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DESCRIPTION OF A NEW GENUS AND SPECIES OF WEEVIL PARASITOID FROM HONDURAS (DIPTERA: TACHINIDAE)

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ABSTRACT

Lixadmontia franki, **new genus** and **new species**, is described in the Blondeliini (Diptera: Tachinidae). This parasitic fly attacks the larvae of the weevil *Metamasius quadrilineatus* Champion which infests bromeliads in tropical montane cloud forests of Honduras, and it is a potential biological control agent of the bromeliad-eating weevil *Metamasius callizona* (Chevrolat) in Florida. It is most similar to members of the genera *Admontia* and *Lixophaga.* A key to the species of *Admontia* and *Lixadmontia* in North and Central America is given. *Admontia dubia* Curran is placed in synonymy with *Admontia pollinosa* Curran **new synonymy**.

Key Words: *Lixadmontia franki*, *Metamasius quadrilineatus*, *Admontia*, taxonomy, biological control

RESUMEN

Se describe *Lixadmontia franki* nuevo género y nueva especie en la Blondeliini (Diptera: Tachinidae). La mosca parasítica ataca a las larvas del picudo *Metamasius quadrilineatus* Champion que infestan bromeliaceas en bosques nebulosos de Honduras, y es un agente potencial en el control biológico del picudo *Metamasius callizona* (Chevrolat), una plaga de bromeliaceas en Florida. Es más similar a los miembros de los géneros *Admontia* y *Lixophaga*. Se presenta una clave para las especies de *Admontia* y *Lixadmontia* en América del Norte y Central. Se pone *Admontia dubia* Curran en sinonomía con *Admontia pollinosa* Curran **nueva sinonomía.**

Translation provided by the authors.

In the course of searching for parasitoids of a bromeliad-infesting weevil, *Metamasius quadrilineatus* Champion (Coleoptera: Dryophthoridae), an undescribed tachinid fly was found in Honduras, which may prove to be useful as a biological control agent of the Mexican bromeliad weevil, *Metamasius callizona* (Chevrolat), a pest that was accidentally introduced into Florida from the Neotropical region (Frank & Thomas 1994). The fly appeared at first to belong to the genus *Admontia*, especially on characters of the head, but the female fore tarsi, the male genitalia, and other characters of the abdomen more closely resemble members of the genus *Lixophaga*. Females of both genera deposit eggs ready to hatch at the openings of burrowing or boring insect larvae. A few species of *Admontia* have been reared from larvae of crane flies (Diptera: Tipulidae) living in soil or rotting wood, while various species of *Lixophaga* have been reared from larvae of Lepidoptera and Coleoptera. In North America, *Lixophaga unicolor* Smith has been reared from both Sesiidae (Lepidoptera) and Cerambycidae (Coleoptera) larvae boring in the same tree trunks. The best known species of *Lixophaga*, *L. diatraeae* (Townsend), develops in the larvae of a pyralid, the sugar cane borer, *Diatraea saccharalis* (F.). Much effort was expended in the early years of the last century on the introduction of this formerly Cuban tachinid into various parts of Latin America.

Although host records of species of *Admontia* are mostly tipulid larvae, Arnaud (1978) recorded some Lepidoptera, including *Spodoptera* sp. (Noctuidae) and *Grapholita* sp. (Olethreutidae), as hosts of *A. degeerioides* (Coquillett). Arnaud (1978) listed larvae of various Lepidoptera as hosts of various species of *Lixophaga*. Most hosts belonged to taxa with protected larvae, either in stems as borers or in webbing or rolled leaves, such as in Pyralidae, Tortricidae, and other microlepidoptera. *Lixophaga variabilis* (Coquillett), however, was recorded as parasitizing a wide array of hosts, including larvae of beetles, caterpillars, and even sawflies. There are only two records of *Lixophaga* being reared from weevils: *L. sphenophori* (Villenueve) has been reared from *Rhab-*

docoelis sp. as well as from *Diatraea*, and *L. parva* Townsend from *Lixus* sp. Some of these records may represent contaminants, i.e., parasitized larvae or puparia inadvertently included in the soil used for the insect that ended up being recorded as host. The wide host range of *L. variabilis* may also be a reflection of inadequate taxonomy of this particularly difficult genus.

