

Description of a new species of *Anagrus* from China related to *A. takeyanus* (Hymenoptera Mymaridae)

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Abstract

A new species of the fairyfly genus *Anagrus* HALIDAY, 1833 (Hymenoptera Mymaridae), *A. fragranticus* S. TRIAPITSYN sp. n., is described and illustrated from a series of specimens collected in Beijing, China. Indicated in the key are its distinguishing characters from the closely related species, *A. takeyanus* GORDH, 1977, a known egg parasitoid of *Stephanitis* spp. (Hemiptera Tingidae) in Japan and the USA, as well as from an unnamed species from Argentina. The New World species *A. raygilli* S. TRIAPITSYN, 2000 is for the first time recorded from the Hawaiian Islands (USA), where in the past it had been misidentified as *A. takeyanus*.

Keywords : Mymaridae, *Anagrus*, new species, taxonomy, egg parasitoid.

Introduction

Four members of the cosmopolitan fairyfly genus *Anagrus* HALIDAY, 1833 (Hymenoptera Mymaridae), all belonging to the *incarnatus* species group of the nominative subgenus as defined by CHIAPPINI *et al.* (1996), are reviewed in this communication. Two of them were confused in the past with *A. takeyanus* GORDH, 1977, a well-known egg parasitoid of *Stephanitis* spp. (Hemiptera Tingidae) in Japan and the southeastern USA (GORDH & DUNBAR, 1977; TSUKADA, 1992, 1999; BALDSON *et al.*, 1996).

The discovery of a very distinctive, undescribed species of *Anagrus* in Beijing, China, has prompted me to reassess my previous identifications of *A. takeyanus* from the Hawaiian Islands, with which the specimens from Beijing were compared initially because they keyed to the same couplet with *A. takeyanus* and *A. epos* GIRAULT, 1911 in the key by CHIAPPINI *et al.* (1996). They could not be identified using the existing key to the Chinese species of *Anagrus* by CHIAPPINI & LIN (1998) either. The Hawaiian specimens

resembling *A. takeyanus* were then found to fit better in *A. raygilli* S. TRIAPITSYN, 2000, a biologically unrelated species from the tropics and subtropics of the New World which is a leafhopper egg parasitoid (TRIAPITSYN, 2000, 2002). It also has become clear that the real *A. takeyanus* and the Chinese species described herein as *A. fragranticus* S. TRIAPITSYN sp. n. are definitely related based on their morphological features, as discussed below in the "Diagnosis". A key is provided to facilitate their separation from each other as well as from the two similarly looking, but apparently unrelated, taxa: *A. raygilli* and an unnamed species of *Anagrus* from Argentina, which was mentioned as *A.* "sp. B" by TRIAPITSYN (1999).

All specimens of the type series of the new species were critical point dried and card-mounted from material preserved in 70% ethanol; three females and one male were then selected, cleared in 10% KOH, dissected, and slide-mounted in Canada balsam. Total body length and head length were measured from dry specimens prior to slide-mounting, other measurements were made from slide-mounted specimens; unless otherwise indicated, all measurements (as length or length/width, if necessary) are given in micrometers (μm). Terms for morphological features follow GIBSON (1997). Abbreviations for the collections are as follows: CNCI, Canadian National Collection of Insects, Ottawa, Ontario, Canada; IEFA, E. CHIAPPINI collection, Istituto di Entomologia e Patologia Vegetale, Università Cattolica del Sacro Cuore, Piacenza, Italy; IZAS, Institute of Zoology, Chinese Academy of Sciences, Beijing, China; MLPA, Museo de La Plata, La Plata, Buenos Aires, Argentina; UCRC, Entomology Research Museum, University of California, Riverside, California, USA; USNM, National Museum of Natural History, Washington, D.C., USA. An abbreviation used in the key and the description is: F = funicle (flagellar in males) segment.

Genus *Anagrus* HALIDAY, 1833

Comments: Information on the history of the taxonomic studies on the genus, including lists of the synonyms and diagnoses of its subgenera and species groups, etc., is available elsewhere (CHIAPPINI *et al.*, 1996; CHIAPPINI & LIN, 1998; TRIAPITSYN & BEARDSLEY, 2000) and is not repeated here.

