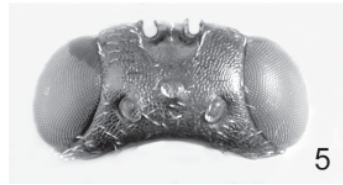
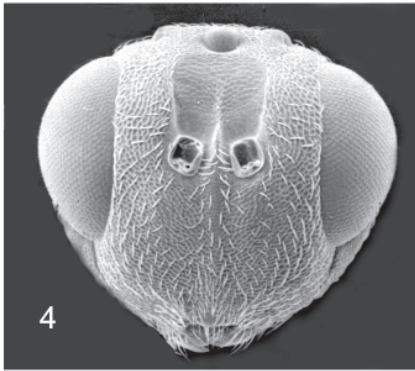
(Figs 2, 5, 15, 18, 20, 26, 30, 33, 37)

TYPE MATERIAL. **Holotype** ♀: SPAIN: Huesca, Casteljon de Monegros, 41°37'10.87"N 00° 12' 28.76" W, 14 VI 2003, ex *Empusa* sp. (A. Foucart) (in NHM). Paratypes. Same references, 19 ♀♀ 2 ♂♂ ; (in NHM, MNHN, GD). PORTUGAL: Coimbra, 1 ♀, Gois, 17 V 1991 (M.J. Gijswijt) (in ZMUA). SPAIN: Cáceres, 1 ♀, 16 km S Placencia, 10 VI 1994 (M.J. Gijswijt) (in ZMUA); Cadiz, 1 ♀, Jimena de la Frontera, 11 VI 1986 (M.J. Gijswijt) (in ZMUA); 1 ♂, Ubrique, 14 V 1995 (M.J. Gijswijt) (in ZMUA); Málaga, 1 ♀, Casares, 8/10 VI 1986 (M.J. Gijswijt) (in ZMUA); 1 ♀, Manilva, 12 km SW Estepona, 18 V 1990 (M.J. Gijswijt) (in ZMUA); 1 ♀, Arcos de la Frontera, 12/13 VI 1986 (M.J. Gijswijt) ; Almería, 3 ♀♀, Mojacar, 13 IV 1990 & 26 IV 1994 (M.J. Gijswijt) (in ZMUA); 1 ♀, Cuevas del



Fig. 1. *Podagrion bouceki* sp. nov., a female ovipositing in an egg-case of *Empusa pennata* (Thunberg).

Almanzora, 14 V 1992 (M.J. Gijswijt) (in ZMUA); 2 ♀♀, Villaricos, 22 IV/1 V 1994 (M.J. Gijswijt) (in ZMUA); 1 ♀, Canton, 8 IV 1994 (M.J. Gijswijt) (in ZMUA); 1 ♀, 15 km N Tabernas, 30 IV 1995 (M.J. Gijswijt) (in ZMUA); 1 ♀, Mojacar, 14 VI 1994 (G. Delvare) (in GD); 1 ♀, San Isidro, 5 VI 1994 (G. Delvare) (in GD); 3 ♀♀, Sierra de Gata, La Isleta 16 VI 1994 (G. Delvare) (in GD); Murcia, 2 ♀♀, Sorbas, 5 VI 1994 (G. Delvare) (in GD); 1 ♀, Southern slope of Sierra Nevada, Juviles, 7 VI 1994 (G. Delvare) (in GD); Madrid, 1 ♀, Monzanares, 3 VII 1986 (M.J. Gijswijt) (in ZMUA); Valencia, 1 ♀, Saler, 18 V 1989 (J.-Y. Rasplus) (in JYR); 1 ♀, El Saler, 22 VI 1992 (T. Oltra) (in JYR); Alicante, 1 ♀, Rebate, 13 X 1990 (J.-Y. Rasplus) (in JYR); 1 ♀, Guardamar a. Seu, 13 X 1990 (J.-Y. Rasplus) (in JYR); Castellón, 1 ♀, Alfondiguilla, 14 V 1989 (J.-Y. Rasplus) (in JYR); 1 ♀, Sierra Espadan, 40 km N Valencia, 20 V 1987 (M.J. Gijswijt) (in ZMUA); Cuenca, 1 ♀, Metilla del P. along CU 504, 24/29 V 1987 (M.J. Gijswijt) (in ZMUA). FRANCE: Pyrénées Orientales, 1 ♀, Néfiach, 18 IV 1990 (J.-Y. Rasplus) (in JYR); Hérault: 1 ♀, Marseillan-Plage, 15 VIII 1964 (in JYR); 1 ♀, Vic-la-Gardiole, Les Aresquiers, 17 VI 1990 (G. Delvare) (in GD); 2 ♀♀, Saint-Guilhem-le-Désert, les Lavagnes, 31 V 1990 (G. Delvare) (in GD); 1 ♀, Pégairolles-de-Bueges, 15 IX 1985 (G. Delvare) (in GD); 2 ♀♀, Saint-André-de-Bueges, Les Prats, 23 VIII 1990 (G. Delvare) (in GD); 1 ♀, Aniane, Pont-du-Diable, 31 V 1990 (G. Delvare) (in GD); 1 ♀, Saint-Etienne-d'Issensac, 23 VIII 1990 (G. Delvare) (in GD); 1 ♀, St-Bauzille-de-Montmel, on an ootheca of *Mantis religiosa*, 19 IV 1984 (G. Delvare) (in GD); 5 ♀♀, Grabels, on an ootheca of *Empusa pennata*, Grabels, 19 VII 1993 (J.-M. Males) (in GD); 16 ♀♀ 3 ♂♂, Grabels, ex *E. pennata*, 19 VII 1993, adult emergency on 1–2 VIII 1993 (J.-M. Males) (in NHM, MNHN, GD); Montpellier, campus Cirad, 17 ♀♀ 1 ♂, ex *E. pennata*, 15 VIII 1998, emergence on 24 VIII 1998 (J.-M. Males) (in GD); 8 ♀♀ 3 ♂♂, Cazevielle, ex *M. religiosa*, 6 V 1988 (G. Delvare) (in GD); 1 ♀, Cazevielle, 13 VII 1984 (G. Delvare) (in GD); 1 ♀, Viols-le-Fort, 29 VII 1990 (G. Delvare) (in GD); 2 ♀♀, Saint-Martin-de-Londres, Frouzet, 16 VI 1990 (G. Delvare) (in GD); Gard, 1 ♀, Blandas, 24 VI 1989 (G. Delvare) (in GD); Ardeche, 6 ♀♀, Vallon-Pont-d'Arc, ex *M. religiosa*, 7 IV 1984 (H.-P. Aberlenc) (in GD); 1 ♀, same locality and collector, 16 VIII 1984, Malaise trap (in GD); Gard, 3 ♀♀, Crespian, 30 VI/5 VII 1980 (M.J. Gijswijt) (in ZMUA); 1 ♀, Crupies, 7 VIII 1974 (M.J. Gijswijt) (in ZMUA);) Drôme, 2 ♀♀, Buis-les-Baronnies, 6 VIII 1992 (G. Delvare) (in GD); 1 ♀, Saou, 30 VIII 1981 (M.J. Gijswijt) (in ZMUA); Vaucluse, 1 ♀, Beaumont, 4 X 1985 (M.J. Gijswijt) (in ZMUA); 1 ♀, Viens, 29 VII 1974 (M.J. Gijswijt) (in ZMUA); 1 ♀, Entrechaux, 28 VII 1973 (M.J. Gijswijt) (in ZMUA); 1 ♀, Lourmarain, 26/28 VII 1974 (M.J. Gijswijt) (in ZMUA); Vaucluse, 1 ♀, Bédoin, 350–435 m, 11 VIII 1992 (G. Delvare) (in GD); CORSICA, 1 ♀, Porto Vecchio, 9 VII 1990 (J.-Y. Rasplus) (in JYR).



Figs 2–10. Heads of *Podagrion* spp., all in frontal view. 2 – male of *Podagrion bouceki* sp. nov.; 3 – female of *P. gibbum* Bernard; 4 – male of *P. pachymerum* (Walker); 5 – female of *P. bouceki* sp. nov.; 6 – female of *P. gibbum*; 7 – female of *P. klugianum* (Westwood); 8 – female of *P. pachymerum*; 9 – female of *P. minus* Strand; 10 – female of *P. splendens* Spinola.

ADDITIONAL MATERIAL EXAMINED FROM THE PALEARCTIC REGION. MOROCCO: 3 ♀♀, Taghazoute (20 km N Agadir), 8 V 1989 (H. Tussac) (in GD); 3 ♀♀, Moulay Idriss, Volubilis, 3/4 VI 1992 (G. Delvare) (in GD); 14 ♀♀, same locality, 17 IV 1995 (H. Tussac) (in GD); 3 ♀♀, Ain Chkeff (near Meknes), 29 VI 1984, ex *Sphodromantis viridis* (J.-F. Vayssieres) (in GD); 5 ♀♀, Oued Sebou (near Kénitra), 30 IV 1983, ex *S. viridis* (J.-M. Maldes) (in GD); 1 ♀ 2 ♂♂, Allal Tazi (near Kénitra), 30 IV 1983, ex *S. viridis* (J.-F. Vayssieres) (in GD). IRAN: 5 ♀♀, Djirofté, ex Mantidae, 1 I 1969 (Safavi) (in MNHN). OMAN: 1 ♀ 1 ♂, Naki, 19 X 1990 (Gallagher & Deeming) (in CNCI).

DESCRIPTION. Female 3–3.7 mm. Color variable, depending on host. Adults emerged from *Mantis religiosa* or *Sphodromantis* spp. have greenish to bluish reflections on head and mesosoma; the frons, laterally in front of lateral ocelli, has a characteristic area of delicate reticulation that is more brightly colored and blue, contrasting with the greenish surface of frons (Fig. 5). Gaster mostly dark, with small light spot dorsally. Scape, pedicel and funicle brown, clava dark brown. Fore and hind coxae concolorous with body, except apices, mid coxa dark brown. Fore and hind femora dark with slight metallic reflections. Mid femur and hind tibia brownish; other tibiae and tarsi testaceous. Veins brown. Pilosity on wings brown. Adults emerged from *Empusa* spp. darker, almost black; area of frons less obvious, with less contrasting coloration. Head and mesosoma with fine and fairly short, silvery hairs.

