Problems in Costa Rican Thrips Taxonomy and Systematics (Insecta: Thysanoptera)

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Problems in Costa Rican thrips taxonomy and systematics (Insecta: Thysanoptera)

Laurence A. Mound

Abstract

The following nomenclatural actions are in response to a series of published reports, emanating from the University of Costa Rica, that were based on faulty microscopy and inaccurate scholarship. Among Thysanoptera Phlaeothripidae, the recently described genera Kolia and Arthrips are considered new synonyms of Holothrips, and reasons are provided for continuing to regard Abiastothrips as a synonym of Holothrips; also Camilothrips and Marinaella are considered new synonyms of Eurythrips. Among Thripidae, Frankliniella caribae is considered a new synonym of Frankliniella insularis and the synonymy of Frankliniella fortissima with insularis is re-established; Jessicathrips is considered a new synonym of Thrips genus. In addition, two misinterpretations of the Code of Zoological Nomenclature are discussed.

Key Words: Generic synonyms; Code of Zoological Nomenclature; microscopy; thrips

Resumen

Las siguientes acciones de nomenclatura son en respuesta a una serie de informes publicados, que proceden de la Universidad de Costa Rica, los cuales se basaron en un microscopio pobre usado y un conocimiento inexacto. Entre los Thysanoptera, Phlaeothripidae, se consideran los géneros recientemente descritos Kolia y Arthrips nuevos sinónimos de Holothrips, y se aportan las razones para continuar considerando Abiastothrips como sinónimo de Holothrips; también se consideran Camilothrips y Marinaella nuevos sinónimos de Eurythrips. Entre los Thripidae, se considera Franklieniella caribae un nuevo sinónimo de Franklieniella insularis y se restablece la sinonimia de Franklieniella fortissima con insularis; Jessicathrips se considera un nuevo sinónimo del género Thrips. Además, se discuten dos errores interpretaciones del Código de Nomenclatura Zoológica.

Palabras Clave: sinónimos genéricos; Código de Nomenclatura Zoológica; microscopía; thrips

Taxonomy, the process of naming organisms, is a science to which anyone can contribute, regardless of expertise. However, every new name for a species or genus that is published in accordance with the basic requirements of the International Code of Zoological Nomenclature (ICZN 2014) becomes technically available, and must be considered as a valid scientific hypothesis. The supporting evidence for such hypotheses must also be available for critical assessment by other workers. This situation was discussed by Goldarazena et al. (2008) with respect to a series of taxonomic problems emanating from Costa Rica, and these authors emphasized that taxonomy requires a combination of good technical methods and critical scholarship. Despite this, misinformation about Thysanoptera continues to emerge from the University of Costa Rica. Unfortunately, as pointed out by Goldarazena et al. (2008), also Mound (2013), correction of such published errors is often laborious and costly. This paper considers a few of the recently published factual errors for which it has been possible to develop refutations.

INADEQUATE LABORATORY TECHNIQUES

Two new genera, Kolia and Arthrips, were described by Soto-Rodriguez, Retana-Salazar & Rodriguez-Arrieta (2013) for which the most important diagnostic character state was the position of the maxillary stylets very low in the head (Fig. 1). The first of these genera was erected for 4 new species, of which three were based on single specimens and the fourth on 3 specimens, and the second genus was erected for 2 species, of which one was based on a single specimen and the other on 2 specimens. Six of these specimens were taken in Malaise traps, and no biological information was available for any of the 9 specimens. The combination of character states given by the authors for these 2 genera was intriguing, because apart from the remarkable position of the stylets the species were not clearly distinguished from members of the common and species-rich genus Holothrips. Species in that genus feed on fungal hyphae, and are common in Costa Rica on recently dead woody plants. Indeed, a colony of 1 species was found in 1992 living in an abandoned scolytid gallery within a stem of Cecropia next to the Museo de Insectos of the University of Costa Rica, and Mound & Marullo (1996) pointed out that individuals of Holothrips were unusually common in Malaise traps. Requests to borrow one or more of the original specimens of Kolia and Arthrips were rejected, but through the courtesy of the Director of the Centro de Investigación en Estructuras Microscópicas at UCR where the specimens are deposited (the publication actually named the depository as Colección Institucional de Thysanoptera de la Universidad de Costa Rica), a large series of photographic images was made available. These images indicate that the specimens have been poorly slide-mounted, such that they are seriously distorted with the fore legs retracted under the head (Figs. 3–5). However, ventral images of the heads (Figs. 6–7) clearly demonstrate that the maxillary stylets are fully protruding from the mouth cone. This is the normal feeding position that can be observed in any species.
of Phlaeothripidae with long stylets. The stylet position as described for both Arthrips and Kolia is thus an artifact, and cannot be considered as diagnostic of these taxa. Because of this, and the other character states indicated in the original descriptions, the generic names, Arthrips and Kolia, are here recognized as new synonyms of Holothrips Karny. This genus is discussed and extensively illustrated by Okajima (1987), also Mound & Tree (2014), and in the normal retracted position the stylets of species in this genus lie close together medially for the full length of the head. Unfortunately, the species-level identities of the stylets of species in this genus lie close together medially for the full length of the head. Unfortunately, the species-level identities of the specimens will make critical comparisons difficult.

