

**Zeitschrift:** Mitteilungen der Schweizerischen Entomologischen Gesellschaft =  
Bulletin de la Société Entomologique Suisse = Journal of the Swiss  
Entomological Society

**Herausgeber:** Schweizerische Entomologische Gesellschaft

**Band:** 83 (2010)

**Heft:** 3-4

**Artikel:** Notes on the jumping plant-louse *Platycorypha erythrinae* (Hemiptera :  
Psylloidea) in Brazil

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**DOI:** <https://doi.org/10.5169/seals-403013>

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## Notes on the jumping plant-louse *Platycorypha erythrinae* (Hemiptera: Psylloidea) in Brazil

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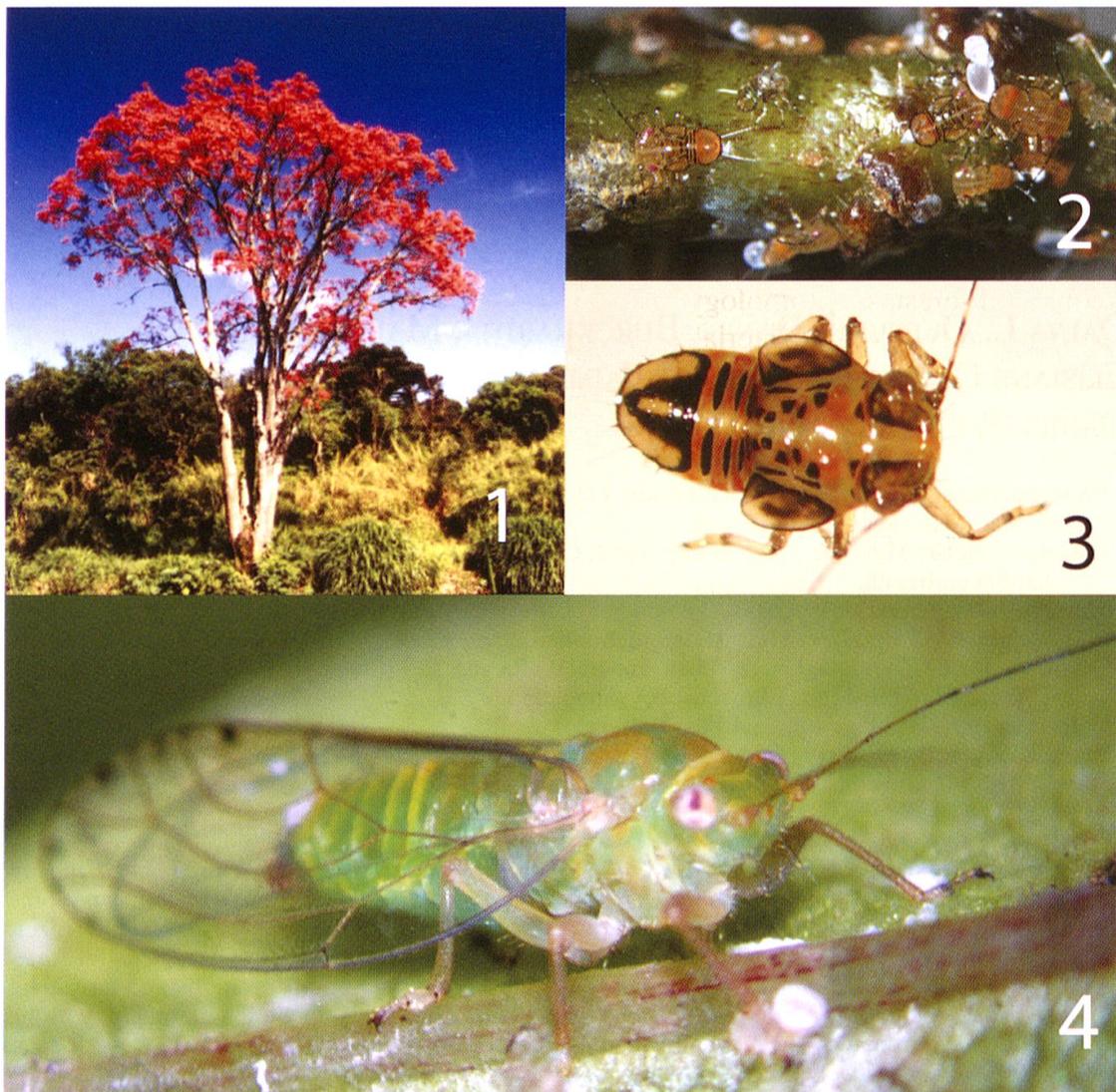
The Cockspur Coral Tree, *Erythrina crista-galli*, is native to South America but is also planted, mostly as ornamental, in Central America and the Caribbean, in tropical Africa, East Asia, Australia and some islands in the Indian and Pacific Oceans. The jumping plant-louse *Platycorypha erythrinae* (Lizer, 1918) is monophagous on this plant and is currently known from localities in South and Central America. New localities are recorded from Brazil. Short illustrated descriptions of adults and larvae are provided. The populations from Brazil resemble most those from Argentina in the morphology of the male and female terminalia. The taxonomic history of *P. erythrinae* is detailed, the phylogenetic relationships of *Platycorypha* Tuthill, 1945 are briefly discussed and the known localities of *P. erythrinae* are listed.