Head twice as broad as long in dorsal view, 0.83–0.90 as high as broad. Fronto-vertex about half as long as head width, slightly shorter than height of eye (32:36) (Fig. 5). Malar space half as long as eye height. Lower face and gena densely reticulate, becoming alutaceous near malar groove, latter almost straight. OOL as 0.70–1.1 times OD. Pedicel + flagellum 1.36–1.45 times as long as width of head (Fig. 15), F1 1.32–1.50 times (exceptionally 1.25) as long as broad and 0.75–0.95 times as long as pedicel, following segments progressively shorter; F7 0.61–0.72 times as long as broad.

Mesosoma 1.6–1.85 times as long as wide. Mesoscutum and scutellum respectively 1.65 and 0.9 times as wide as long. Notauli complete, reaching transscutal line although superficial posteriorly (Fig. 20). Frenal area quite distinct, smooth or nearly so, sometimes with extremely fine and superficial network. Propodeum with carinae forming an inverted V, distinctly curving outwards posteriorly, forming an obviously acute angle at base (20–60°) and a slight one at mid length of propodeum (70–90°) (Fig. 30); surface mostly reticulate to rugulose-reticulate, especially on adpetiolar area; not sloping much laterally; spiracle slightly longer than distance to hind margin of metanotum. Hind femur with 7–8 teeth, 2nd and 4–6th shorter. Cubital vein setose along basal cell, with 9–16 hairs; basal vein with 7–16 hairs (Fig. 18).

Ovipositor sheaths 1.25–1.4 times as long as body.

Male (heteromorph) 2.5–3 mm. Some coloration as female. Pedicel + flagellum 1.5–1.63 times as long as width of head. F1 1.6–2 times as long as wide. Frenal area reticulate, although more finely so than rest of scutellum. Propodeum rugulose-reticulate, carinae on a longer median branch (Fig. 33). Hind femur bearing 4 teeth, the penultimate one partly fused with the last tooth (Fig. 37). Cubital vein of forewing bearing 4–10 hairs.

NAME DERIVATION. Named in honour of Zdeněk Bouček, the world's foremost chalcidologist.

DISTRIBUTION. The species is common and widely distributed. In the Palearctic I examined specimens from Morocco, Portugal, Spain, France, Corsica, Greece, Oman and Iran. But it is also widely distributed in the afrotropical region. This distribution surprised me, but I could not find any morphological differences between the specimens collected in the Mediterranean Basin and West Africa for example, including structure of tergites and sternites (both sexes) and male genitalia. The dendrogram resulting from the clustering analysis in our morphometric study (Delvare 2002) showed that the afrotropical specimens are distributed together within the palearctic ones. In the subsaharian Africa, we examined specimens from Senegal, Gambia, Guinea, Burkina Faso, Ivory Coast, Benin, Cameroon, Somalia and South Africa.

HOSTS AND BIOLOGY. This species is especially attracted by *Empusa* spp., mainly *E. pennata* (Thunberg, 1815); my colleague J.-M. Maldés found 5 females trying to oviposit on the same egg-case. I left 7 *Empusa* egg-cases as sentinels on the CSIRO campus near Montpellier and 4 of these were parasitized by *Podagrion bouceki* sp. nov. The eggs of *Empusa* are the largest among those of the mantid species found in the mediterranean region. In the summer and early autumn it is often possible to collect adults of *Podagrion bouceki* sp. nov. whose size agrees with that of specimens reared in laboratory cultures on *Empusa*. In spring and early summer smaller specimens can be collected, which probably develop upon eggs of *Mantis religiosa* Linné, 1758, although this latter host was less frequently recovered. The species was also reared from *Sphodromantis viridis* (Forskål, 1775) in Northern Africa. It is therefore bivoltine in the mediterranean region: a summer generation on *Empusa* and a winter or spring generation on *Mantis religiosa* or *Sphodromantis viridis*.

***Podagrion gibbum* Bernard, 1938 stat. nov.**

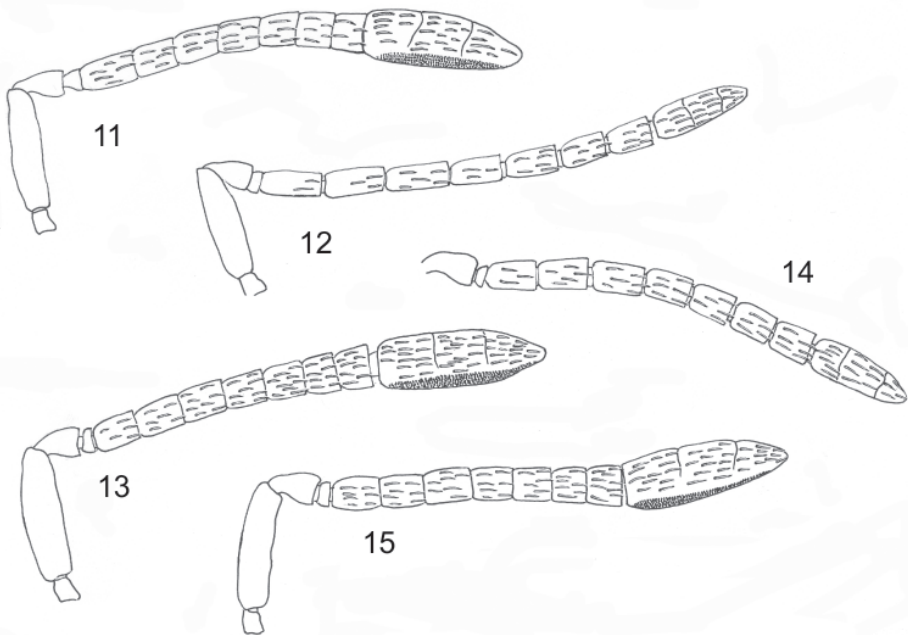
(Figs 3, 6, 17, 24, 32, 34, 38)

Podagrion pachymerum var. *gibba* Bernard, 1938: 42–45 (type locality: Banyuls [France]).

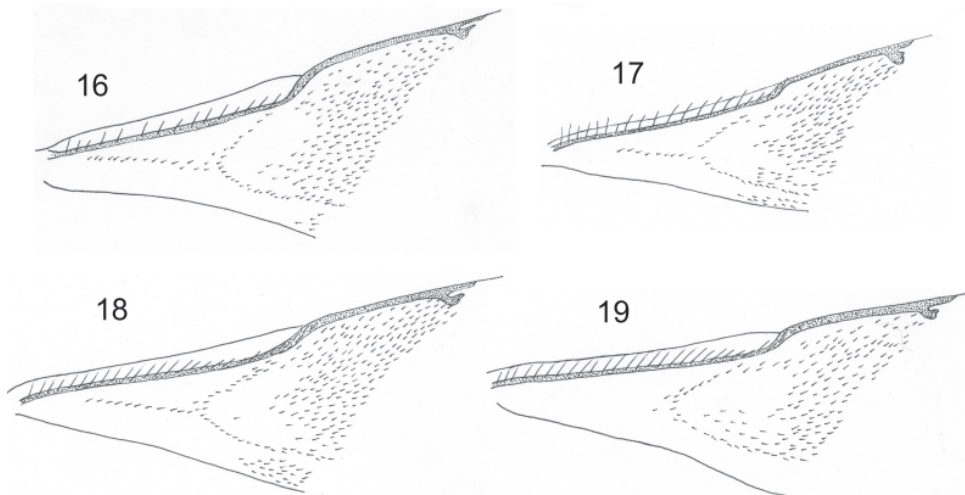
Podagrion pachymerum gibba: Grissell 1995: 244.

TYPE MATERIAL EXAMINED. Lectotype ♀, here designated, labelled „Banyuls/sortie empuse/éclos IX 36/F. Bernard“ (in MNHN). Paralectotypes, same references, 5 ♀♀ 2 ♂♂ (in MNHN) and 4 ♀♀ 1 ♂ (in MHNG).

ADDITIONAL MATERIAL EXAMINED. SPAIN: Granada, 1 ♂, Southern slope of Sierra Nevada, Trévez, 8 VI 1994 (G. Delvare) (in GD). FRANCE: Hérault, 19 ♀♀ 2 ♂♂, Cazeville, ex *Iris oratoria*, 6 V 1988, adult emergence on 10 V 1988 (in GD); 1 ♂, Saint-Jean-de-Bueges, 17 VI 2000 (G. Delvare) (in GD); Bouches-du-Rhône, 1 ♀, Saint-Martin-de-Crau, ex *I. oratoria*, 17 V 1999, (A. Foucart) (in GD); 10 ♀♀ 3 ♂♂, same data but ex *Ameles decolor*. GREECE: Mani, 8 ♀♀ 3 ♂♂, Marmaria, ex *Ameles spallanzania*, 16 IV 1997, emergence on 22 V



Figs 11–15. Antennae of *Podagrion* spp. 11–12, female and male, respectively of *Podagrion pachymerum* Walker; Figs 13–14, female and male, respectively of *P. splendens* Spinola; Fig. 15, female of *P. bouceki* sp. nov.

