



## Check the biodiversity of the Lonchaeidae Family (Diptera)

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### Abstract

Larvae (Lonchaeidae Family ) are found under the bark of trees, in tunnels made by bark beetles, in decaying wood and other decaying plant material or debris, such as manure. The larvae of some species form galls on plants (including cereals); others live on juicy fruits. Flies are found on tree trunks, stumps, cut wood, leaves, and in grass. Some species are agricultural pests. The aim of this manuscript was to carry out check the biodiversity of the Lonchaeidae Family (Diptera) related to its biogeography, bioecology, habitat, geographic distribution, taxonomy, life cycle, phenology and taxonomic and conceptual aspects of the Family, Subfamilies and Species. To this end, a bibliographic survey of Ichneumonidae was carried out in the years 1937 to 2022. Only complete articles published in scientific journals and expanded abstracts presented at national and international scientific events, Doctoral Thesis and Master's Dissertation were considered. Data were also obtained from platforms such as: Academia.edu, Frontiers, Qeios, Pubmed, Biological Abstract, Publons, Dialnet, World, Wide Science, Springer, RefSeek, Microsoft Academic, Science and ERIC.

**Keywords:** Parasitism; Lepidoptera; Coleoptera; Damage; Parasitoid

### 1. Introduction

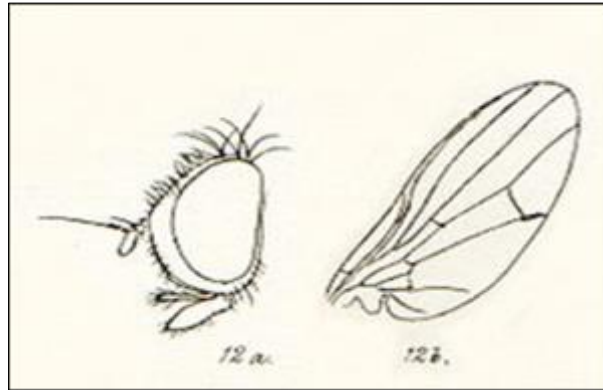
They are small black or blue-black flies, often with a metallic sheen and with transparent wings without black spots. The head is hemispherical (shorter than tall) and the lunula is well defined. The third antennal segment is generally elongated and the antennae are decumbent. The ocelli are present and there are divergent postocellar setae. The forehead is narrow in males and wide in females (Figure 1) [1,2].



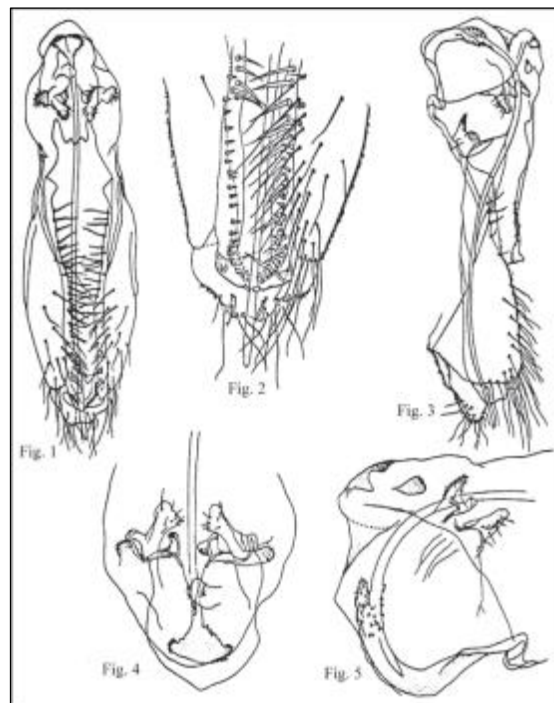
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**Figure 1** Specimens of Lonchaeidae Family; (Source: <https://static.inaturalist.org/photos/12679906/medium.jpeg>)

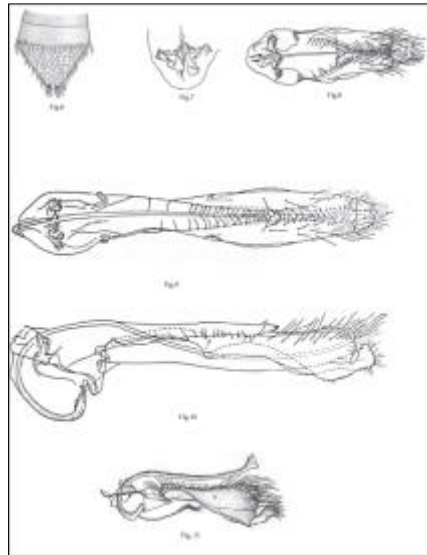
There is a pair of orbital setae on the head. Wing venation is complete. The costa has two interruptions, near the brachial vein and before the subcostal vein. The subcostal vein is variable in size. The anal vein is short. The abdomen is oval and somewhat flattened, in females it has a long and sclerotized ovipositor, triangular in shape (Figures 2, 3 and 4) [1,2].