INACCURATE MICROSCOPY

According to Retana-Salazar (2013b) the holotype of Trichothrips chauserbergeri Priesner, the type species of the genus Abiastothrips Priesner, has only 2 sensoria on each of antennal segments III and IV, he therefore redefined Abiastothrips as a valid genus distinct from Holothrips Karny with which it had previously been considered a synonym (Mound & Marullo 1996). The statement concerning the number of antennal sensoria is curious, because not only does Priesner (1928) state, when re-describing schauserbergeri, that there are 3 sensoria on segment III and four on IV, but Schliephake & Klimt (1979) clearly illustrate this species with this sensorial arrangement, and lativerticis Post (1961), a north American species that is considered a synonym of schausergeri, was also described as having this sensorial arrangement. Moreover, in synonymising Crototrips priesneri Bagnall with schausergeri, Priesner (1964) states that there are 3 sensoria on the third antennal segment. In July 2014 the original specimen of schausergeri was re-examined, and there are clearly 3 sensoria on III and four on IV, and this is true also of the holotype and paratype of priesneri, as well as of all of the available specimens of schausergeri in the collections of the Senckenberg Museum, Frankfurt, and the Natural History Museum, London. Examination of these specimens indicates that the notopleural sutures are slightly variable in schausergeri, normally being fully complete but sometimes weakly incomplete on one side. The rejection of Abiastothrips as a synonym of Holothrips (see ThripsWiki 2014) is thus not supported by the available evidence.

In Frankliniella insularis (Franklin), a common and widespread Neo-
tropical species of Thripidae, the posterior margin of abdominal tergite VIII bears a comb of dentate microtrichia but with 1 to 3 of these microtrichia absent medially. Priesner (1925) described Frankliniella for-
tissima also as having this condition with the words “Die Zähnchen des Kammes am 8. Tergit stehen wenig dicht, in der Mitte ist die Reihe un-
terbrochen”. An original female from which fortissima was described is in the collections of the Senckenberg Museum, and is labelled “TYPE” and this clearly has tergite VIII with the comb present but lacking a few microtrichia medially (Fig. 8). Jacot-Guillarmod (1974, 783) placed fortissima as a synonym of insularis, and this synonymy is widely ac-
cepted (Mound & Marullo 1996; Cavalleri & Mound 2012). In contrast, Retana-Salazar (2010a) in a key to species, also Retana-Salazar & Soto-
Rodriguez (2013a), claim that the comb on tergite VIII is absent in for-
tissima, and that fortissima is thus distinct from insularis. Curiously, the data matrix provided by Retana-Salazar (2010b) for Frankliniella species scores both fortissima and insularis as having the comb on ter-
gite VIII present but interrupted medially. Moreover, the second half of the first couplet in the key to species provided by Retana-Salazar (2010a) that leads ultimately to fortissima, states that the comb on VIII is complete. There are no other characters by which fortissima can be distinguished satisfactorily from insularis, and these names continue to be considered as referring to a single species.