Key to species of *Anagrus* resembling *A. takeyanus*, females

- 1 Midlobe of mesoscutum with a pair of adnotaular setae *A. raygilli* S. TRIAPITSYN, 2000
- 1' Midlobe of mesoscutum without adnotaular setae 2
- 2 Forewing long and narrow, about 8 × as long as wide *A.* sp.
- 2' Forewing short and broad, 5-6 × as long as wide (Figs 2, 4) 3
- 3 F2 much shorter than F4 or F6 (Fig. 1) *A. takeyanus* GORDH, 1977
- 3' F2 subequal in length to F4 or F6 (Fig. 3) *A. fragranticus* sp. n.

Anagrus (*Anagrus*) *raygilli* S. TRIAPITSYN, 2000

Anagrus (*Anagrus*) *takeyanus* GORDH: TRIAPITSYN, 1997: 4 (misidentification); TRIAPITSYN & BEARDSLEY, 2000: 34 (misidentification).

Anagrus (*Anagrus*) *raygilli* TRIAPITSYN, 2000: 90-94; TRIAPITSYN, 2002: 220.

Type locality: Chillá, Sacatepéquez, Guatemala.

Type material: Examined were the holotype in USNM and paratypes in UCRC, as indicated by TRIAPITSYN (2000).

Material examined: HAWAIIAN ISLANDS (USA: **Hawaii**). **Molokai Island**, IX-X.1994, W.D. Perreira, 1♀. **Oahu Island**: Dillingham Field, 15-28.V.1996, W.D. Perreira, 1♀; Pupukea Rd., 15-28.V.1996, W.D. Perreira, 1♀ [UCRC]. Other specimens from Hawaii, misidentified and listed by TRIAPITSYN & BEARDSLEY (2000) as *A. takeyanus*, belong here as well.

Comments: This species is known from several countries in the New World (TRIAPITSYN, 2002) and probably occurs there throughout the range of its only known host, *Idona minuenda* (MOZNETTE, 1919) (Hemiptera Clypeorrhyncha Cicadellidae), which is a minor pest of avocado in Mexico. It is quite likely that *A. raygilli* was accidentally introduced into Hawaii from one of those countries. I initially misidentified a female specimen of *A. raygilli* from Manzanillo, Colima, Mexico, as *A. takeyanus* (TRIAPITSYN, 1997). However, *A. raygilli* is obviously more closely related to the North American species *A. tretiakovae* S. TRIAPITSYN, 1998, which is also a leafhopper egg parasitoid, than to *A. takeyanus* (TRIAPITSYN, 2000).

Anagrus (*Anagrus*) sp.

Anagrus (*Anagrus*) sp. B; TRIAPITSYN, 1999: 215-216.

Material examined: 2 females from Loreto, Misiones, Argentina [MLPA], labeled as "*Anagrus* (*Anagrus*) sp. B" (TRIAPITSYN, 1999).

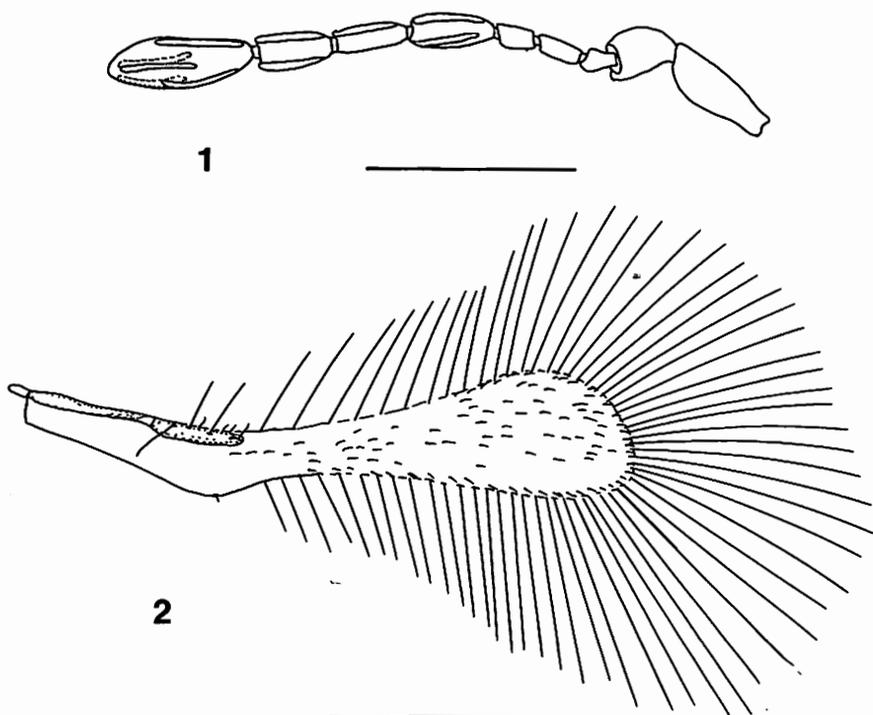
Diagnosis: Female of this species can be easily distinguished from females of *A. takeyanus* and *A. fragranticus* sp. n., both of which also lack adnotaular setae on the midlobe of mesoscutum, by the relatively narrow forewing (Fig. 4, p. 215 in TRIAPITSYN, 1999), as indicated in the key. In addition, the two macrochaetae on the marginal vein of the forewing are not as close to each other in *A. sp.* as in the two species mentioned above, so it is very likely that they are not closely related. The male of this species is unknown.