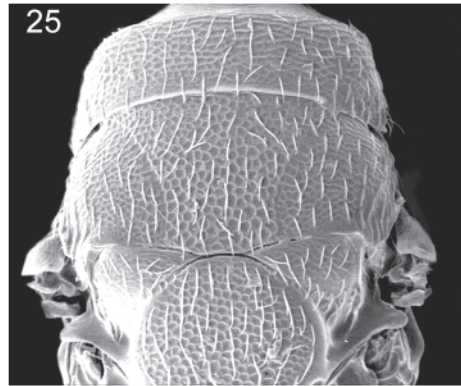
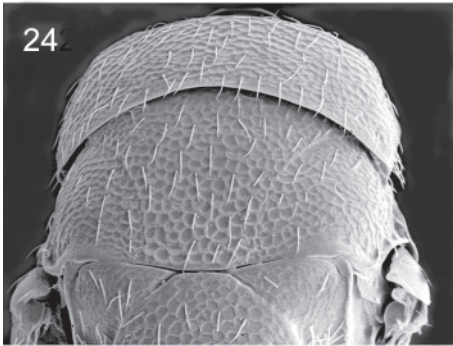
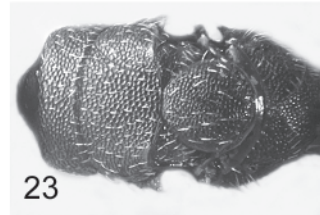
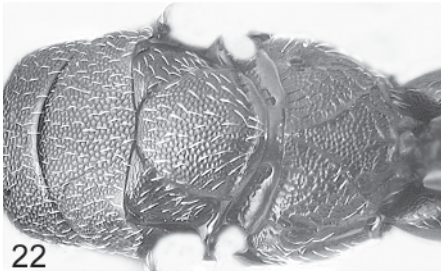
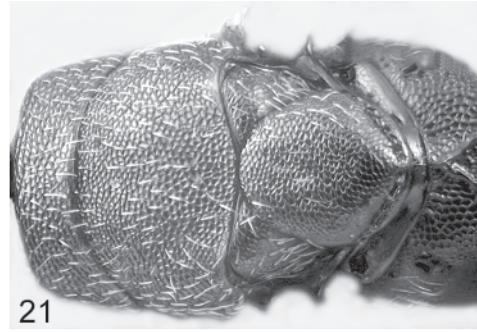
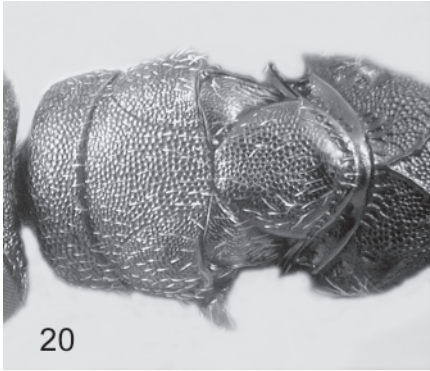


Figs 16–19. Forewing bases of *Podagrion* spp., females. 16 – *P. pachymerum* Walker; 17 – *P. gibbum* Bernard; 18 – *P. bouceki* sp. nov.; 19 – *P. splendens* Spinola.

1997 (J.-M. Maldes) (in GD); Ahaia, 1 ♀, 7 km SW Dervéni, 6 VI 1989 (M.J. Gijswijt) (in ZMUA); Arkadia, 1 ♀, 1 ♂, Ág. Pétros, 1,000 m, 24 IV 1989 (M.J. Gijswijt) (in ZMUA); Argolida, 1 ♂, Mikines, 20 IV 1989 (M.J. Gijswijt) (in ZMUA).

REMARKS. The series of specimens from which a lectotype is designated was housed in MNHN within a box labelled “types de Ferriere”; the specimens did not bear any type labels. However the data provided on the labels completely agrees with the information provided by Bernard (1938) together with the description of *Podagrion pachymerum* var. *gibba*: “L’oothèque d’*Empusa ege-na* [a junior synonym of *Empusa pennata*], si reconnaissable à son fil dressé .../... En 1935 et 1936, j’ai réuni des pontes récoltées à Fréjus (Var) et Banyuls (Pyrénées-Orientales) .../... et 3 seulement d’*Empuse* .../... La troisième, prise en août, .../... était entièrement attaquée par des Chalcidiens .../... il en est sorti .../... 5 ♂ et 13 ♀ du genre *Podagrion*.” This type designation is essential because the original description is inaccurate to distinguish the species from the other *Podagrion*, and also to point out the importance of this series which otherwise would have been overlooked.

DIAGNOSIS. Small size species: Female 2.3–2.8 mm. Head and mesosoma almost black; lower face with slight greenish reflections. Mesosoma sometimes with slight bronze reflections. Hind femur reddish to dark brown, rarely with metallic reflections. Head relatively transverse in dorsal view, 1.75–2.1 times as wide as long. OOL larger than OD ($\times 1.2$ – 1.4) (Fig. 6). Lower face uniformly and finely reticulate without a subtorular area of squamose sculpture. Flagellum short, together with pedicel 1.25–1.4 times as long as width of head. Notauli complete, clearly distinct throughout (Fig. 24). Scutellar disc not much convex. Frenal area visible as a completely smooth area, abruptly delimited anteriorly. Propodeal carinae forming an inverted Y, with short median branch; oblique carinae straight to very slightly curving outwards, forming together a slightly acute angle at base, and a right to obtuse angle at mid length of propodeum (Fig. 32); propodeal surface reticulate to rugulose-reticulate; spiracle relatively short, hardly as long as its distance to hind margin of



Figs. 20–23. Mesosoma of *Podagrion* spp., females (20–23). 20 – *Podagrion bouceki* sp. nov.; 21 – *P. klugianum* (Westwood); 22 – *P. splendens* Spinola; 23 – *P. minus* Strand. Mesoscutum, respectively (24, 25). 24 – *P. gibbum* Bernard; 25 – *P. pachymerum* (Walker).

metanotum; spiracular groove not much deep. Hind femur bearing 6–7 teeth ventrally. Cubital vein of fore wing setose along basal cell (5–10 hairs), basal vein bearing 5–9 hairs (Fig. 17). Ovipositor relatively short, ovipositor sheaths only 1–1.25 times as long as body.

Male (heteromorph). 2.1–2.9 mm. Similar as female except as follows: Head and mesosoma with more greenish reflections. Legs, except hind coxae and part of mid coxae reddish-brown. Head less transverse in dorsal view. Adscrobal area with coarser reticulation dorsally. Pedicel + flagellum 1.65–1.7 times as long as head width. Frenal area delicately reticulate. Propodeal carinae originating from a longer median branch (Fig. 34). Penultimate tooth of hind femur completely separated from the terminal one (Fig. 38).

RECOGNITION. This species is distinguished by its small size, short ovipositor, reddish hind femur, complete notauli and distinct frenal area, mostly straight propodeal carinae forming together a slightly acute to right angle, and setose cubital vein. Because of this small size it is superficially similar to *Podagrion minus*, but this latter species has incomplete notauli, indistinct frenal area and bare cubital vein. Large females of *P. gibbum* (emerged from *Empusa pennata*) have the propodeal carinae forming a more acute angle and moderately curving outwards posteriorly, and therefore might be mistaken for *Podagrion bouceki* sp. nov. because. In *P. bouceki* sp. nov., however, the OOL is distinctly shorter and the hind femur is dark, with metallic reflections.

DISTRIBUTION. I have seen specimens from Spain, France and Greece in Europe. Probably present in the whole northern part of the Mediterranean Basin, possibly in the southern part.

HOSTS. Mostly reared from *Iris oratoria* (Linné, 1758), *Ameles decolor* (Charpentier, 1825) and *A. spallanzania* (Rossi, 1792); the type series came from an egg-case of *Empusa pennata* but this event was never repeated since then, although *Empusa* egg-cases were collected a number of times in various countries from the Mediterranean region.

***Podagrion klugianum* (Westwood, 1847)**

(Figs 7, 21, 27, 35, 47–49)

Palmon (Pachytomus) Klugianus Westwood, 1847: 260 (type locality: Egypt).

Priomerus insidiosus Coquerel, 1856: 507 (type locality: La Réunion [= Bourbon]) [erroneously synonymized with *Palmon fraternum* Westwood, 1847 by Dalla Torre 1898: 369]; **syn. nov.**

Coquerelia insidiosa Saussure in Grandidier, 1890: pl. 20, fig. 7 (type locality: Madagascar).

Podagrion klugianum: Dalla Torre 1898: 369, Grissell 1995: 240.

Coquereliana insidiosa: Gahan & Fagan 1923: 39.

Podagrion meridionale Masi, 1935: 68–71 (type locality: Tarda [Morocco]); **syn. nov.**

Podagrion insidiosa: Masi, 1940: 251.

Podagrion armigerum Masi, 1940: 251, 254–257 (type locality: Villagio Duca degli Abruzzi [Somalia]); **syn. nov.**

Podagrion tarachodesi Risbec, 1951: 312–313 (type locality: Abengourou [Ivory Coast]); **syn. nov.**

Podagrion sphodromantidis Risbec 1951: 313 [part, misidentification].

Podagrion enei Bakkendorf, 1960: 364–368 (type locality: Ibadan [Nigeria]); **syn. nov.**

Podagrion armigerum: Grissell 1995: 235.

Podagrion enei: Grissell 1995: 237–238.

Priomerus insidiosus Coquerel [as a synonym of *Podagrion fraternum* Westwood]: Grissell 1995: 238.

Podagrion meridionale: Grissell 1995: 242.

Podagrion tarachodesi: Grissell 1995: 248.

TYPE MATERIAL EXAMINED. *Palmon (Pachytomus) Klugianus*. Lectotype ♂, designated by Graham and validated by Grissell (1995: 240). The type is glued on a squared card and labelled „ex Ficus Aegypti/Dr. Klug/N°62/posterior tarsi similar when perfect to anterior 4“ „W“ [blue label] „Palmon (Pachytomus) Klugianum Westwood/M. de V. Graham det. 1970/Lectotype ♂“ (OUM Type N° 1346).

Priomerus insidiosus. ♀ neotype, here designated: LA REUNION: Chemin de Grand Bassin, ex mantid egg case (RQ 2948), 1994 (Quilici S.).

Podagrion meridionale. Lectotype, here designated, a ♀ labelled „♀ 12/Tarda/Maroc/Coll. Rungs“ and „Podagrion meridionale Ms./cotypi !/det. L. Masi“ (in MSNG).

Podagrion armigerum. Lectotype, here designated, a ♀ glued on a card [remounted] and labelled „Vill. Duca Abruzzi/1930/Russo“ „da ooteche di Mantidi“ „Museo Civico di Genova“ „Cotypi“ and „Podagrion armigerum MS ♀♂“ (in MSNG).

Podagrion tarachodesi. Lectotype, here designated, a ♀ extracted from a slide labelled in Risbec's handwriting „ex Tarachodes sp./Bambey/Podagrion tarachodesi Risbec“ (in MNHN). Paralectotypes. 5 ♀♀, same data as Lectotype; 23 ♀♀ 16 ♂♂ [from IVORY COAST: Abengourou], labelled „301c/Dagatiguy/ex ponte Mantis gastrica/Podagrion tarachodesi Risbec“ (in MNHN).