**Figure 2** Morphological details of the Lonchaeidae; (Source: [https://en.wikipedia.org/wiki/File:Lonchaea\\_chorea.jpg](https://en.wikipedia.org/wiki/File:Lonchaea_chorea.jpg))

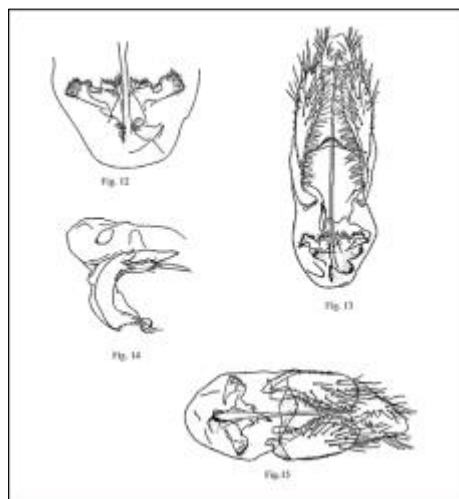


**Figure 3** *Neosilba inesperatan* sp. nov.: Fig. 1 Male terminalia of *N. inesperatan* ventral view. Fig. 2: preanterior and posterior ends of the aedeagus detail. Fig. 3: male terminalia side view. Fig. 4: Paramere detail ventral view. Fig. 5: base detail of the aedeagus side view; (Source: <https://www.scielo.br/j/aib/a/QVsKkg3qtZbsn3NdMB4KYMN/?lang=pt>)

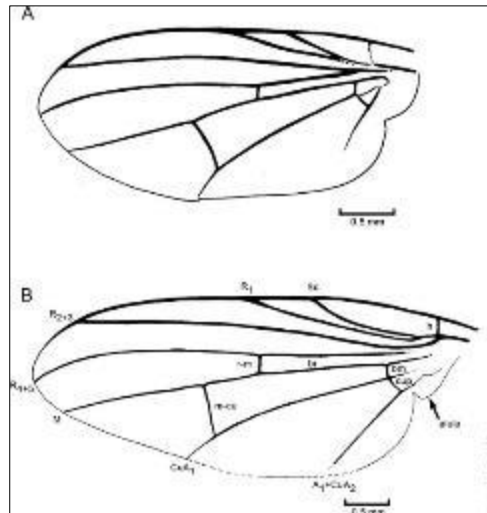


**Figure 4** Dorsal view of the end of the abdomen of *Neosilba glaberrima* (Wiedemann, 1830) (Lonchaeidae), showing a characteristic arrangement of the hairs. Fig. 7: Ventral view with detail of the ♂ paramere of *N. glaberrima*. Fig. 8: Ventral view of the ♂ genitalia of *N. glaberrima*. Fig. 9: Ventral view of the ♂ genitalia of *Neosilba zadolicha* (McAlpine & Steyskal, 1982) (Lonchaeidae). Fig. 10: Side view of *N. zadolicha* ♂ genitalia. Fig. 11: side view of the ♂ genitalia of *Neosilba pendula* (Bezzi, 1919) (Lonchaeidae) aedeagus highlighted; (Source: <https://www.scielo.br/j/aib/a/QVsKkg3qtZbsn3NdMB4KYMN/?lang=pt>)

This family is distinguished from Periscelididae by the subcostal vein, from Sapromyzidae by the absence of preapical tibial setae at least in the anterior and posterior tibiae, and from Pallopteridae by the presence of propleural setae in the frontal lunula. The larvae are mainly phytophagous, they feed on damaged plant tissues, they can also be coprophagous, mycophagous, saprophagous or predatory (Figures 5 and 6) [1,2,3,4].

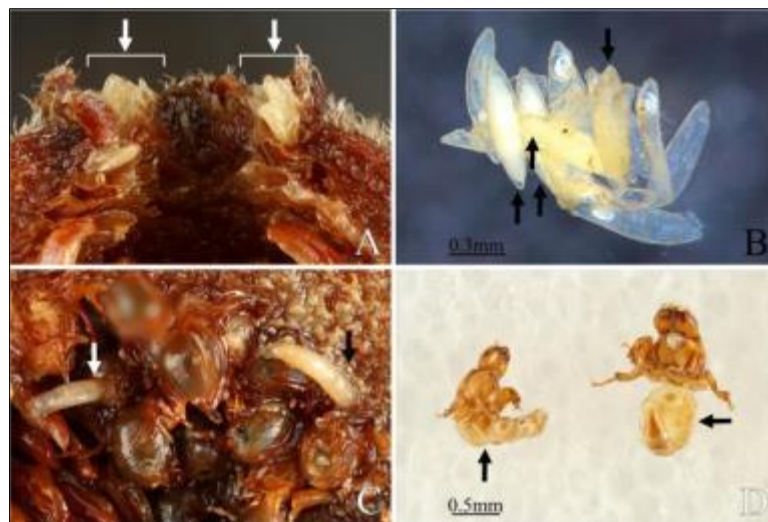


**Figure 5** 12: Ventral view of the paramere in detail of *Neosilba certa* McAlpine & Steyskal, 1982: (Lonchaeidae). Fig. 13: Ventral view of *N. certa* ♂ genitalia. Fig. 14: side view with detail of the spine-shaped structure of the base of the aedeagus in the shape of a “C” of *Neosilba bifida* Strikis & Prado, 2005 (Lonchaeidae). Fig. 15: Ventral view of the ♂ genitalia of *N. bifida*; (Source: <https://www.scielo.br/j/aib/a/QVsKkg3qtZbsn3NdMB4KYMN/?lang=pt>)