Females of *Admontia* and *Lixophaga* have globose abdomens, presumably for the retention of a large number of embryonated eggs prior to oviposition. Deposition of these eggs on soil, rotten wood, or frass at the entrance to a burrow in a stem may be less efficient than laying eggs directly on the host. However, it allows these flies to successfully parasitize protected hosts, a tactic also used by members of the tribe Dexiini as well as by the eryciine genus *Lydella* that attacks the European corn borer, *Ostrinia nubilalis* (Hübner), in the corn stalk. *Admontia* and *Lixophaga* may not be the only blondeliines whose females deposit eggs near their hosts and rely on the searching capabilities of their neonate larvae to find the host. Females of *Chaetostigmoptera* and *Paracraspedothrix* also have globose abdomens like those of *Admontia* and *Lixophaga*, a condition that resembles that found among the Goniini that deposit microtype eggs on foliage to be eaten by potential hosts. These four genera may form a clade within the Blondeliini. To this group must also be added the new species described below, which is sufficiently unlike either *Admontia* or *Lixophaga* to be included readily in either. Although it runs to *Admontia* in keys to blondeliine genera (Wood 1985, 1987), the fore tarsus of the female resembles that of *Lixophaga* and lacks the expanded fore tarsus characteristic of *Admontia*. Therefore, *Lixadmontia,* a new genus, is proposed.

Materials and Methods

Terminology used in the descriptions follows McAlpine (1981). Acronyms for collections in which types are deposited are as follows:

CNCI	Canadian National Collection of Insects, Ottawa, Ontario
EAPZ	Escuela Agrícola Panamericana, El Zamorano, Honduras
FSCA	Florida State Collection of Arthropods, Gainesville, Florida
IRRC	Indian River Research & Education Center, Ft. Pierce, Florida
USNM	United States National Museum, Washington, D.C.

Lixadmontia Wood and Cave **new genus**

Head (Fig. 1): Arista tapering evenly to apex (as in *Lixophaga*), thickest on basal third or less (basal half thickened in *Admontia*); first two aristomeres minute, not longer than wide (first aristomere longer than wide and second aristomere 2 to 5 times as long as wide in most species of *Admontia)*. Frons with two proclinate upper orbital bristles in both sexes (as in *Admontia*, but these bristles more widely separated from one another in *Lixadmontia*). Two reclinate upper orbital bristles in both sexes (as in *Admontia)*, anterior bristle longer than posterior bristle, the former in line with frontal bristles rather than displaced laterally, the latter more in line with two large proclinate orbital bristles. Outer vertical bristle well-developed in both sexes, more than half as long as inner vertical bristle (a third or less as long in *Admontia*) and about twice as long as posterior reclinate orbital bristle (well-developed only in females of *Lixophaga*, and in males of *Admontia podomyia* Brauer and Bergenstamm and *A. cepelaki* (Mesnil)). Parafacial parallel-sided, with a few tiny scattered appressed setae below lowest frontal, not descending to level of uppermost bristle on facial ridge (more extensive and erect in most species of *Admontia*). Gena one-quarter height of eye. Facial ridge setose on lower third (usually lower half in *Admontia*), but bristles, especially those uppermost, more decumbent. Occipital setae extending down to lower cranial margin with scarcely any occipital dilation.

