Review of the genus *Flavopimpla* (Hymenoptera: Ichneumonidae: Pimplinae) from Vietnam with descriptions of two new species

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Abstract: The genus *Flavopimpla* Betrem, 1932 is reviewed for the first time from Vietnam with descriptions of two new species: *Flavopimpla lanugo* sp. n. from Xuan Son National Park, Phu Tho Province, northern Vietnam and *Flavopimpla vinhcuensis* sp. n. from Phu Ly, Dong Nai Province, southern Vietnam. A key to three Vietnamese *Flavopimpla* species is compiled.

Key words: *Afrephialtes*; Ephialtini; *Flavopimpla*; parasitoid; new species; taxonomy

Introduction

Ephialtini, one of three tribes of the subfamily Pimplinae (Ichneumonidae), comprises representatives known as idioibiont ectoparasitoids of immature stages of other endopterygote insects or koinobiont ectoparasitoids of spiders (Townes 1969; Fitton et al. 1988; Gauld et al. 2002; Gauld & Dubois 2006). There are several genera of Ephialtini comprised of large, mainly black species with long ovipositors, including *Flavopimpla* Betrem, 1932 (= *Afrephialtes* Benoit, 1953). Various authors have treated *Flavopimpla* and *Afrephialtes* as separate genera (e.g., Gupta & Tikar 1969; Fitton et al. 1988; Sheng & Sun 2010), and the conspicuous yellow-marked, stouter species of the traditional *Flavopimpla* are superficially distinct from the more monochrome, slender species assigned to *Afrephialtes*. However, Townes (1969) synonymised *Afrephialtes* under *Flavopimpla* and Gauld et al. (2002) found 'Afrephialtes' to be paraphyletic with respect to *Flavopimpla* sensu stricto, supporting Townes’s synonymy.

*Flavopimpla* is included in the keys to genera of Ephialtini (Pimplini of Townes) of Townes (1969) and Gupta & Tikar (1969) and can best be recognised by the lack of the lateromedian longitudinal carinae or longitudinal groove of the propodeum, the coarsely punctate propodeum and the narrower, impunctate apical band on metasomal tergites 1–5, when compared to *Liotryphon* Ashmead, 1900. Species of the African genus *Xanthophenax* Saussure, 1892, can closely resemble *Flavopimpla* but can be distinguished by the broader malar space (c. 0.7 × basal mandibular width, versus c. 0.3 ×) and by (in some species) the diagonal grooves delimiting basal, triangular areas on the second tergite. Gauld et al. (2002) found one apomorphic character supporting the monophyly of *Flavopimpla* (including *Afrephialtes*), namely the intercoxal carinae on the metasternum abruptly angled posteriorly and meeting in a sharp carina between or in front of the hind coxal foramina. Currently, 18 species of *Flavopimpla* have been recognised, 14 of them occur in the Oriental region (Gupta & Tikar 1976; Yu et al. 2005; Sheng & Sun 2010).

Recent field work in Vietnam has produced a remarkable collection of ichneumonids and based on the new material we have begun reviewing the ichneumonid fauna for the first time (Pham et al. 2010; Pham et al. 2011a–e). We follow Gauld et al. (2002) and assign the specimens from Vietnam to the genus *Flavopimpla*. Two of the three species present in Vietnam proved to be new. These two species are described here and included in a key to the three species in Vietnam.

Material and methods

Specimens were collected by hand net and Malaise trap from 2002–2010 and deposited in the collection of the Natural History Museum (BMNH), London, UK; the Institute of Ecology and Biological Resources (IEBR), Hanoi, Vietnam; and the Netherlands Centre for Biodiversity Naturalis (RMNH), Leiden, Netherlands. The morphological terminology follows Gauld (1991). Photographs were taken with a Nikon Digital Camera DXM 1200 via a stereomicroscope.
with light-box. The scales in figure plates indicate 1 mm, except 0.5 mm for metasterna and ovipositor tips.

**Taxonomy**

**Flavopimpla Betrem, 1932**


**Diagnosis.** Body moderately long; face almost flat, weakly convex medially; clypeus convex subbasally, depressed apically, with median apical notch; mandible weakly convex medially; clypeus convex subbasally, depressed apically, with median apical notch; mandible moderately to strongly punctate; notauli short to moderately strong, usually strong and sharp but sometimes weak; scutellum and metasternum weakly to moderately convex, moderately to strongly punctulate; mesopleuron polished, with sparse to moderately dense punctures, pubescent; metapleuron with submetapleural carina complete; propodeum without longitudinal groove medially, with posterior part of lateral longitudinal carina present; fore wing with areolet nearly trapezoidal, vein 2s-m always shorter than 3rs-m; hind wing with first abscessa of vein Cu1 shorter than vein cu-a; first tergite rather short; second tergite with basolateral groove deep and short; tergites 2–5 with strongly punctate; tubercles on tergites 3–6 more or less distinct; ovipositor longer than fore wing, lower valve not lobed subapically, tip of lower valve with strong teeth.