Keywords: *Platycorypha erythrinae*, *Erythrina crista-galli*, taxonomy, distribution, Brazil, Neotropical.

### INTRODUCTION

*Erythrina crista-galli* L. (Fabaceae), commonly known as Cockspur Coral Tree, Coral or Seibo, is a nitrogen fixing, thorn-bearing tree of medium size (LegumeWeb 2009). It blooms in profusion from September to December and its beautiful orange-red flowers make it an attractive ornamental tree (Lorenzi 1992) (Fig. 1). It is native to Uruguay, Argentina, Paraguay, Bolivia and Brazil but is also planted, mostly as ornamental, in Central America and the Caribbean, in tropical Africa, East Asia, Australia and some islands in the Indian and Pacific Oceans (LegumeWeb 2009). In Brazil it occurs from the States of Maranhão to Rio Grande do Sul.

*E. crista-galli* is not cultivated at large scale and, therefore, only few insects were reported to cause damage to this plant. Silva *et al.* (1968) mention the occurrence of 33 insect species associated with the genus *Erythrina*. One of them is the jumping plant-louse *Platycorypha erythrinae* (Lizer, 1918) (cited as *Trigonon ery-*



Figs 1–4: 1, *Erythrina crista-galli* tree; — 2–4, *Platycorypha erythrinae*: 2, Colony of nymphs; 3, nymph; 4, adult.

*thrinae*), known from Argentina (Lizer 1918), Brazil (Silva *et al.* 1968), Paraguay, Peru, Uruguay (Burckhardt 1987) and Panama (Brown & Hodkinson 1988).

Currently, *P. erythrinae* has no pest status. As *E. crista-galli* is a widely planted ornamental outside its native range, there is the risk that *P. erythrinae* is imported in areas outside South America where it may become a pest. This situation is known from the closely related *Platycorypha nigrivirga* Burckhardt, 1987, a species originating from Argentina, Bolivia and Uruguay (Burckhardt 1987) and recently introduced into Mallorca (Burckhardt 2009), continental Spain (Sánchez 2008), California (Rung *et al.* 2009) and South Africa (NHMB data).

This work provides a description of *P. erythrinae* with illustrations of taxonomically relevant structures, reports *P. erythrinae* from new localities in Brazil and discusses the phylogenetic relationships of *Platycorypha*.

## MATERIAL AND METHODS

In February 2008 adults and nymphs of *P. erythrinae* were collected on *E. crista-galli* seedlings in Brazil: Paran: Colombo, photographed and conserved in 70 % ethanol. Later insects were collected in Brazil: Minas Gerais: Santa Brbara do Tugrio. Some adults were cleared in hot KOH (10 %) and mounted permanently on slides. The slides were examined with a compound microscope, photographed and drawings were prepared with a camera lucida. The material is preserved at the Embrapa Florestas, entomology laboratory, and Naturhistorisches Museum Basel, Switzerland (NHMB). Material from other *Platycorypha* spp. was examined from the collections of the NHMB.