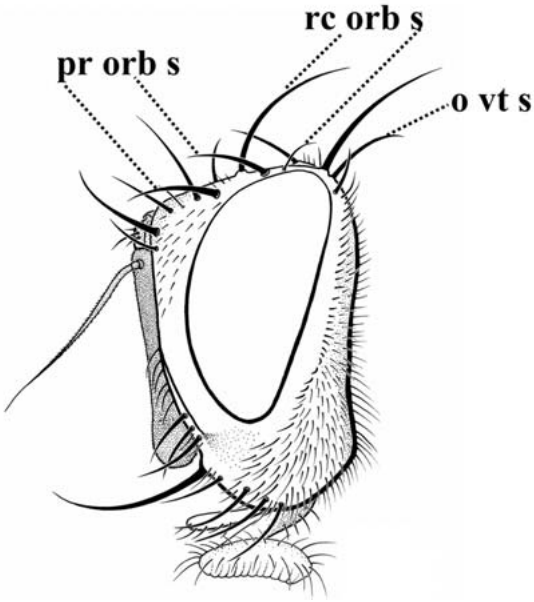

Fig. 1. Left lateral view of head of male *Lixadmontia franki*. *pr orb s*, proclinate orbital bristle; *rc orb s*, reclinate orbital bristle; *o vt s*, outer vertical bristle.

Thorax: Postpronotum with three bristles arranged in a triangle. Anterodorsal corner of anepisternum with two bristles, one below and behind the other (as in *Lixophaga retiniae* (Coquil-

lett) and *A. cepelaki*, but no other *Admontia*). Katepisternum with 2-3 bristles, middle katepisternal bristle small, absent in some specimens, when present arising almost directly below pleural suture and only slightly behind anterior katepisternal bristle. Apical scutellar setae closer to subapical scutellar bristles than to each other. Subapical scutellar bristles nearly parallel to one another or convergent (divergent in *Admontia* and *Lixophaga*). Lateral scutellar bristles less than half as long as subapical scutellar bristles and parallel to one another, curving medially (longer and divergent in most *Admontia* and *Lixophaga*, i.e., parallel to subapical scutellar bristles, but homoplastic in both genera). Fore tarsus of female slender (as in *Lixophaga*), not broadened or flattened (as in *Admontia*).

Abdomen: Abdominal syntergite 1+2 lacking median marginal bristles (present on all *Admontia* and *L. retiniae*) and with mid-dorsal depression not extending to hind margin of tergite. Tergites 3 and 4 each with a pair of median marginal bristles, but no discal bristles (which are present in all *Admontia* and a few species of *Lixophaga*). Fifth sternum of male with 2 to 3 small bristles on posterolateral corner (a single large bristle in *Lixophaga*).

Genitalia (Fig. 2): Cerci of male fused medially for less than half their length, as in *Lixophaga* (in *Admontia* fused along more than half their length), and more widely separated from each other.

Type-species: *Lixadmontia franki* Wood and Cave **new species**.

Lixadmontia franki Wood and Cave **new species**

Male: Head: Arista brown, darker in color than base of first flagellomere; first aristomere minute, second aristomere not longer than wide. First flagellomere entirely gray-brown in male and nearly as long as height of eye, slightly shorter and paler on basal third to half in female. Parafrontal and parafacial silvery-gray. Genal groove dark reddish. Occiput gray, all occipital setae black except for a small midventral patch of pale hairs. Thorax: Scutum, scutellum, and pleuron uniformly gray pruinose. Abdomen: Abdominal syntergite 1+2 dark on basal half, reddish on apical half laterally and ventrally, with mid-dorsal