Comments: This unnamed species, known from two poorly slide-mounted females, was diagnosed and illustrated by TRIAPITSYN (1999).

Anagrus (*Anagrus*) *takeyanus* GORDH, 1977
(Figs 1, 2)

Anagrus takeyanus GORDH in GORDH & DUNBAR, 1977: 85-90.

Anagrus (*Anagrus*) *takeyanus* GORDH: CHIAPPINI *et al.*, 1996: 575-576.



Figs 1-2. *Anagrus takeyanus* (female from Griffin, Georgia, USA). 1: Antenna; 2: Forewing. Scale bars = 0.1 mm.

Type locality: Mt. Carmel, Connecticut, USA.

Type material: Examined were the holotype and numerous paratypes in USNM (all females).

Material examined: JAPAN, Kyoto, Kamigamo Forest Experiment Station of Kyoto University, 20.XII.1991, M. Tsukada— 7♀♀ ("ex. *Stephanitis takeyai* eggs in *Pieris japonica*") (det. E. Chiappini) [IEFA]. USA, Georgia: Athens, 24.V.1990, B. Sparks— 1♀ ("ex. *Stephanitis pyrioides* eggs") (det. M.E. Schauff). Spalding Co., Griffin, 8.V.1990, S.K. Brunigan— 2♀♀ ("ex. *Stephanitis pyrioides* eggs") [USNM].

Comments: This species was redescribed in detail by CHIAPPINI *et al.* (1996). The known hosts of *A. takeyanus* include the azalea lacebug, *Stephanitis pyrioides* (SCOTT, 1874), in Alabama, Florida, Georgia, and North Carolina, in the USA (BALDSON *et al.*, 1996) as well as the andromeda lacebug, *S. takeyai* DRAKE & MAA, 1955, in Connecticut, USA (GORDH & DUNBAR, 1977) and Japan (TSUKADA, 1992, 1999).

Anagrus (Anagrus) fragranticus S. TRIAPITSYN, sp. n.
(Figs 3-7)