A further problem arising from these errors concerns the confusing, and contradictory, description of a new species, Frankliniella carib-
uae Retana-Salazar (2010a). This was based on 9 females; the holotype from Trinidad, that had previously been identified at the Natural His-
tory Museum in London, as insularis, and 8 paratypes from Costa Rica. The description states of the ocellar setae: “Setas ioll en posicion 1/2 (Fig. 2)”, but the discussion of this species states that it differs from insularis in “la posición de las setas ioll en el interior del triángulo ocelar”. The Figure 2 provided by Retana-Salazar (Fig. 9) reflects the first of these statements, but therefore cannot support the second statement. Considering that the head surface is curved not flat, there is no significant difference in the position of ocellar setae pair III be-
tween caribae and insularis (see Fig. 34 in Cavalleri & Mound 2012). Abdominal tergite VIII of caribae was described as “Peine medial pre-
sente pero con dientes más pequeños hacia el centro”, but the comb of insularis is known to be variable (Mound & Marullo 1996), and the condition described for caribae is not uncommon among specimens within populations of insularis from several countries. At present there is no evidence to support the hypothesis that the 9 females listed by Retana-Salazar represent a different species, and caribae is here con-
sidered to be a new synonym of insularis.

A new genus and species, Mariniella edwini, was described by Re-
tana-Salazar & Soto-Rodriguez (2013b) based on a single female from Costa Rica that is deposited in the Senckenberg Museum, Frankfurt. This genus was described as a new member of the subfamily Phlaeothripinae, but diagnosed as unique within this subfamily in having the maxillary styles broad. The original specimen was studied at SMF dur-
ing July 2014, using a X40 phase-contrast microscope objective, and more particularly a X100 oil immersion objective. With both lenses, but particularly using the short depth of field of the higher magnification, it became clear that the maxillary styles are actually slender, but that they run closely parallel to the maxillary guides. It appears that the total width of styles plus maxillary guides was measured when claiming the styles to be broad. In describing both the genus and the species the authors state “Placas del prapectus poco desarrolladas” [= pro-
ster nal basantra]. However in the “Comentario” on the new genus they refer to “la ausencia de placas del prapectus”. In fact these structures are present on the holotype, although not easy to see due to the lack of clarity of the slide preparation. A further curious error is the state-
ment in the species description “pata I sin diente tarsal”, because their own illustrations, Figure 1, A and B, clearly show a tooth on the fore
tarsus. The authors interpret a supra-generic group Glyptothripini as comprising species with “ornamentación fuertemente reticulada” and

Figs. 1 and 2. 1. Maxillary styles of genus Kolia [Fig. 18 from Soto-Rodriguez et al (2013)]. 2. Head and antennae of Jessicathrips cubensis [Fig. 1a from Gonzalez et al. (2010)].
Figs. 3–9. [3–7 provided by Olman Alvarado Rodríguez of CIEMIC, University of Costa Rica]. 3–5. Holotype females of *Arthrips madresalvensis*, *Kolia lilianae* and *Kolia zaïdæ*. 6–7. Mouth cone of *Kolia guanacastenis* and *Kolia zaïdæ*, with protruding maxillary stylets indicated. 8. Tergite VIII posterior margin of *Frankliniella fortissima* female labelled “type” with microtrichial comb interrupted medially. 9. Head of *Frankliniella caribae* holotype (Fig. 2 from Retana-Salazar 2010a).
“tubo fuertemente elongado y ornamentado”. However, both of these character states are not developed in many of the species of *Eurythrips* and *Terorthrothrips*, the 2 most species-rich genera of this group (see illustrations in Mound 1976 & 1977). In view of the lack of any diagnostic characters, the genus *Marinaella* is here considered a new synonym of *Eurythrips* Hinds.

A second new Glyptothripine genus and species described by Retana-Salazar & Soto-Rodriguez (2013c), *Camiliothrips saidammedi*, was based on 5 wingless females from Costa Rica of which 1 paratype was studied in July 2014 at the Senckenberg Museum, Frankfurt. The description states that the prosternal basantra are absent in this species, whereas these sclerites are actually present but due to contraction of the prosternal surface are in an oblique position. The new genus was further justified by the lack of tergal wing-retaining setae. As with lack of ocelli and reduction in compound eye size, this condition is correlated with wing loss in many taxa throughout the Order Thysanoptera. It certainly occurs among the litter-living, fungus-feeding, species of *Eurythrips* and *Terorthrothrips* (Mound 1976 & 1977). One diagnostic character stated for *Camiliothrips* was the presence of only 2 sense cones on the third antennal segment, with the claim that species of *Eurythrips* have 3 sense cones on this segment. However, both Stannard (1968) and Mound (1976) have pointed out that the number of sense cones on this segment is variable among and within *Eurythrips* species. In *ampliventris* Hinds, the type species of *Eurythrips*, the number varies from 1 to 3, and this variation can occur between the left and right antennae as well as among individuals from the same locality. In the absence of any further evidence, the genus *Camiliothrips* is therefore considered a new synonym of *Eurythrips* Hinds.