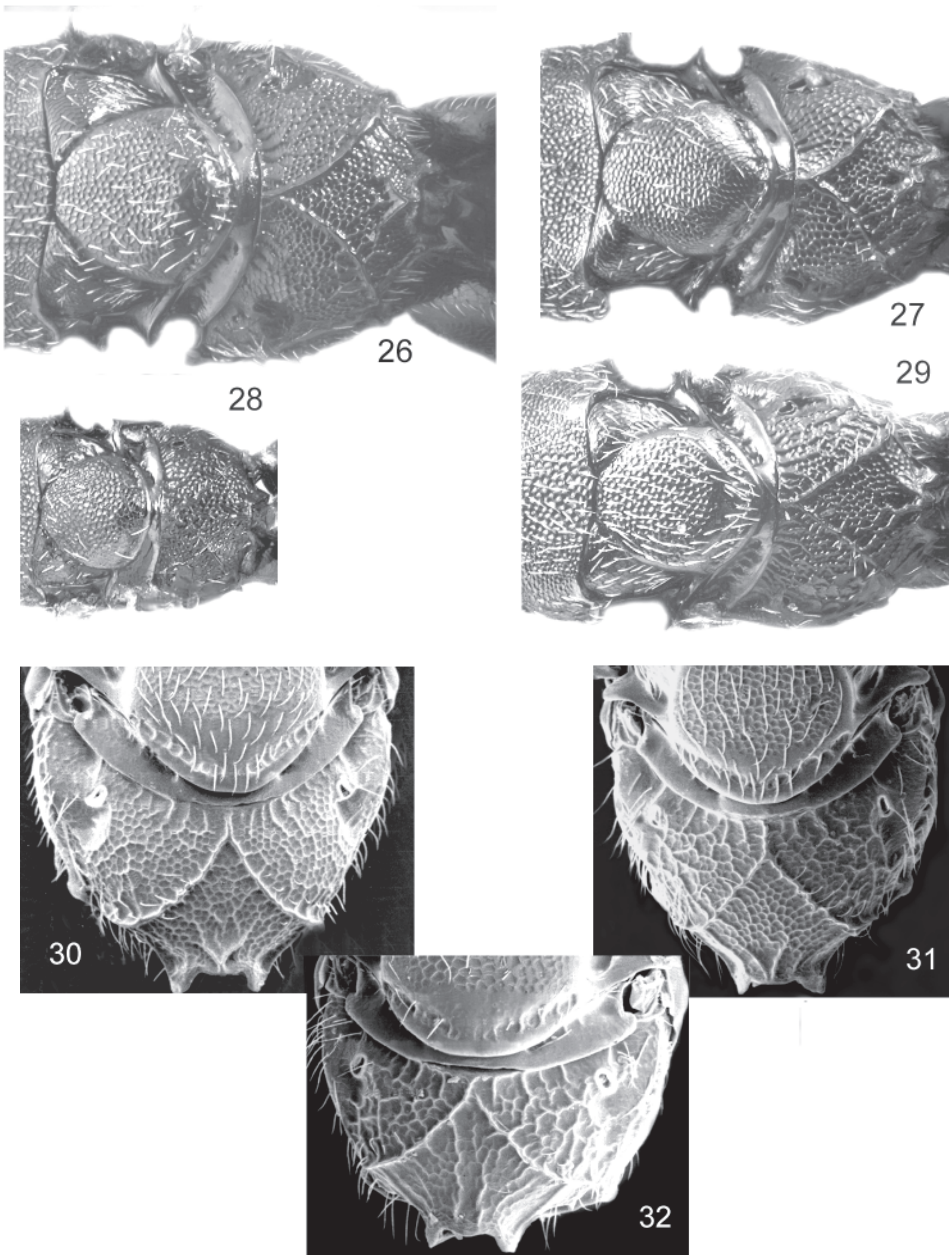
Podagrion enei. Holotype and allotype (on slides !)(in ZMUC).

ADDITIONAL PALEARCTIC MATERIAL EXAMINED. MOROCCO: 2 ♀♀, Rabat, ex a Mantodea egg-case (D. Lépiney) (in NHM); 1 ♂, Oasis de Tarda (Régnier) [this specimen belongs to the original series of *Podagrion meridionale* which was partly sent to Masi, partly to Ferriere]; 2 ♀♀, Kénitra, *Quercus suber* forest, 12 IV 1995 (H. Tussac) (in GD); 3

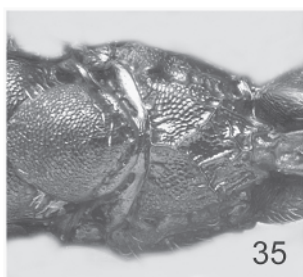
♀♀ 3 ♂♂, Ain Chkeff [near Meknes], 29 VI 1984, ex *Sphodromantis viridis* (J.-F. Vayssieres) (in GD); 2 ♂♂, Moulay Idriss, 4 VI 1992 (G. Delvare) (in GD); 1 ♂, Moulay Idriss, Volubilis, 17 IV 1995 (H. Tussac) (in GD); 1 ♀, Agadir, 14 IV 1995 (H. Tussac) (in GD). TUNISIA: 1 ♀, Hammamet, 14 V 1999 (H. Tussac) (in GD). CYPRUS: 1 ♀, Yermasoyia Riv., 13 X 1967 (G.A. Mavromoustakis) (in CNCI). ISRAEL: 1 ♀ 1 ♂, Tel Aviv, XII 1968, ex *S. viridis* (D. Gerling) [identified as *P. meridionale* by J.-R. Steffan] (in MNHN); 1 ♀, same data (in NHM) [identified as *P. klugianum* by Z. Bouček]; 1 ♀ 1 ♂, Daganya, Jordan Valley, ex *Mantis religiosa* (V. Palmoni) (in NHM). EGYPT: 3 ♀♀ 1 ♂, Alexandria, 1974, ex Mantodea eggs (T.F. Alawi) (in NHM).

REMARKS. *Priomerus insidiosus* was apparently and wrongly synonymized with *Palmon fraternus* Westwood by Dalla Torre (1898). Saussure (1890) figured it as *Coquerelia insidiosa*; it became therefore the type species of *Coquerelia*. No specimens from the original series could be found in MNHN, where they should have been housed, in spite of a careful examination of the whole chalcidoid collection. Because of the confusion regarding the identity of this species, it is essential to clarify its status, and a neotype designation is proposed for this purpose. The neotype agrees with the figure provided by Coquerel (1856: pl. 15) and the type locality: Coquerel described the species from Reunion island. Moreover Coquerel mentioned it as a phoretic species, which is false, according to Gerling (1965): Coquerel mentioned having observed females ovipositing eggs in fresh oothecae, in the same time as the mantid female did; Gerling conversely found that females of *P. klugianum* [as *P. meridionale*] did oviposit in old egg-cases. The phoretic species is therefore different from *P. insidiosus* and this is another reason to settle the identity of *Priomerus insidiosus*. Lectotypes are also proposed for the species described by Masi to ensure their identity and taxonomic status. Risbec (1951) described *P. tarachodesi* from a number of series reared from different hosts. This author often misidentified several species under the same name and this was the case here. Therefore a lectotype designation is essential to establish the identity of *P. tarachodesi*. I could not find any reliable morphological differences between the populations from the palearctics and those from subsaharian Africa which would support the segregation of different species. There is however some subtle variation among allopatric populations which can be used to keep some of the above names at a subspecific level. The nominal subspecies *P. klugianum* ssp. *klugianum* is distributed in the Palearctic Region (mostly southern Mediterranean Basin and Middle East) and its usual host is *Sphodromantis viridis*, rarely *Mantis religiosa*. Females have the mesosoma more greenish and the ovipositor shorter (1.5–1.7 times as long as the body). The subspecies *P. klugianum* ssp. *tarachodesi* stat. nov. is found in West and Central Africa, and mostly parasitizes there *Sphodromantis lineola* and sometimes *Tarachodes saussurei*. Females of this subspecies have the mesosoma greenish to bluish, the adpetiolar area of the propodeum is more brightly bluish and the ovipositor longer: 1.7–2 times as long as the body. A third subspecies, *P. klugianum* ssp. *armigerum* stat. nov. is found in East Africa; it is mostly similar to *tarachodesi* but here the angle formed by the propodeal carinae is less acute (Figs 48–49). At last *P. klugianum* ssp. *insidiosum* stat. nov. inhabits Southern Africa, Madagascar and the Mascareign Islands; females of this subspecies have the body dark bluish and the longest ovipositor for the species: at least 2 times as long as the body; its host in this area is mostly *Polyspilota aeruginosa*.

DIAGNOSIS. Female 3–3.5 mm (excluding ovipositor). Species of medium size, with greenish to bluish reflections on mesosoma; head more bluish with frons often having an area of still more bluish color laterally. Lower face more greenish laterally. Antenna with funicle generally lighter than clava (brownish to testaceous *versus* dark brown). Hind femur dark with metallic reflections on outer side, hind tibia brownish. Head less than twice as broad as long in dorsal view ($\times 1.6$ – 1.9) (Fig. 7). Outline of frons, when seen in dorsal view, distinctly convex. Head without area of delicate sculpture on frons laterally (although the reticulation is everywhere fine). Notauli completely absent posteriorly, even as change in sculpture (Fig. 21). Lateral lobes of mesoscutum distinct



Figs 26–32. Scutellum and propodeum of *Podagrion* spp., females. 26 – *Podagrion bouceki* sp. nov.; 27 – *P. klugianum* (Westwood); 28 – *P. minus* Strand, 29 – *P. pachymerum* (Walker), 30 – *P. bouceki* sp. nov.; 31 – *P. pachymerum*; 32 – *P. gibbum* Bernard.



Figs 33–36. Propodeum of *Podagrion* spp., males. 33 – *Podagrion bouceki* sp. nov.; 34 – *P. gibbum* Bernard; 35 – *P. klugianum* (Westwood); 36 – *P. pachymerum* (Walker).

from median lobe through change in sculpture only. Axillar grooves narrow but deep. Scutellum evenly convex, showing no frenal area, the apex of scutellum being reticulate (Fig. 27). Propodeum with lateral carinae joining on a very short median one, slightly curving outwards posteriorly; aperticular area delimited laterally by sublateral costulae; anterolateral areas of propodeum reticulate, aperticular area more or less rugose-reticulate; spiracle fairly long; spiracular groove moderately deep, delimited by a fine and regular carina, areolate. Hind femur bearing 7–8 teeth ventrally. Cubital vein of forewing completely bare along basal cell, basal vein bearing 7–8 hairs. Ovipositor sheaths very long, at least 1.5 times as long as the body but frequently more ($\times 1.7$ times) and in tropical Africa up to 2 times as long.