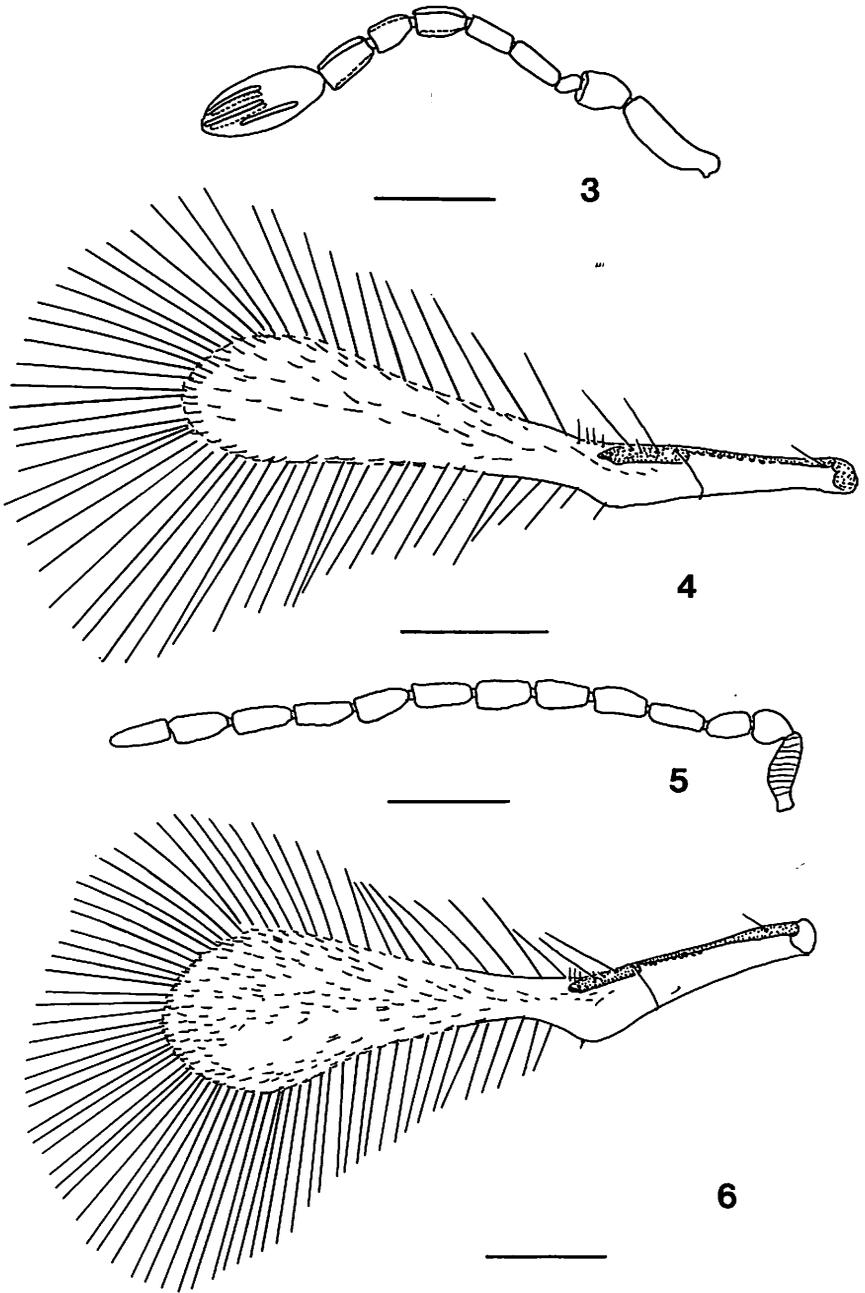
Type material: Holotype female on slide [to be deposited in IZAS]: CHINA, Beijing, Fragrant Hills, 23-24.VII.2002, M.L. Buffington (by sweeping riparian vegetation and juniper). Paratypes: same data as the holotype—4♀♀, 7♂♂ on cards and 2♀♀, 1♂ on slides [CNCI, IEFA, IZAS, UCRJ].

Description:

Female. *Color*: Body mostly yellow with orange-yellow markings on mesoscutum (anteriorly) and axilla, eye and ocelli dirty pink, appendages pale or very light brown except F2-F6 and clava brown. *Head*: About as wide as mesosoma. Antenna (Fig. 3) sparsely setose; scape about 3 × as long as wide and about 2 × longer than pedicel; F1 subglobular, much shorter than pedicel and shortest of funicle segments; F2 a little longer than F3 or F5 and subequal in length to F4 or F6; longitudinal sensilla on F4 (1 or 2), F5 (0 or 1) and F6 (2 or 3); clava about 2.5 as long as wide and longer than two preceding segments combined, with 5 longitudinal sensilla. *Mesosoma*: A little shorter than metasoma. Mesoscutum finely longitudinally striate, without adnotaular setae. Forewing (Fig. 4) 5.2-5.5 × as long as wide; hypochaeta reaching posterior margin, distal macrochaeta about 1.3 × length of proximal macrochaeta, the macrochaetae very close to each other; forewing blade slightly infuscated behind venation but otherwise hyaline, with distinct bare area in broadest part, discal microtrichia arranged in 3 or 4 irregular rows; longest marginal cilia 2.1-2.2 × maximum forewing width. Hind wing 20-23 × as long as wide, hyaline, with a row of microtrichia along each margin. *Metasoma*: Ovipositor reaching mesophragma anteriorly and slightly exerted beyond apex of gaster posteriorly; ratio of total ovipositor length to length of its exerted part 15-20 : 1. External plate of ovipositor usually with 2 setae, sometimes with 1 seta. Ovipositor length/ foretibia length ratio 1.8-2.0 : 1.