A new genus and species of Thripidae, *Jessicathrips cubensis*, was described by Gonzalez, Retana-Salazar & Castillo (2010) from Cuba based on a single female. The generic definition provided includes all of the characteristics of the genus *Thrips*, except for the presence of only 6 antennal segments. The new genus was differentiated solely on this character. However, the illustration that accompanied the description indicates a specimen with grossly deformed antennal segments (Fig. 2), with the left and right antennae asymmetric. Antennal abnormalities are common among Thripidae, and based on such an artefact the putative genus *Jessicathrips* cannot be considered as distinct from *Thrips*. The species involved is probably the widespread pest, *Thrips tabaci*. The new species name fails to meet the requirements of Article 16.4.2 of the International Code for Zoological Nomenclature (ICZN 2014), in that no indication was given of the institutional collection in which the holotype was deposited. The name *Jessicathrips cubensis* is thus unavailable and must be considered a *nomen nudum*, although for reference purposes it can be placed within the long synonymy of genus *Thrips* Linnaeus.

**BIBLIOGRAPHIC ERRORS**

Retana-Salazar (2013a) provides a Table of 59 Thysanoptera species with the title “Lista de especies descritas por Priesner para América Latina”. However, 11 of these are listed in error. Two of the 11 were described by authors other than Priesner [*Chaetanaphothrips orchidii* (Moulton); *Plagiorthris euageneae* (Costa Lima)], and the following 9 species were described by Priesner from Old World countries, not from anywhere in the Americas [from The Netherlands, *Liorthris vaneeckei*; from Egypt, *Dorcadothrips caespitis* and *Apertygorthris haloxyl*; from Austria, *Trichothrips schaubergeri*; from Java, *Mystrothrips dammermanni* and *Psilothrips amans*; from Sumatra, *Pygmaeothrips ferecaeus* and *Streptomontes mirabilis*; from Liberia, *Williamsiella pediculus*]. The head of the Table includes the statement “informadas por Mound y Marullo (1996)”, but those authors do not record these species from Latin America, although 8 of them are type species of widespread genera that include species from Latin America.

Retana-Salazar & Soto-Rodriguez (2013a), in discussing the species *Frankliniella fortissima*, make the following statement about a slide in the collections of the Senckenberg Museum, Frankfurt: “The slide is labelled as “type” in the original collection of Priesner and following the criteria established in the ICZN this slide is the holotype.” This statement concerning the International Code of Zoological Nomenclature is incorrect, because Article 73.1.3 of the Code (ICZN 2014) explicitly states that holotypes can only be fixed in the original publication and by the original author. Priesner (1925), in describing *fortissima*, makes no mention of any specimens as Types, indeed he does not indicate how many specimens of his new species that he had studied.

**Discussion**

Taxonomy is certainly a difficult biological discipline, involving the satisfactory delineation of one species from another, whether by morphology or molecules, and the assessment of observed differences to infer phylogenetic relationships. However, a large proportion of the difficulties faced by professional taxonomists arise from poor quality work. Most of the Thysanoptera names for the Neotropical fauna are derived from 2 North American workers. Taxon descriptions by J. D. Hood (Hoebeke 1994) are detailed and supported by excellent slide preparations and highly skilled line drawings. In contrast, those by D. Moulton (Arnaud & Lee 1973) are often superficial, based on distorted slide preparations, and with illustrations that are sketchy and inaccurate. As a result, many of the thrips taxa described by Moulton from Brazil are likely to remain unrecognizable. Similarly, the number and diversity of errors indicated in the paragraphs above can only increase the problems of understanding Neotropical biological diversity.

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