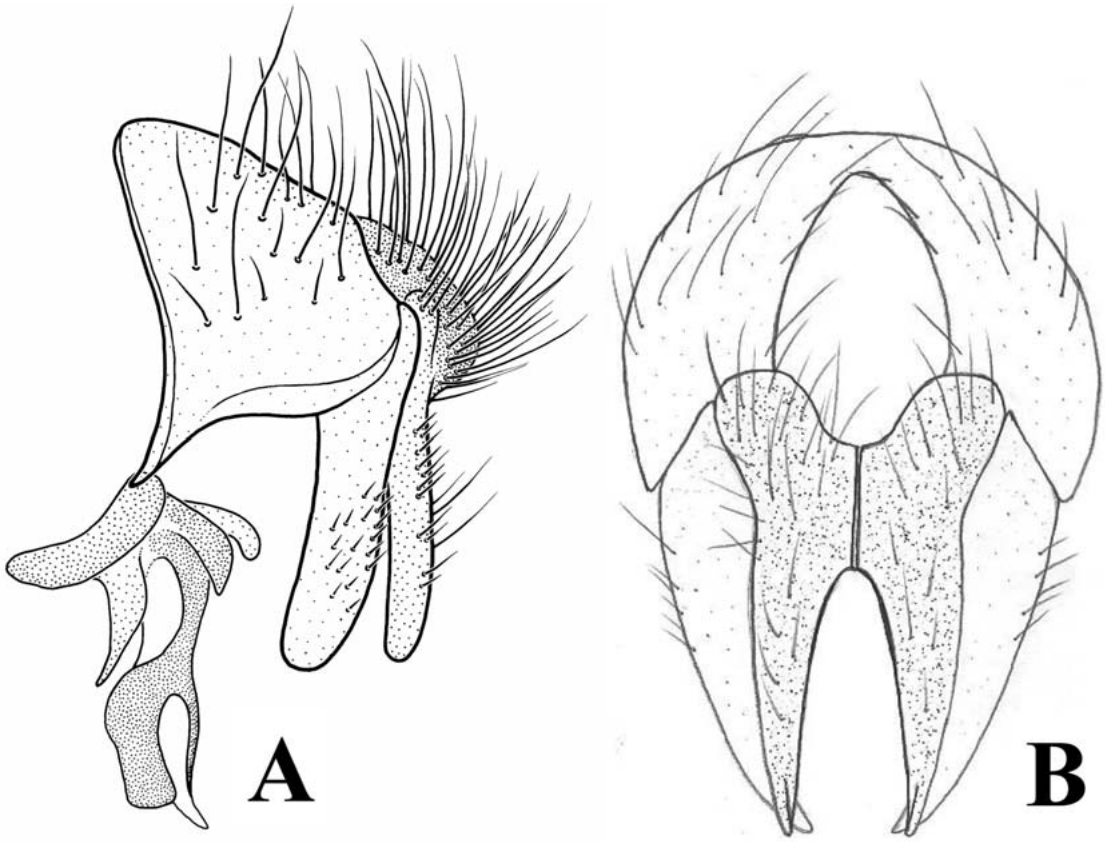

Fig. 2. Right lateral view (A) and caudal view (B) of male terminalia of *Lixadmontia franki*.

stripe about 1/3 width of abdomen. Tergite 3 reddish laterally and ventrally, with black mid-dorsal stripe continuous with that of syntergite 1+2, widening distally to nearly the full abdominal width. Tergite 4 entirely black dorsally except for reddish anterolateral corners, reddish ventrally on anterior half, black ventrally on posterior half. Tergite 5 black dorsally, reddish ventrally. Tergites 3 to 5 each with narrow transverse basal band of silvery pruinosity. Sides tapering towards apex.

Female: Similar to male except: syntergite 1+2 and tergites 3-5 black dorsally and laterally, tergites 3-5 narrowly reddish ventrally at middle or entirely black; abdomen more parallel-sided.

Holotype: male, [first label] HONDURAS, Fco. Morazán, Tatumbla, Montaña El Aguacate, 17 Oct 1995, rcol J. Ortega, [host plant] *Tillandsia oreogenes,* [second label] ex: larva de *Metamasius quadrilineatus* (Curculionidae), deposited in CNCI.

Paratypes: 1 male, same data as holotype (CNCI); 2 males, 2 females, same data as holotype except 13-IX-1995 (EAPZ); One male, HONDURAS, El Paraíso, Yuscarán, Montserrat, 6-III-1995 and 17-VIII-1995, same collector, host plant, and host as holotype (EAPZ). One female, HONDURAS, Francisco Morazán, Cerro La Montaña, 26-XI-1995, same collector and host as holotype (EAPZ). Two males and 1 female, HONDURAS, Francisco Morazán, Cerro Uyuca, IX-1995, D. Alvarez, same host as holotype (EAPZ). Five males and five females, from a laboratory colony at the Escuela Agrícola Panamericana, Honduras, received into UF/IFAS quarantine facility, Ft. Pierce 4-XI-2005 (FSCA, IRRC, USNM).