## RESULTS

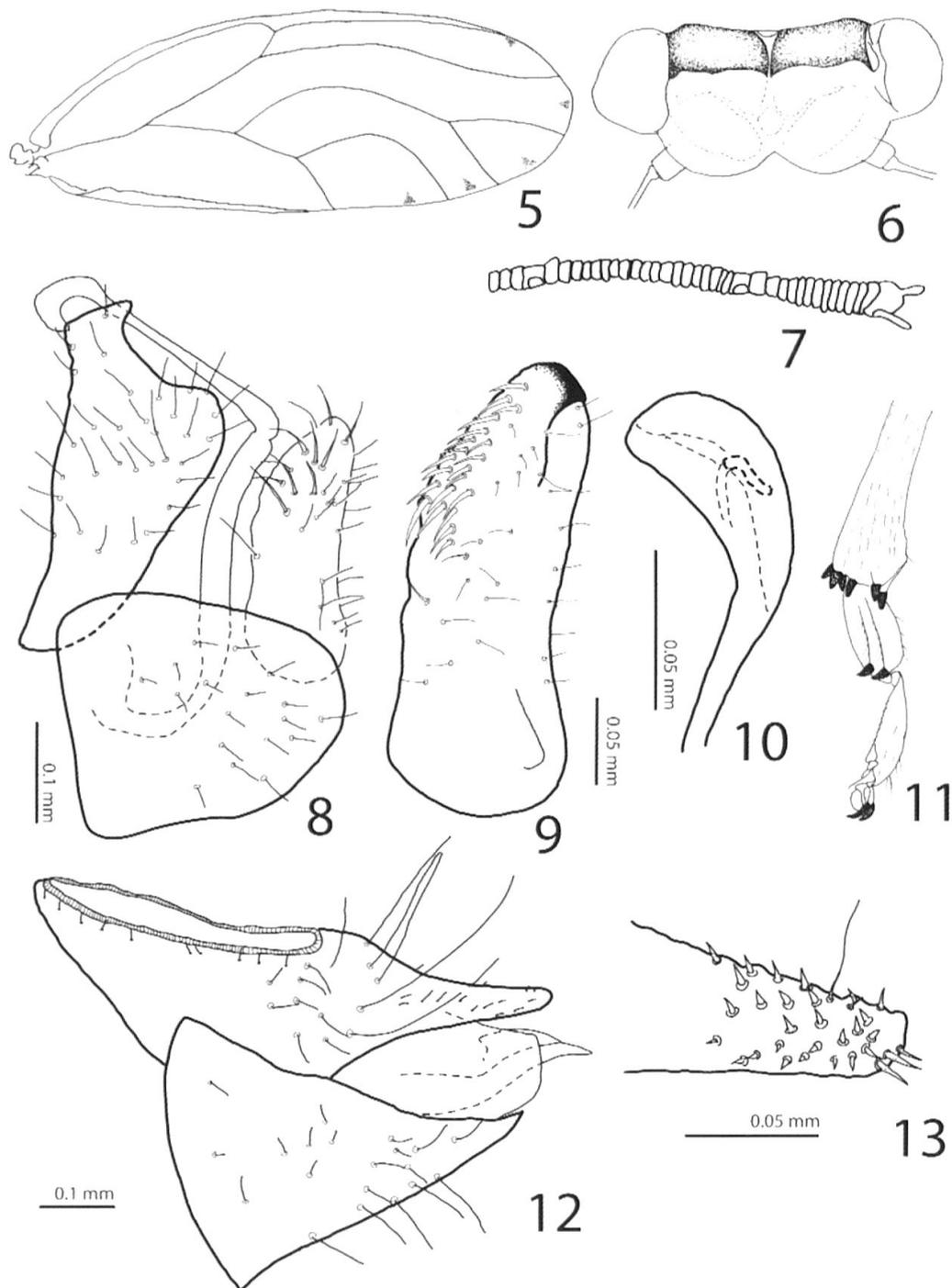
*Taxonomic history*

*Platycorypha erythrinae* (Lizer) was originally described in *Psylla* by Lizer (1918) and later transferred by Crawford (1925) to *Trigonon* Crawford, 1920, a genus otherwise comprising two Asian species. Costa Lima (1942) followed this when citing *Trigonon erythrinae* on *E. crista-galli* leaves from Argentina. Silva *et al.* (1968) mention *Trigonon erythrinae* from *Erythrina* sp. in Brazil: Porto Alegre – RS. Caldwell (1947) suggested that *P. erythrinae* is closely related to the Mexican *Paurocephala magnifrons* Crawford, 1914, and erected the genus *Neopsyllia* to receive the two species (as *Neopsyllia erythrinae* and *N. magnifrons*) together with *Neopsyllia amabilis* Caldwell, 1947, from Mexico. Burckhardt (1987) agreed that the species included in *Neopsyllia* by Caldwell are closely related and suggested that *Platycorypha*, an originally monotypic genus erected by Tuthill (1945) for *P. princeps* Tuthill, 1945 from Cuba and Mexico, and *Neopsyllia* form together a monophyletic group and, therefore, synonymised the two. He also added the Neotropical *P. fibris* Burckhardt, 1987, and *P. nigrivirga* Burckhardt, 1987. Brown & Hodkinson (1988) followed this and recorded *P. erythrinae* from Panama, Argentina, Uruguay, Paraguay and Brazil.