There are no host records from Vietnam for any of the three *Flavopimpla* species. Outside Vietnam, the few reliable host records for the genus are from wood-boring Lepidoptera (Pyralidae: Pyraustinae and Sesiidae) (Yaseen & Bennett 1972; Gupta & Tikar 1976; Fitton et al. 1988).

A key to the three known Vietnamese species is compiled below, based only on females since the males of *F. lanugo* sp. n. and *F. vinchuensis* sp. n. are unknown.

1 Ovipositor with upper valve slightly to distinctly broader than lower valve (Figs 1E, 2C); posterior carina of first sternite more broadly notched medially (Fig. 1D); face about 0.7 times as high as wide (Fig. 1F); hind wing with first abscessa of vein Cu1 about 0.45 times length of vein cu-a. ............ 2

– Ovipositor with upper valve subapically slightly narrower than lower valve (Fig. 3F); posterior carina of first sternite deeply notched medially (Fig. 3D); face 0.9 times as high as wide (Fig. 3G); hind wing with first abscessa of vein Cu1 about 0.7 times length of vein cu-a. ............ *F. vinchuensis* sp. n.

2 Metasternum with carina between hind coxal foramina strongly curved (Fig. 1C); first tergite equal to its apical width; tergites 2–4 with transverse smooth bands extending over apical 0.2–0.25 of tergites (Fig. 1B); ovipositor 5.4–5.6 times as long as hind tibia, with upper valve subapically only slightly broader than lower valve (Fig. 1E) ............ *F. lanugo* sp. n.

– Metasternum with carina between hind coxal foramina evenly curved (Fig. 2D); first tergite 1.25 times as long as apical width; tergites 2–4 with transverse smooth bands extending over apical 0.15–0.17 of tergites (Fig. 2B); ovipositor 6.5 times as long as hind tibia, with upper valve subapically distinctly broader than lower valve (Fig. 2C) ............ *F. latiannulata* (Cameron, 1907)

**Flavopimpla lanugo** sp. n.

**Diagnosis.** Metapleuron with sparse hairs, ventral part entirely impunctate; carina between hind coxal foramina strongly curved; first tergite nearly as long as apical width; tergites 2–4 with apical transverse smooth bands extending about 0.2× length of each tergite; ovipositor decurved, 5.4× as long as hind tibia, tip weakly swollen, upper valve slightly broader than lower valve.

**Description** (Holotype) (Fig. 1). Body length 16 mm, fore wing 12 mm, ovipositor 18 mm.

Head. Antenna with 34 flagellomeres, first flagellomere 1.4× length of second; diameter of lateral ocellus 0.67× ocellar-ocular distance; frons subpolished; face 0.7× as high as wide, with long, dense white hairs, upper margin of face with broad concavity; clypeus pubescent, apex thin and emarginate; malar space about 0.3× basal width of mandible; upper tooth of mandible slightly broader than lower tooth; occipital carina meeting hypostomal carina at about 0.55× basal mandible width from base of mandible; gena slightly swollen, polished, with sparse hairs, about 0.67× compound eye width laterally.

Mesosoma. Epomia length about 0.75× basal width of mandible; pronotum polished, impunctate except dorsal margin and posterior corner pubescent; mesoscutum 1.3× as long as width at anterior level of tegulae, with dense, minute hairs, notauli distinct on anterior 0.25 of mesoscutum, extending nearly to front level of tegulae; mesopleuron with moderately dense, long, white hairs except posterior area near mesopleural suture, epicnemial carina weakly present on lower 0.7 of mesopleuron, lateral sections of postpectal carina present to middle of mid coxa; metapleuron polished and impunctate dorsally and ventrally, pubescent anteriorly and posteriorly, submetapleural carina rounded anteriorly, angled before postero-fork; metasternum with carina between hind coxal foramina strongly curved; propodeum strongly convex, densely, coarsely punctate, with long, white hairs except mediadorsally and petiolar area, without carinae except short posterior stub of lateral longitudinal carina, propodeal spiracle oval, about 2.0× as long as wide, not touching pleural carina. Hind leg with femur 4.0× as long as wide, length 0.7× tibia, basitarsus