Male (heteromorph) 2.5–3.4 mm. Similar as female except as follows: Color more greenish, with bronze reflections. Scutellum more convex. Propodeal carinae forming an inverted Y; aperticular area quite

rugose, contrasting with the antero-lateral areas; propodeum obviously sloping laterally; spiracular groove deep (Fig. 35). Penultimate tooth of hind femur distinctly separated from the last one.

RECOGNITION. This species is distinguished by the combination of incomplete notauli, absence of frenal area, morphology of the propodeum, teeth of the hind femur and long ovipositor. In the Palearctics it cannot be misidentified for any other species.

DISTRIBUTION. Palearctics: Morocco, Tunisia, Egypt, Israel, Cyprus. Afrotropics: Capo Verde, Senegal, Mali, Chad, Burkina Faso, Guinea, Sierra Leone, Liberia, Ivory Coast, Ghana, Benin, Nigeria, Cameroon, Congo, Ethiopia, Somalia, Kenya, Mozambique, South Africa, Madagascar, La Reunion, Mauritius. This is one of the commonest species in Africa and it is easy to rear because the egg-cases of its hosts are well visible, deposited on bushes and branches.

HOSTS AND BIOLOGY. *Mantis religiosa*, *Sphodromantis viridis* (in the Palearctics); *S. lineola* (Burmeister, 1838), *Tenodera superstitiosa* (Fabricius, 1781) and *Polyspilota aeruginosa* (Goeze, 1778) in subsaharian Africa. Gerling (1965) described the oviposition behaviour.

***Podagrion lybicum* Masi, 1929**

(Figs 42, 43)

Podagrion lybicum Masi, 1929: 221–222 (type locality: Oasis of Giarabub [Lybia]); Grissell 1995: 240–241.

TYPE MATERIAL EXAMINED. Holotype ♂ [not ♀ as erroneously quoted in the description] (in MSNG).

DIAGNOSIS. Male 2.8 mm. Body dark with the following metallic reflections: head, pro-, meso- and metanotum coppery; metapleuron and propodeum bluish. Coxae and hind femur concolorous with mesonotum. Head 1.83 times as broad as wide (56:30.5). OOL shorter than OD (4.5:6). Gena delicately but completely reticulate, the cells isoedric near malar groove, elongate near occipital carina. Flagellum missing on the type. Mesonotum with similar reticulation over entire surface. Notauli complete and clearly distinct throughout. Scutellum about as long as wide (30:29), fairly convex. Axillar grooves relatively broad. Frenal area present, nearly smooth (very delicate reticulation hardly visible). Propodeum with carinae as an inverted Y: the lateral carinae together form a right angle, and originate on a short median branch (Fig. 43); spiracular groove deep; spiracle elongate; propodeum mostly reticulate, but showing some rugulae at its anterior margin and within the adpetiolar area. Hind coxa relatively short. Hind femur very large, 1.85 times as long as wide and with 6 strong teeth (Fig. 42). Cubital vein of fore wing bare along basal cell; basal vein with 9 hairs. RECOGNITION. Unfortunately the species is known only from the male holotype and we did not discover any female which could be associated with it. It can be separated from other *Podagrion* spp. by the following combination of characters: complete notauli, distinct frenal area, convex scutellum, short propodeum with carinae forming a right angle and broad hind femur.

DISTRIBUTION. Lybia.

HOSTS. Unknown.

***Podagrion minus* Strand, 1911**

(Figs 9, 23, 28, 39, 44–46)

Podagrion minus Strand, 1911: 158–159 (type locality: Lucca [Italy]); Grissell 1995: 243.

TYPE MATERIAL EXAMINED. Holotype ♀ (in ZMHB).

ADDITIONAL MATERIAL EXAMINED. SPAIN: Almería, 1 ♀, Nijar, Sierra de Alhamilla, 14 VI 1994 (G. Delvare) (in GD); Murcia, 1 ♂, autoroad way out to Sorbas, sweeping *Retama sphaerocarpa*, 5 VI 1994 (G. Delvare) (in GD); Madrid, 1 ♀, Vaciamadrid (G. Mercet) (in MNM); 1 ♂, Escorial (Cabrera) (in MNM). MOROCCO: 2 ♀♀, Oued Ourika, High Atlas, Marrakech Region, V 1983, ex *Sphodromantis viridis* (J.-M. Maldès) (in GD).

DIAGNOSIS. Female of small size: 2–2.15 mm. Coloration mostly similar to that of *P. splendens* but hind femur reddish-testaceous. Head about 2 times as broad as long (Fig. 9). Anterior outline of frons fairly convex when seen in dorsal view. OOL greater ($\times 1.3$) than OD. Flagellum short, combined with the pedicellus only 1.35 times as long as width of head (Fig. 44). Mid lobe of mesoscutum reticulate, becoming squamose on lateral lobes. Notauli visible over two thirds length of mesoscutum (Fig. 23). Axillar grooves narrow anteriorly. Frenal area very indistinct, only slightly more delicately reticulate than anterior part of scutellum, the latter broadly rounded posteriorly (Fig. 28). Propodeum with carinae forming together a right to slightly acute angle, originating on a short median branch (latter sometimes missing), straight or slightly curving outwards; spiracle short, elliptical (Fig. 45); spiracular groove not much deep; propodeum surface mostly reticulate. Hind femur with 5–7 teeth (Fig. 46). Cubital vein of fore wing bare along basal cell, basal vein with 7–8 hairs. Ovipositor sheaths 1.1–1.26 times as long as body

Male. The only associate male, not typical heteromorph, has 5 teeth on the hind femur, with last 2 teeth being separated (Fig. 39). The propodeal carinae are straight but originate on a longer median carina than in female.

RECOGNITION. *Podagrion minus* is distinguished by its small size, reddish hind femur, ornamentation of propodeum, incomplete notauli and indistinct frenal area. It is superficially similar to *P. gibbum* but the latter species has complete notauli, a distinct frenal area and setose cubital vein. Small specimens of *P. splendens* can be difficult to separate from *P. minus* because the propodeal ornamentation approaches that of latter species. In *P. splendens* however the OOL is shorter and the hind femur is dark with slight metallic reflections.

DISTRIBUTION. This species is apparently rare and is found in the western Mediterranean Basin: Morocco, Spain, Italy.

HOST. The species was reared once from *Sphodromantis viridis*; this record is surprising because the females have a short ovipositor while the spongy cover of that mantid egg-case is quite thick. *S. viridis* may be a marginal host because only 2 adults were reared and the consistently small size of collected specimens of *Podagrion minus* suggests that it parasitizes small mantids belonging to the subfamily Amelinae.

***Podagrion pachymerum* (Walker, 1833)**

(Figs 4, 8, 11, 12, 16, 25, 29, 31, 36, 41)

Priomerus pachymerus Walker, 1833: 118 (type locality: South of France).

Palmon religiosus Westwood, 1847: 259 [no country quoted in original description; apparently synonymized by Mayr (1874: 63)].

? *Bactyrishion bicoloratum* Costa, 1857: 226 [apparently synonymized by Mayr (1874: 63)].

Podagrion pachymerum var. *rufiventre* Giraud, 1863: 1311 (type locality: Austria (near Vienna); **syn. nov.**

Podagrion splendidum Walker, 1871: 19. [lapsus for *P. splendens*; see Grissell (1995: 244)].

Cleptimorpha binotata Walker, 1872b: 84–85 (type locality: Madeira); **syn. nov.** [considered synonym by Graham, pers. comm. and validated here].

Podagrion pachymerum: Dalla Torre 1898: 370; Chopard 1922: 265–271; Picard 1936: 468–472; Eady 1959: 270; Bouček 1976: 182; Grissell 1995: 244–245.

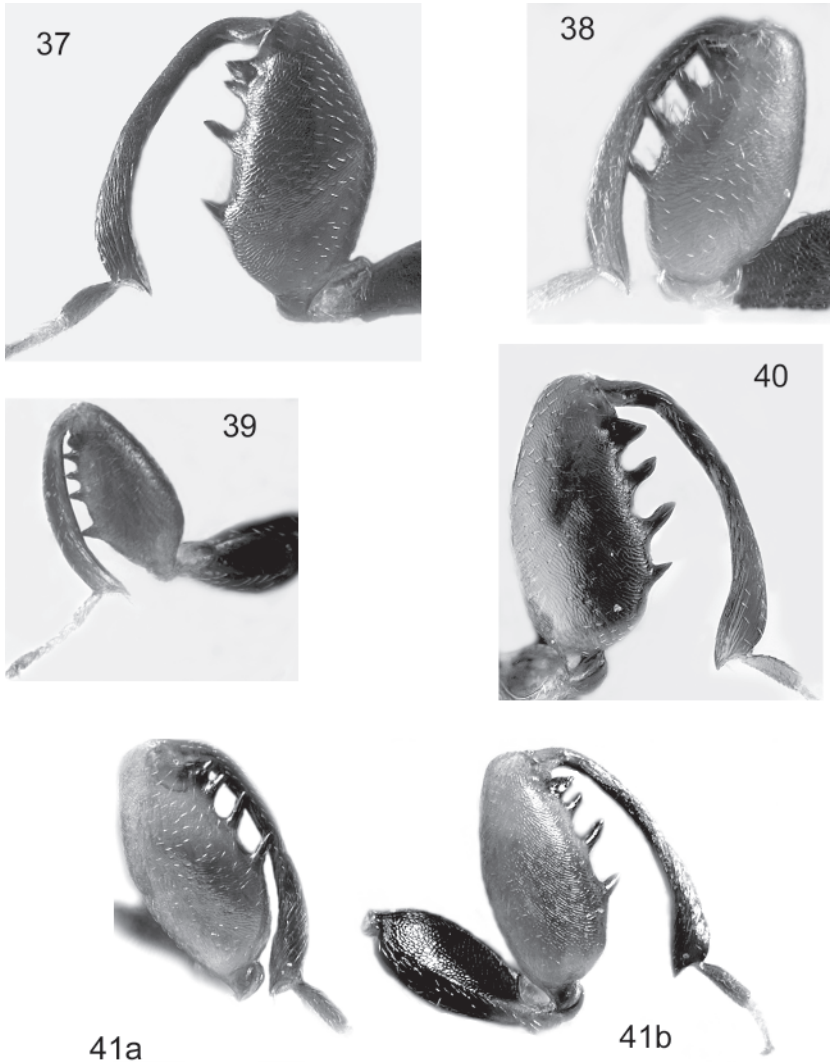
Podagrion bellator: Nikol'skaya 1952: 110 [misidentification].