*Platycorypha*, as currently defined, is a small neotropical genus comprising six described species associated with Fabaceae.

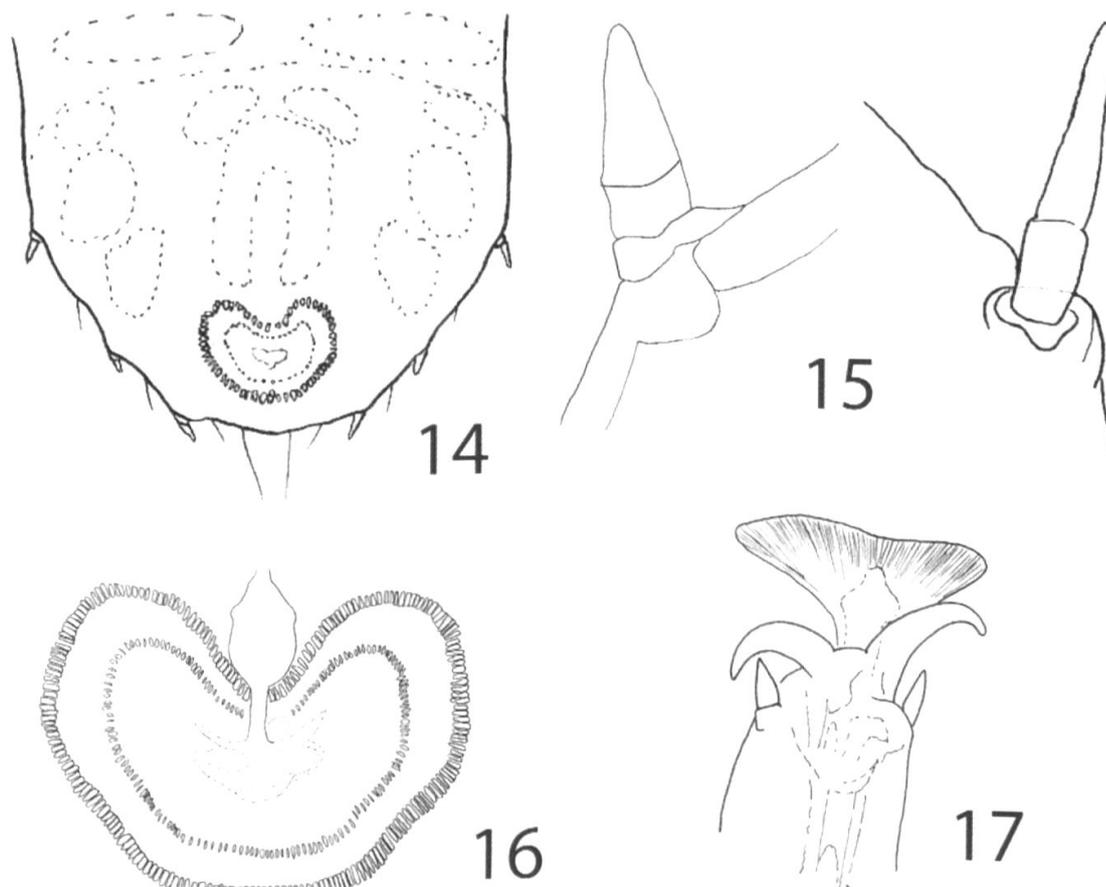
*Description of Platycorypha erythrinae*