Etymology: The species is named for Dr. J. Howard Frank, Professor at the University of Florida, in recognition of his persistent and tireless efforts to find and study parasitoids of *M. callizona* in order to establish a biological control agent of this pest in Florida.

Biology: *Lixadmontia franki* lives in cool, moist montane cloud forests in central Honduras at elevations between 1,200-2,000 m. Cave (1997), Alvarez del Hierro (1997), and Alvarez del Hierro & Cave (1999) described the discovery, ecology, levels of parasitism in the field, and potential of *L. franki* (as *Admontia* sp.) as a biological control agent of *M. callizona*. Cave et al. (2003) noted that five tachinid larvae emerged from a single unidentified weevil host (probably *M. quadrilineatus*) collected by Barbra Larson on July 7, 2000 in Alta Verapáz, Guatemala; the larvae pupated on July 17 and later emerged as adults on August 6. These specimens were identified as being of the same species from Honduras. However, the specimens were lost and therefore are not included in the type material for *L. franki*.

In the key to genera in the Manual of Nearctic Diptera (Wood 1987), this species ought to key out to *Admontia* if the user begins at couplet 119, the first blondeliine couplet. *Lixadmontia* could be mistaken for a species of *Admontia*, except for its parallel to convergent subapical scutellar bristles. It is not likely to be mistaken for *Lixophaga* because of setulae on the parafacial, although *Lixophaga retiniae* (Coquillett 1897) has setulae present. Also, *Lixophaga* males do not have proclinate orbital bristles. There are no known Nearctic Blondeliini with convergent subapical scutellar bristles, this being rather exceptional in a few Neotropical genera, which are otherwise apparently Blondeliini. To facilitate the recognition of *L. franki* if it should be introduced successfully into Florida, the following key is presented.

KEY TO SPECIES OF *ADMONTIA* AND *LIXADMONTIA* OF NORTH AND CENTRAL AMERICA

1. Second aristomere two or more times as long as wide (Fig. 42 of Wood 1987) 2

1'. Second aristomere about as long as wide 10

2. Lateral scutellar bristles about as long, as stout and as straight as sublateral bristles, and more or less parallel to them (unless distorted during preparation) (as in Fig. 185 of Wood 1987, but with apical scutellar bristles straightened and reduced in size) 3

2'. Lateral scutellar bristles at most two-thirds as long as sublateral bristles, usually curved medially and subparallel to one another (as in Fig. 184 of Wood 1987) 9

3. Crossveins r-m and m-cu each surrounded by an area of darkened membrane several times wider than width of the crossvein. Currently known only from Cortes Pass, Mexico . . . . . *Admontia ducalis* Reinhard

3'. Crossveins r-m and m-cu not appreciably more infuscated than other veins 4

4. First and second aristomeres, and thickened base of third aristomere, pale orange. Palpus orange. Only 2 katepisternal bristles 5

4'. Arista and palpus brown or black. Three katepisternal bristles (except in some males of *A. pergandei*) 6

5. First flagellomere of female orange, especially in area at base of arista. First fore tarsomere widened apically, as wide at its apex as width of second fore tarsomere. Wing clear or lightly infuscated along veins . . . . . *Admontia rufochaeta* Curran

5'. First flagellomere of female gray, darkened around area at base of arista. First fore tarsomere gradually dilated apically but narrower at its apex than width of second fore tarsomere. Wing distinctly infuscated beyond apex of vein R1 and crossvein r-m, especially along veins . . . . . *Admontia nasoni* Coquillett

6. Outer vertical bristle well-developed, as large as lateroclinate upper orbital bristle and both nearly as large as upper proclinate orbital bristle. Lower facial margin protruding, visible in profile. Europe to eastern Siberia and Yukon, presumably also Alaska. . . . . *Admontia cepelaki* (Mesnil)