Measurements of the holotype: Body: 483; head: 83; mesosoma: 182; metasoma: 218; ovipositor: 206. Antenna: scape: 79; pedicel: 36; F1: 16; F2: 38; F3: 34; F4: 42; F5: 34; F6: 39; clava: 100. Forewing: 427/82; longest marginal cilia: 182. Hind wing: 409/18; longest marginal cilia: 152. Legs (given as femur, tibia, tarsus): fore 126, 115, 130; middle 112, 142, 127; hind 121, 140, 121.

Male. Similar to female except for normal sexually dimorphic characters and the following. Body color mostly brown except face, axilla, anterior scutellum, and appendages light brown; vertex (except for a brown stemmaticum), distal edge of mesoscutum, and posterior scutellum yellow; propodeum and first gastral tergum pale; eye and ocelli dirty pink. Antenna (Fig. 5) with flagellomeres subequal in length except F1 a little shorter. Mesosoma about as long as metasoma. Forewing (Fig. 6) much wider than in female (about 4.3 × as long as wide) and with discal microtrichia more numerous, bare area not as distinct. Hind wing about 19 × as long as wide. Genitalia as in Fig. 7.



Figs 3-6. *Anagrus fragranticus* sp. n. (holotype and paratypes). 3: Antenna, female; 4: Forewing, female; 5: Antenna, male; 6: Forewing, male. Scale bars = 0.1 mm.

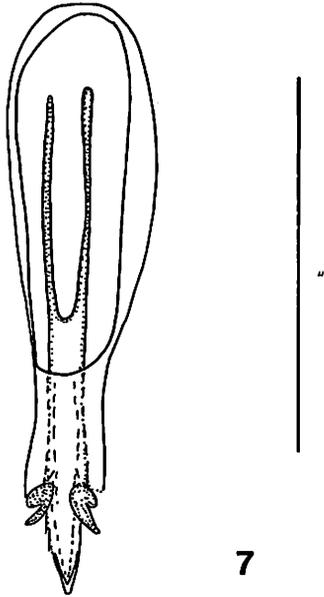


Fig. 7. *Anagrus fragranticus* sp. n. Genitalia, male. Scale bar = 0.1 mm.

Measurements of the male paratype: Body: 515; genitalia: 157. Antenna: scape: 67; pedicel: 34; F1: 38; F2: 49; F3: 48; F4: 48; F5: 48; F6: 49; F7: 49; F8: 49; F9: 50; F10: 50; F11: 52. Wings: fore: 515/120; hind: 479/25.

Diagnosis: Female of the new species can be easily distinguished from female of *A. takeyanus* by the antennal characters mentioned in the key. In addition, body coloration of female *A. fragranticus* sp. n. is mostly yellow whereas that of female *A. takeyanus* is light brown to brown. Both these species, which form a distinctive subgroup within the *incarnatus* species group of the subgenus *Anagrus* HALIDAY, 1833 s. str., are characterized by a minute size (body length usually less than 0.5 mm, rarely up to 0.6 mm), short antennae (Figs 1, 3, 5), a lack of adnotaular setae on the midlobe of mesoscutum, and short and broad forewings (Figs 2, 4, 6; length/width ratio less than 6:1) which have a distinct bare area in the widest part of the disc; the two dorsal macrochaetae on the marginal vein of the forewing are very close to each other. These macrochaetae are set relatively far apart from each other in both *A. raygilli* and *A. sp.* The male genitalia of *A. fragranticus* sp. n. (Fig. 7) are very similar in shape and structure to the typical male genitalia of the *incarnatus* group species as discussed by CHIAPPINI & MAZZONI (2000).

Etymology: The specific name refers to the type locality of this species, Fragrant Hills in Beijing, China.

Comments: Although no host is known for this new species, it could be a lacebug egg parasitoid like its close relative, *A. takeyanus*.

Acknowledgments

I thank Matthew L. Buffington (UCRC) for collecting interesting mymarids in China and making them available for this study and also Elisabetta Chiappini (IEFA), Michael E. Schauff (USNM) and Juan Schnack (MPLA) for the loans of specimens. Vladimir V. Berezovskiy (UCRC) made slide mounts and line drawings.

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