Adult: General coloration of live specimens predominantly green with spots that vary from yellow to brown, some specimens also greenish-brown (Fig. 4). Head (Fig. 6) strongly transverse; vertex about 2.5 times as broad as long, flat apart from shallow discal foveae, coronal suture fully developed, preocular sclerite broad and running full length of side of vertex. Genal processes very short, rounded, sparsely beset with moderately long setae and bearing each two very long setae. Ocelli orange, prominent. Antenna filiform, 10-segmented, yellowish at base gradually darkening to apex, longer terminal seta slightly shorter than segment 10, shorter terminal seta about half length of longer seta (Fig. 7). Forewing (Fig. 5) bearing fine, evenly spaced setae along fore margin, pterostigma relatively short and narrow, radular areas in cells  $r_1$ ,  $r_2$ ,  $m_1$ ,  $m_2$  and  $cu_1$  dark; surface spinules covering small areas along the wing margin in cells  $r_1$ ,  $r_2$ ,  $m_1$ ,  $m_2$  and  $cu_1$ . Metacoxa with long and



Figs 5–13: *Platycorypha erythrinae*, adult. — 5, Forewing; 6, head, dorsal view; — 7, antennal apex; — 8, male terminalia, in profile; — 9, inner surface of paramere; — 10, tip of distal segment of aedeagus; — 11, apex of metatibia and metatarsus; — 12, female terminalia, in profile; — 13, apex of female proctiger.

pointed meracanthus. Metatibia with distinct genual spine and six (1+1+3+1) grouped apical spurs [five (1+1+2+1) according to Lizer (1918)]; metabasitarsus with two lateral spurs about the same size as the apical spurs on the metatibia (Fig. 11).



Figs 14–17: *Platycorypha erythrinae*, fifth instar nymph. — 14, caudal plate, ventral view; — 15, marginal setasetae on caudal plate; — 16, circumanal ring; — 17, apex of tarsus with arolium.

Male terminalia (Fig. 8) with irregularly triangular posterior lobes on proctiger. Paramere (Fig. 9) lanceolate; inner surface in distal half with thick long setae near anterior margin; outer side covered with thick long setae apically; fore margin in the middle irregularly undulating. Distal segment of aedeagus weakly dilated apically (Fig. 10) and more or less curved, apex blunt. Female terminalia (Fig. 12) with proctiger bearing oval anus and circumanal ring consisting of two rows of pores; dorsal outline of apical process indistinctly serrate (Fig. 13). Subgenital plate pointed apically.

Measurements (in mm): head width 1.10, forewing length 3.07, metafemur length 0.74, metatibia length 0.73, metatarsus length 0.43, male proctiger length 0.40, paramere length 0.27, length of distal segment of aedeagus 0.29, female terminalia length 0.72.

Nymph: Coloration of first instar yellow-orange. Later instars with contours of forewing pad, dorsal sclerites and caudal plate dark and strongly contrasting with lighter colour of the interior parts of sclerites (Fig. 3), sometimes completely dark in the last instars. Compound eyes red. Fifth instar with 10-segmented filiform antenna, segments yellow-orange basally and dark apically. Hindwing pad with a single setaseta. Caudal plate (Fig. 14) bearing 3+3 marginal setasetae which often bear wax filaments (Fig. 15). Circumanal ring (Fig. 16) ventral, near abdominal hind margin; outer ring consisting of a single row of oval pores. Tarsal arolium (Fig. 17) fan-shaped, with short pedicel.

Tab. 1. Locations with coordinates of *Platycorypha erythrinae* occurrences with source.

Country	Location	Latitude in °	Longitude in °	Reference
Argentina	Buenos Aires	-34.5875	-58.6725	Burckhardt 1987, Brown & Hodkinson 1988
	San Fernando	-34.4441	-58.5775	Burckhardt 1987, Brown & Hodkinson 1988
Brazil	RS – Porto Alegre	-30.0333	-51.2000	Silva <i>et al.</i> 1968
	PR – Colombo EMBRAPA	-25.3811	-49.2963	New record
	PR – Curitiba	-25.4166	-49.2500	Brown & Hodkinson 1988
	MG – Santa Bárbara do Tugúrio	-21.2500	-43.5833	New record
Costa Rica	without details on location*	9.7489	-83.7534	Arguedas 2007
Panama	Canal Zone – Barro Colorado Island	8.9666	-79.5333	STRI 2009
	Colon – Mandinga	8.5000	-799.667	STRI 2009
	Canal Zone – Mindi Dairy	9.3000	-799.000	Brown & Hodkinson 1988
Paraguay	location unknown**	-24.0000	-60.0000	Burckhardt 1987, Brown & Hodkinson 1988
Peru	Callanga	-12.5666	-763.166	Burckhardt 1987
Uruguay	Treinta y Tres	-33.2333	-54.3833	Burckhardt 1987, Brown & Hodkinson 1988
	Montevideo to Salta	-29.0000	-59.0000	Burckhardt 1987, Brown & Hodkinson 1988

\* listed as *Platycoorypha* (sic) sp. from *Erythrina* spp.