6'. Outer vertical bristle absent or weakly differentiated, hardly larger than one of the larger bristles of the occipital fringe. Lower facial margin not visible in profile. 7

7. Parafacial wide, with patch of setae at least 3 irregular rows wide. British Columbia and Utah to California and Arizona . . . . . *Admontia badiceps* Reinhard

7'. Parafacial narrower, about width of first flagellomere, with setae arranged in single irregular vertical row confined to anterior half of parafacial or less. 8

8. First fore tarsomere of female abruptly dilated near middle, its apex as wide as second fore tarsomere. Male without elongate upper occipital bristles. Abdominal tergites 3 and 4 each with a single pair of median marginal bristles. Widespread . . . . . *Admontia pergandei* Coquillett

8'. First fore tarsomere of female gradually widening apically. Male with one or more upper occipital bristles longer than others, and thus resembling upper vertical bristles, but usually separated from inner vertical bristle by a smaller seta. Europe to Yukon. . . . . .*Admontia grandicornis* (Zetterstedt)

9. Abdominal tergites entirely tessellated gray pruinose, the bases of all setae each surrounded with a halo of glossier cuticle. Widespead . . . . . *Admontia pollinosa* Curran

9'. Abdominal tergites glossy black, except for a narrow basal band of silvery pruinosity, usually devoid of setae. Widespread . . . . . *Admontia degeerioides* (Coquillett)

10. Outer vertical bristle well-developed, as large as proclinate orbital bristles, and twice the size of posterior reclinate orbital bristle (Fig. 1). Parafacial setae few, sparse, and very small, easily overlooked. Subapical scutellar bristles parallel to convergent, apices of lateral bristles usually curving beneath them, apical setae closer to subapical scutellar bristles than to each other. Abdominal tergites 3 and 4 lacking discal bristles; lateral marginal setae well-developed on syntergite 1+2, median marginal setae lacking. Honduras . . . . . *Lixadmontia franki* Wood and Cave **n. sp.**

10'. Outer vertical bristle absent or equivalent in size to reclinate upper orbital bristle. Parafacial setae conspicuous. Subapical scutellar bristles divergent, apical setae as close to one another as to subapical scutellar bristles 11

11. Arista, except for the tapered apex, orange 5

11'. Arista brown 12

12. First flagellomere mostly orange, grayish at apex; arista dark brown, contrasting with first flagellomere. Parafacial setae long and erect, as long as uppermost facial bristles and overlapping with them in middle of parafacial. Widespread in USA . . . . . *Admontia tarsalis* Coquillett

12'. First flagellomere gray, orange only at extreme base; arista pale brown. Parafacial setae shorter and recumbent. Arizona . . . . . .*Admontia offella* Reinhard

Note: *A. rufochaeta* may be conspecific with *Admontia duospinosa* West, but *duospinosa* has not been included for lack of specimens. In a footnote to his key, Curran (1927) indicated that he had not included this species.

Coquillett (1895) described *Degeeria washingtonae* based on a female, a year after his description of *A. pergandei* based on a male; it has not been possible to distinguish which are females of the latter or males of the former, and the two seem to belong to the same species. By describing them in different genera, it is evident that Coquillett did not realize that they could be conspecific. However, synonymy is not warranted until a revision has been completed.

Curran (1927) separated *Admontia dubia* Curran from *A. pollinosa* on a tenuous character state; the facial ridge is bristled on its lowest 1/3 in *dubia*, and on the lowest 1/2 or more in *polli-*

nosa. Additional material has shown this separation to be untenable, and *A. dubia* is hereby synonymized with *A. pollinosa* **new synonymy**.

Many specimens from Central America resemble *A. tarsalis* and/or *A. offella* and some may belong to either of these species. Unfortunately, only a fragment of the holotype of *Admontia occidentalis* van der Wulp, the earliest name, remains, and it was not possible to decide which of various species might be referred to this taxon.

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