TYPE MATERIAL EXAMINED. *Priomerus pachymerus*. Lectotype ♀, designated by Eady (1959: 270) labelled „S. France“ and bearing a Waterhouse label „Palmon pachymerus Walker“ (BMNH, Hym. Type 5–1626).

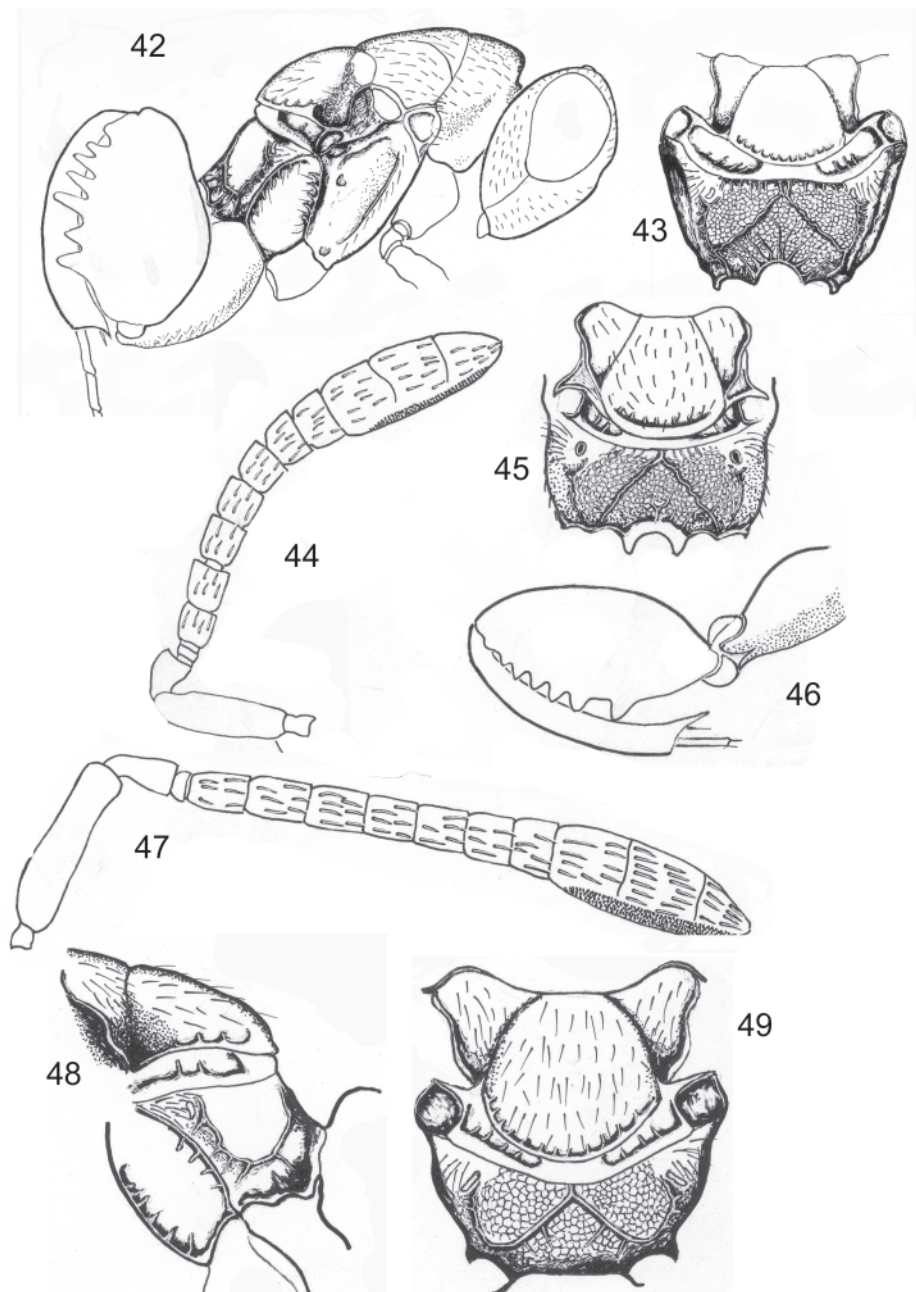
Podagrion pachymerum var. *rufiventre*. Lectotype, here designated, a pinned ♀ from the Giraud's Collection with the following handwritten labels „Podagrion splendens“ and „Palmon pachymerus var. rufiventris Giraud“ (in MNHN). Paralectotypes. Another ♀ and a ♂, from the same series.

Cleptimorpha binotata. Neotype ♀, designated by Graham (pers. comm.) and validated here; it is labelled „Madeira: Pico da Cruz/Funchal/3 II 1980/M. Koponen“.

ADDITIONAL MATERIAL EXAMINED. SPAIN: Almeria, 1 ♀, 15 km N Tabernas, 30 IV 1995 (M.J. Gijswijt) (in ZMUA); 1 ♀, Beires, Barranco de las Navas, 1,000 m, 7 VI 1994 (G. Delvare) (in GD); 1 ♀, Mojacar, Sierra Cabrera, 26 IV 1994 (M.J. Gijswijt) (in ZMUA); Valencia, 1 ♀, Valencia (Moroder) (in MNM); 1 ♀, same locality (G. Mercet) (in MNM); Castellon, 1 ♀, Navajas, 11 V 1989 (J.-Y. Rasplus) (in JYR); Avila, 1 ♀ 1 ♂, Candeleda, 24/30 VI 1986 (M.J. Gijswijt) (in ZMUA); Soria, 1 ♀, 15 km S Le Burgo de Osmá, 3 VII 1990 (M.J. Gijswijt) (in ZMUA); Zaragoza, 1 ♀, Nuevalos, 700 m, 13 VII 1994 (F. Fontal) (in MNM); 1 ♀, Majamar, 6 X 1910 (in MNM); Madrid, 1 ♀, Vaciamadrid (Dusmet) (in MNM); 3 ♀♀, Escorial (Cabrera) (in MNM); Tarragona, 1 ♀, Cabo Salou, 16/28 VI



Figs 37–41. *Podagrion* spp., hind femur of heteromorph males. 37 – *Podagrion bouceki* sp. nov., 38 – *P. gibbum* Bernard; 39 – *P. minus* Strand; 40 – *P. splendens* Spinola; 41a & b – *P. pachymerum* (Walker). Figs 37–41. *Podagrion* spp., hind femur of heteromorph males. 37 – *Podagrion bouceki* sp. nov., 38 – *P. gibbum*; 39 – *P. minus*; 40 – *P. splendens*; 41a & b – *P. pachymerum*.



Figs 42–43. *Podagrion lybicum* Masi, male holotype. 42 – head and mesosoma in lateral view; 43 – propodeum. Figs 44–46. *Podagrion minus* Strand, female. 44 – antenna, 45 – propodeum, 46 – hind femur, Figs 47–49. *Podagrion klugianum* (Westwood), female. 47 – antenna, 48 & 49 – Holotype of *P. armigerum* Masi, propodeum, respectively in lateral and dorsal view.