\*\* Cited as «Charque adalia» (Burckhardt 1987) or «Charquedalir» (Brown & Hodkinson 1988)

### Distribution

The known distribution of *Platycorypha erythrinae* is detailed in Tab. 1. The following new distributional records of *P. erythrinae* are reported here from Brazil: Paraná State, on nursery seedlings in Colombo and in parks of Curitiba; Minas Gerais State, Santa Bárbara do Tugúrio in natural environment.

### Biology

Polyvoltine with overlapping generations in spring and summer; adults overwinter on the host. The leaves of the host turn yellow and wither when the psyllid population is high (Lizer 1918). Eggs are laid on the young branches and leaves and the nymphs develop on young shoots and leaves (Fig. 2).

### DISCUSSION AND CONCLUSION

The material from Brazil described here (adults and nymphs) fits well the descriptions of Lizer (1918) and Burckhardt (1987). According to the description of Brown & Hodkinson (1988) specimens from Panama differ in the body coloration of the adults, which is entirely pale orange rather than predominantly green, and the smaller body dimensions. Burckhardt (1987) described specimens from Peru which differ subtly but constantly from material from Argentina, Brazil, Paraguay and Uruguay in the more expanded surface spinules of the forewing, the more evenly curved posterior outline of the male proctiger, the more slender paramere with a larger anterior lobe, the less curved apical dilatation of the distal segment of the aedeagus,

the dorsal outline of the apical process of the female proctiger which is more serrate and the apex of the proctiger bearing a distinct small hook. The specimens from Panama are similar to the Peruvian form. The differences in colour may be an artefact of the way the specimens are preserved (dry versus ethanol conservation). The morphological differences, however, are real reflecting intra or interspecific variation. More information particularly on host relationships of the Panamanian and Peruvian populations is necessary to solve this problem.

Within *Platycorypha* the number of apical metatibial spurs varies between four and six (Burckhardt 1987) but seems constant within local populations. Lizer (1918) recorded five spurs for specimens from Buenos Aires and we observed mostly six in our material from Brazil.

When describing *Paurocephala magnifrons* Crawford (1914) included in his subfamily Pauropsyllinae the four phylogenetically unrelated genera *Pauropsylla* Rübsaamen, *Paurocephala* Crawford, *Heteropsylla* Crawford and *Calophya* Löw on the basis of the rounded head and the usually visible frons. Hollis (1984) showed that *Pauropsylla* belongs to the Triozidae and is unrelated to *Paurocephala*. Mifsud & Burckhardt (2002) and Burckhardt & Mifsud (2003) pointed out that Crawford's (1914) concept of *Paurocephala* was vague, rendering it polyphyletic. In the narrower definition of Mifsud & Burckhardt (2002) *Paurocephala* comprises some 64 species in the Old World tropics. It belongs to the Paurocephalinae of the liviid assemblage (Burckhardt 2005). *Heteropsylla* is a New World genus associated with Fabaceae which belongs to the subfamily Ciriacreminae of the psyllid assemblage (Muddiman *et al.* 1992), and *Calophya*, a member of the family Calophyidae, occurs in the New World and in East Asia and Australia with introductions into Europe and Africa (Burckhardt & Basset 2000).

Crawford (1925) transferred *P. erythrinae* to *Trigonon* due to the presence of long antennae and probably also the absence of genal processes. *Trigonon* currently comprises two species in Southeast Asia with unknown host relationships (Hodkinson 1983). Both *Trigonon* and *Platycorypha* are included by White & Hodkinson (1985) in the Psyllidae, Acizziinae. On the basis of the adult head structure, it seems more likely that *Trigonon* is a member of the Ciriacreminae of the psyllid assemblage sensu Burckhardt (2005). The presence of sectasetae along the margin of the caudal plate and the absence of additional pore fields on the abdomen in the nymphs of *Platycorypha* (Fig. 14) suggest that it is a member of the subfamily Arynainae/Psyllinae of the psyllid assemblage.

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(received September 8, 2010; accepted October 21, 2010)