1966 (G. van Rossem) (in ZMUA); Girona, 1 ♀, Roses, 7 VI 1990 (H. Tussac) (in GD). FRANCE: Morbihan, 4 ♀♀ 2 ♂♂, ex *Mantis religiosa* (Alexandre F.) (in GD); Haut-Rhin, 6 ♀♀ 2 ♂♂, Bollenberg, 363 m, ex *M. religiosa* (Hugel S.) (in GD); Vendée: 1 ♀, Yeu, VIII 1984 (Tiberghien) (in JYR); Dordogne, Plazac, 12 VIII 1991 (J.-R. Rasplus) (in JYR); Lot, 1 ♀, Brengues, 21 VII 1984 (H. Tussac) (in GD); 1 ♀, Cahors, 18 IX 1990 (H. Tussac) (in GD); Lozère, 1 ♀, Meyrueis, 16 VII 1991 (J.-Y. Rasplus) (in JYR); Hérault, 2 ♀♀, Portiragnes, La Redoute, 16/17 VIII 1986 (G. Delvare) (in GD); 37 ♀♀ 9 ♂♂, Aumelas, ex *M. religiosa*, 8 V 1994 (J.-M. Maldas) (in GD); 82 ♀♀ 29 ♂♂, Aumelas, Château-Bas, ex *M. religiosa*, 27 IV 1997 (T. Guilloux) (in GD); 13 ♀♀ 2 ♂♂, Puéchabon, les Chambrettes, ex *M. religiosa* (J.-M. Maldas); 2 ♀♀ 2 ♂♂, Cazevieille, 31 III 1985, ex *M. religiosa* (G. Delvare) (in GD); 16 ♀♀, same data but 6 V 1988; 3 ♂♂, same data but ex *Iris oratoria* (in GD); 1 ♀, Saint-Martin-de-Londres, 16 VI 1990 (G. Delvare) (in GD); 1 ♀, Grabels, 15 IV 1989 (H. Tussac) (in GD); 1 ♀, Montferrier-sur-Lez, 4 V 1984 (G. Delvare) (in GD); 5 ♀♀, same locality, CIRAD campus, 11/30 V 1979 (J.-M. Maldas) (in GD); 1 ♀, Pégairolles-de-Bueges, 21 IV 1984 (G. Delvare) (in GD); 1 ♀, Saint-Guilhem-le Désert, Les Lavagnes, 500 m, 13 IX 1989 (G. Delvare) (in GD); 1 ♀, same data but 18 IV 1993 (in GD); 3 ♀♀ 5 ♂♂, St-Jean-de-Bueges, 1 I 1985, ex *M. religiosa* (G. Delvare) (in GD); 1 ♀ 3 ♂♂, Montagne de la Séranne, 650 m, 14 VII 1984 (G. Delvare) (in GD); 13 ♀♀ 5 ♂♂, Fontanes, ex *M. religiosa* (G. Delvare) (in GD); Gard, 2 ♂♂, Blandas, 24 VI 1989 (G. Delvare) (in GD); 1 ♀, Saint-Laurent-de-Ceze, 21 IX 1988 (M.J. Gijswijt) (in ZMUA); 1 ♀, La-Roque-sur-Ceze, 30 VIII/12 IX 1985 (M.J. Gijswijt) (in ZMUA); 1 ♀, Saint-Michel-d'Euzet, 17 IV 1987 (M.J. Gijswijt) (in ZMUA); 1 ♀, Goussargues, 14 IX 1985 (M.J. Gijswijt) (in ZMUA); 3 ♀♀, Crespian, 9 VI 1982 (M.J. Gijswijt) (in ZMUA); Ardeche, 27 ♀♀ 3 ♂♂, Vallon-Pont-d'Arc, ex *M. religiosa*, 7 IV 1984 (H.-P. Aberlenc) (in GD); 8 ♀♀ 3 ♂♂, Labeaume, ex *M. religiosa*, X 1985 (J. Balazuc) (in GD); 2 ♀♀, St-Alban-sur-Sampzon, 30 IV 1984 (H.-P. Aberlenc) (in GD); Drôme, 1 ♂, Barret-de-Lioure, 1230 m, (J. Hamon) (in JYR); 1 ♀, Montauban, 1,000–1,100 m, 1 VI 1990 (J. Clary) (in JYR); 2 ♀♀, col d'Aubres, 5 km NE Nyons, 21 IX 1987 (M.J. Gijswijt) (in ZMUA); 2 ♀♀, Arpavon, 10 km E Nyons, 20 IX 1987 (M.J. Gijswijt) (in ZMUA); 3 ♀♀, Buis-les-Baronnies, 700–800 m, 6 VIII 1992 (G. Delvare) (in GD); 4 ♀♀, Aubres, on *Hedera*, 16/27 IX 1985 (M.J. Gijswijt) (in ZMUA); 1 ♀, Auban, 670 m, 2 V 1987 (M.J. Gijswijt) (in ZMUA); 1 ♀, Sédéron, col de l'Homme Mort, 6 IX 1990 (M.J. Gijswijt) (in ZMUA); Vaucluse, 1 ♀, Malaucene, 18 VII 1973 (M.J. Gijswijt) (in ZMUA); 1 ♀, Peypin d'Aygues, 13 V 1991 (M.J. Gijswijt) (in ZMUA); 1 ♀, Faucon, 6 VIII 1973 (M.J. Gijswijt) (in ZMUA); 1 ♀, Viens, 29 VII 1974 (M.J. Gijswijt) (in ZMUA); 1 ♀, Mont Ventoux, Combe Brune, 1,200–1,400 m, 6 IX 1986 (M.J. Gijswijt) (in ZMUA); 1 ♀, Entrechaux, 23 VIII 1988 (M.J. Gijswijt) (in ZMUA); 1 ♀, Villes-sur-Auzon, Combe Sourné, 27 IX 1990 (M.J. Gijswijt) (in ZMUA); 1 ♀, Vénasque Forest near Manosque, 1 VII 1980 (G. Delvare) (in GD); Bouches-du-Rhône, 2 ♀♀, La Ciotat, 24/28 VIII 1963 (in JYR); 1 ♀, Le Sambuc, 18 VII 1967 (J.F. Aubert) (in USNM); 1 ♀, Gimeaux, 11 VII 1967 (J.-F. Aubert) (in JYR); Alpes-de-Haute-Provence, 8 ♀♀ 1 ♂, Annot, ex *M. religiosa*, 27 VII 1975, (M.J. Gijswijt) (in ZMUA); 1 ♀, Reillanne, 21 VII 1978, on *Quercus pubescens* (M.J. Gijswijt) (in ZMUA); Var, 1 ♂, Sainte-Baume, 23 VI 1991 (M.J. Gijswijt) (in ZMUA); 1 ♀, Aups, 15 IX 1986 (M.J. Gijswijt) (in ZMUA); 2 ♀♀, Fréjus, 16/17 X 1987 (M.J. Gijswijt) (in ZMUA); 2 ♀♀, Taradeau, 6/9 X 1989 and 5 IX 1992 (M.J. Gijswijt) (in ZMUA); 1 ♀, Saint-Paul-en-Forêt, 15 VII 1995 (G. Delvare) (in GD); Alpes-Maritimes, 1 ♀ 1 ♂, col de Brouis, 19 VII 1990 (J.-Y. Rasplus) (in JYR); 1 ♂, Bouyon, 580 m, 20 V 1991 (M.J. Gijswijt) (in ZMUA). CORSICA, 1 ♀, Haut-Asco, Vecchietto forest, 790 m (J. Hamon) (in JYR); 1 ♂, PN Scandola, Elbo, 26 VI 1990 (J.-Y. Rasplus) (in JYR); 3 ♀♀ 2 ♂♂, Scandola reserve, Gargalu, 6/31 VIII 1989 (J.-Y. Rasplus) (in JYR). ITALY: Mocerata, 1 ♀ 1 ♂, Fiastra, 1,000 m, 20 V 1993 (M.J. Gijswijt) (in ZMUA). SARDINIA, 1 ♀, Tempio, Cusseddu, 25 IX/2 X 1978 (F. Bin) (in CNCI); 1 ♂, „Oberitalien“, ex *M. religiosa*, 8 VI 1925 (in CNCI). HUNGARY: 1 ♀, Nagykovácsi, 12 VII 1976 (M.J. Gijswijt) (in ZMUA).

REMARKS. The type of *Palmon religiosus* could not be traced in OUM and my request to the Napoli Museum for the type of *Bactyrishion bicoloratum* did not induce any reply. The monospecific genus *Cleptimorpha* was synonymized with *Podagrion* by Graham (1981) who intended to select a neotype for *Cleptimorpha binotata* but did not publish it (Graham, pers. comm.). Such a designation is important to precise the status of the genus *Cleptimorpha*. This designation is in accordance with the original data and description provided by Walker (1872b) and the type was chosen from Madeira from which *C. binotata* was described. Walker (1871) figured *Pachymerum splendidum* but the same figure was made by Haliday and had already been published in „The Entomologist“ (issue XII of October 1841) as Fig. 3 and on the back of the figure named as „Priomerus pachymerus“ (see Graham, 1987: 186–188). The name *splendidum* therefore is a junior synonym of *P. pachymerum*.

¹ Bouček, pers. comm.

DIAGNOSIS. Female 3.3 mm. Head and mesosoma with bluish reflections. Hind femur reddish, rarely dark brown. Head about 2 times as long as broad. Outline of frons in dorsal view moderately convex. OOL slightly shorter than or equal to OD ($\times 0.85-1$) (Fig. 8). Flagellum distinctly elongate (Fig. 11), combined with pedicel 1.55–1.65 times as long as width of head. F1 about as long as pedicel and 1.6–1.95 times as long as wide; F7 0.7–0.9 times as long as wide. Notauli complete. Mid lobe of mesoscutum reticulate, cells larger than those on lateral lobes (Fig. 25). Axillae with a more delicate, squamose sculpture. Axillar grooves narrow. Frenal area well distinct, nearly smooth (Fig. 29). Propodeum with carinae as an inverted Y, the lateral carinae straight and forming together an acute angle (70–80) (Fig. 31); surface rugulose-reticulate; adpetiolar area subpentagonal, postero-laterally delimited by distinct costulae; spiracle elongate, as long as its distance to hind margin of metanotum; spiracular groove fairly deep. Cubital vein of fore wing setose along the basal cell, with 11–20 hairs, basal vein with 9–14 hairs (Fig. 16). Ovipositor sheaths 1.27–1.4 times as long as body.

Male (heteromorph) 2.4–3 mm. Flagellum elongate, almost filiform (Fig. 12). Pedicel ♀ flagellum 1.75–1.82 times as long as width of head. F1 2–2.4 times and F7 1.5–1.8 times as long as wide. Frenal area fairly distinct, reticulate though more delicately so than rest of scutellum. Propodeum with carinae as an inverted Y, the lateral carinae originating on a long median branch, straight, and forming an acute angle (Fig. 36); surface reticulate to rugulose-reticulate. Hind femur reddish with penultimate tooth narrowly separated or partially fused with the terminal one (Fig. 41). Cubital vein of forewing setose, bearing 7–14 hairs along basal cell.

RECOGNITION. The elongate flagellum readily distinguishes this species from all other *Podagrion*. Other important characters are the reddish hind femur in both sexes, the complete notauli, distinct frenal area, and the straight propodeal carinae, that form an inverted Y. Large females of *P. bouceki* sp. nov. they have a more elongate flagellum and therefore might be mistaken for *P. pachymerum* because; however the ornamentation of their propodeum is quite different, with strongly curving propodeal carinae, and their hind femur is dark, with metallic reflections.

DISTRIBUTION. Europe and Mediterranean Basin: Algeria (Gr. Kabylia¹), Spain, France, Italia (Varazze, W of Genova¹), Croatia (Dalmatia¹), Hungaria, Czech Republic (Moravia¹), Slovakia¹, Poland (Tarnobrzeg, 200 km S of Warsaw¹), Bulgaria¹, Ukraine (Odessa¹), Syria (Tartous¹). The distribution is the most northern one for the genus in Europe. In France its distribution matches quite well that of its host (Bertrand 1937, Hugel 2000).

HOSTS AND BIOLOGY. *Mantis religiosa* is by far the main host of this species (Chopard 1922, Picard 1933, Sellenschlo 1984) although it was reared once from *Iris oratoria*. *Mantis religiosa* is a monovoltin species; it might be predicted that *Podagrion pachymerum* has a similar phenology because it is present in regions where *Mantis religiosa* is the only mantid species being encountered. Although this is quite possible, a few times but I did find a female of *Podagrion pachymerum* standing on an egg-case of that mantid. Laboratory observations showed that this behaviour is not exhibited by emerging females, which leave the host soon after their way out. Ovipositing females do stay on the egg-case, in which they introduce their eggs over several days (and even several weeks in laboratory cultures); it is therefore possible that a spring generation develops on egg-cases deposited the preceding autumn if females of *P. pachymerum* emerge early enough in spring to oviposit within them. Thorette (1992) quoted *P. pachymerum* as being reared from *Iris oratoria*. I did not examine the relevant specimens but based on the illustration provided (male hind femur, female ovipositor and antenna) he misidentified the species which was certainly *Podagrion gibbum*.

Podagrion splendens Spinola, 1811

(Figs 10, 13, 14, 19, 22, 40)

Podagrion splendens Spinola, 1811: 147 [no type locality].

Podagrion splendens: Nikol'skaya 1952: 110; Ferrière 1955: 209; Bouček 1976: 182; Grissell 1995: 247–248.

TYPE MATERIAL EXAMINED. Neotype ♀, here designated, labelled „Italy: Liguria Ceriale [near Albenga] 3 IX 1972 Z. Bouček leg.“ (in NHM).

ADDITIONAL MATERIAL EXAMINED. MOROCCO: 1 ♀, Moulay-Idriss, Volubilis, 17 IV 1995 (H. Tussac) (in GD); 1 ♀ 1 ♂, High Atlas, Southern slope, Tizi'n Test road, 1,700 m, 30 V 1992 (G. Delvare) (in GD). SPAIN: Almeria, 3 ♀♀, Sierra de Alhamilla, Nijar, 14 VI 1994 (G. Delvare) (in GD); 1 ♀, Sierra de Almagrera, Los Lobos, 2 V 1994 (M.J. Gijswijt) (in ZMUA); 1 ♀, Sierra de Gata, La Isleta, 16 VI 1994 (G. Delvare) (in GD); 1 ♀, Carboneras, 22 IV 1990 (M.J. Gijswijt) (in ZMUA); 1 ♂, Mojacar, 18 IV 1990 (M.J. Gijswijt) (in ZMUA); Murcia, 2 ♀♀ 2 ♂♂, Sorbas, 5 VI 1994 (G. Delvare) (in GD); Jáen, 1 ♀, National Park of Cazorla, 12 VI 1994 (G. Delvare) (in GD); Madrid, 2 ♂♂, Chinchón-Titulcia, 27 IV 1994 (J.L. Nieves) (in MNM); 1 ♀, Montarco (G. Mercet) (in MNM); 1 ♂, Navalperal (G. Mercet) (in MNM); 1 ♀, Escorial (Cabrera) (in MNM); 2 ♀♀, Manzanares el Real, 3 VII 1986 and 15 VI 1990 (M.J. Gijswijt) (in ZMUA); Alicante, 1 ♀, Jávea, 28 VIII 1992 (F. Luna) (in JYR); Girona, 1 ♀, Roses, 7 VI 1990 (H. Tussac) (in GD). FRANCE: Lot, 1 ♀, Brengues (H. Tussac) (in GD); 1 ♀, Labastide-Marnhac, Cluzel, 27 VIII 1991 (H. Tussac) (in GD); Aveyron, 1 ♀, Cantobre, 19 VII 1991 (J.-Y. Rasplus) (in JYR); Aude, 1 ♀, Gruissan, la Clape, 8 VIII 1999 (G. Delvare) (in GD); Hérault, 5 ♀♀ 1 ♂, Aumelas, ex *M. religiosa*, 8 V 1994 (J.-M. Males) (in GD); 1 ♀, Saint-Guilhem-le-Désert, 1 VI 1984 (J.-M. Males) (in GD); 1 ♂, same locality, les Lavagnes, 500 m, 18 IV 1993 (G. Delvare) (in GD); 54 ♀♀ 9 ♂♂, Cazeveille, ex *Mantis religiosa* (2 egg-cases), 6 V 1988 (G. Delvare) (in GD); 2 ♂♂, same locality and collector, ex *Iris oratoria*; 2 ♀♀, Saint-Guilhem-le-Désert (G. Delvare & J.-Y. Rasplus) (in GD); Ardeche, 22 ♀♀ 2 ♂♂, Labeaume, ex *M. religiosa*, X 1983, (J. Balazuc) (in GD); 2 ♀♀, same locality and collector, 8 VII 1984 and 1 VIII 1985 (in GD); 27 ♀♀ 1 ♂, ex *M. religiosa*, 7 IV 1984 (H.-P. Aberlenc) (in GD); 1 ♀, Labastide-de-Virac, 1 VI 1986 (H.-P. Aberlenc) (in GD); Drôme, 1 ♀, Auban, 670 m, 2 V 1987 (M.J. Gijswijt) (in ZMUA); Var, 1 ♀, Vidauban, 8 VI 1991 (M.J. Gijswijt) (in ZMUA); 1 ♀, Vidauban, bois du Rouquan, 13 VII 1995 (G. Delvare) (in GD). CORSICA, 1 ♀, PN Scandola, Elbo, 26 VI 1990 (J.-Y. Rasplus) (in JYR). SARDINIA: 4 ♀♀, Tempio, Cusseddu, 3 VII/7 VIII 1978 (F. Bin) (in CNCI). GREECE: Argolida, 15 ♀♀ 2 ♂♂, between Limnes and Agriori, ex *Empusa fasciata*, 27 VI 1996 (J.-M. Males) (in GD); Thessaloniki, 1 ♀, Kalambaka, 25 VI 1989 (M.J. Gijswijt) (in ZMUA); Lakonia, 1 ♀, Anogia, 15 km S Sparti, 1,000–1,500 m, 29 IV 1989 (M.J. Gijswijt) (in ZMUA). TURKEY: Burdur, 1 ♀, Koruglubeli, 20 km N Aglasun, 950 m, 22 VII 1981 (H. & T. v. Oorshot & H. v. d. Brink) (in ZMUA).

REMARKS. As mentioned above, until recently only one European species was recognized by some authors (Mayr 1974, Dalla Torre 1898). For a long time *P. splendens* was considered an invalid name because it was thought to be published without description (Bouček, pers. comm.). The priority was therefore given to *P. pachymerum*. Because it is now evident that more species occur, the identity of *P. splendens* becomes more important. My examination of collections housed in several national museums has shown that the species has for a long time and until now been misidentified for *P. bouceki* sp. nov. Repeated searches for the type of *P. splendens* in Spinola Collection (housed in Turin) and in other European museums has been unsuccessful (Bouček pers. comm.) (Grissell 1995). This type is therefore most probably lost. The question as to the identity of *P. splendens* is important because it is the type-species of the genus and because of the above confusion. I am resolving the problem the same way as it was for the designation of the type-species of *Elachertus* Spinola (Bouček & LaSalle 1985). It is known that the original Spinola material came from nearby Novi Ligura. The neotype was collected in the same region.

DIAGNOSIS. Female 3.4 mm. Coloration, antenna, hind femur and ovipositor as for *P. bouceki* sp. nov. Head twice as wide as long (Fig. 10). Outline of frons when seen in dorsal view only slightly convex. Frons evenly reticulate, without an area of delicate sculpture being more brightly colored. OOL somewhat shorter to very slightly longer than OD ($\times 0.7$ to 1.1). Reticulation of mid lobe of mesoscutum with cells about the same size, smaller on lateral lobes. Notauli incomplete (Fig. 22). Axillae squamose-reticulate. Axillar grooves broader anteriorly. Frenal area hardly distinct, clearly reticulate, although more delicately so than rest of scutellum. Propodeum with carinae as an

inverted V, the lateral ones forming together a strongly acute angle at base (30–60°) and strongly curving outwards posteriorly; surface rugulose-reticulate; spiracle moderately short (shorter than that of *P. bouceki* sp. nov. but longer than in *P. minus*); spiracular groove not very deep. Cubital vein of the fore wing bare along basal cell; basal vein with 9–13 hairs (Fig. 19).

Male (heteromorph) 2.5–2.8 mm. Coloration and antenna as for *P. bouceki* sp. nov. (Fig. 14). Mesonotum similar to female. Propodeal carinae branching on a longer median carina, forming together an inverted Y (median branch often obliterated or missing); propodeum surface rugulose-reticulate. Cubital vein of forewing often bare or with very few hairs, rarely with more hairs (up to 8). Hind femur sometimes dark brown or even lighter, with 4 strong teeth; penultimate tooth clearly separated from the terminal one (Fig. 40).

RECOGNITION. The species has long been misidentified for *P. bouceki* sp. nov., described above. The incomplete notauli, indistinct frenal area and usually bare cubital vein readily separate it from latter species. Other important characters are the absence of area of delicate sculpture and bright coloration on the frons and the broad axillar grooves. The male is easily distinguished from *P. bouceki* sp. nov. by the structure of its hind femur. Small females of *P. splendens* (very rare in the fields) may be misidentified for *P. minus*. However the hind femur of latter species is reddish, the OOL larger, propodeal carinae are mostly straight and the propodeum surface is reticulate.

DISTRIBUTION. Apparently the mediterranean basin; it was recorded from Russia and the Ukraine (Nikol'skaya 1952, Zerova & Seryogina 1999) but it is quite possible that part of their material was misidentified for *P. bouceki* sp. nov. Specimens examined by me came from Morocco, Spain, south of France, Italy and Greece

HOSTS. This species has mostly been reared from *Mantis religiosa* upon which it develops a winter generation (overwintering in the egg-cases). It was reared once from *Empusa fasciata* Brullé, 1832 in Greece and developed there a summer generation. I did not find any specimens from Spain and France reared from *E. pennata* although sentinels of this Empusidae were deposited near Montpellier. Finally it was reared once from *Iris oratoria*.

Species indet. A

A series of 3 ♀♀ housed in CNCI and labelled „Emerged in Lab./31 V 39/E. G. Lester“ and „ex praying mantid eggs/Europe“ undoubtedly represents an undescribed species. It is well separated from other *Podagrion* spp. by the relatively short ovipositor (only slightly longer than the body), complete notauli, distinctly reticulate axillae, dull but finely reticulate frenal area, straight propodeal carinae, forming together an acute angle (70°), very large spiracle (much longer than its distance to the hind margin of metanotum), deep spiracular groove and setose cubital vein (7–9 hairs). Nevertheless because of the inaccuracy of the locality, I do not wish to use this series to describe a new species. I could not get any information about the author of the collecting and I do not know any other specimens which agree with that series.

Acknowledgements

Zdeněk Bouček (BMNH) and the late Marcus Graham helped me in searching for some types of *Podagrion* and in clarifying some of the above synonymies. This greatly made easier the updating of the nomenclature. They all have my thanks and gratitude, even if it is posthumous. Many thanks also to Philippe Reynaud, from Laboratoire National de la Protection des Végétaux, Montpellier, France, who provided all facilities and equipment to make automontage photographs. At last I am grateful to the following for the loan of specimens: T. Gijswijt (ZMUA), E. E. Grissell (USNM), J. Huber (CNCI), J.-L. Nieves-Aldrey (MNM), J. Noyes and S. Lewis (NHM). Finally, thanks to my colleagues, G. A. P. Gibson and E. E. Grissell, for the careful reading and useful corrections of the initial manuscript.

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