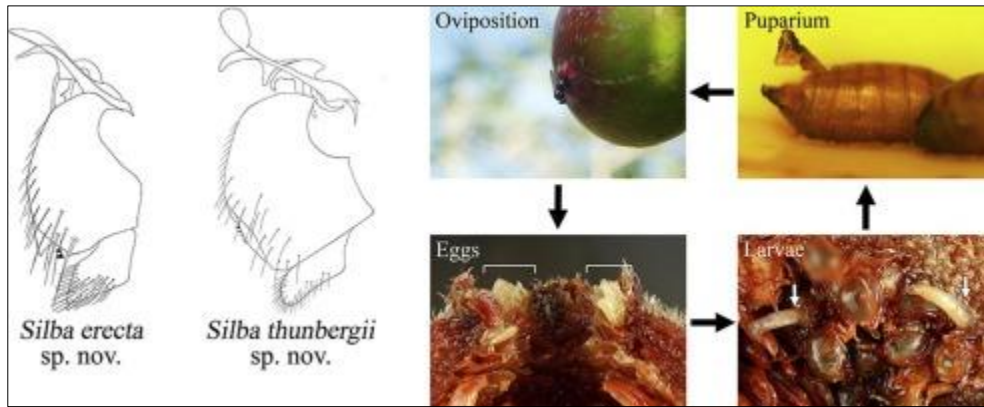
**Figure 6** Camera lucida drawings of Lonchaeidae (cf. Dasiops) wings. A. UAF-GS 9. B. UAF-GS26; (Source: [https://www.researchgate.net/figure/0-Camera-lucida-drawings-of-Lonchaeidae-cf-Dasiops-wings-A-UAF-GS-9-B-UAF-GS26\\_fig5\\_228503582](https://www.researchgate.net/figure/0-Camera-lucida-drawings-of-Lonchaeidae-cf-Dasiops-wings-A-UAF-GS-9-B-UAF-GS26_fig5_228503582))

The pupa is inside a puparium (Figures 7 and 8) [3,4,5,6].



**Figure 7** Egg, larva and pupa of Lonchaeidae; (Source: <https://www.sciencedirect.com/science/article/abs/pii/S1226861519301980#f0035>)

Some species are agricultural pests especially in the neotropical region. *Neosilba perezi* (Romero & Ruppel, 1973), the cassava shoot fly is a pest of these plants *Manihot esculenta* Crantz (Euphorbiaceae). *Dasiops passifloris* McAlpine, 1964 (Diptera: Lonchaeidae) infects passion fruit *Passiflora pallida* L. (Passifloraceae) in the Americas. Species of the genus *Earomyia* are pests of birch and spruce trees, destroying the seeds and cones. The black fig fly *Silba adipata* McAlpine, 1956, is a pest of these trees. *Lonchaea chorea* (Fabricius, 1781 seeks out humans and can be a nuisance [5,6].



**Figure 8** Life cycle of the Lonchaeidae Family; (Source: <https://www.sciencedirect.com/science/article/abs/pii/S1226861519301980#f0035>)

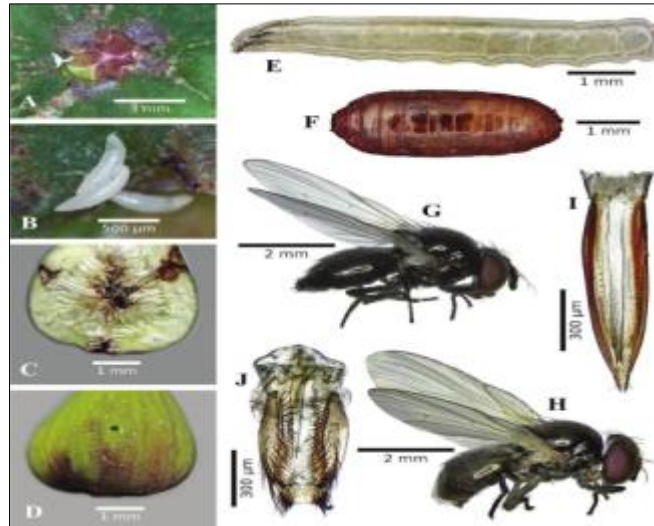
Flies are found on trunks of trees, logs, cut wood, leaves of shrubs, and in grass. Some species are agricultural pests. The polyphagous and oligophagous species of the family Tephritidae (also called fruit flies) and Lonchaeidae are the main pests of horticulture in the neotropical region. Also, in the neotropics, *Neosilba perezii* (Romero & Ruppel, 1973), known as the cassava shoot fly, is a pest of cassava *Manihot esculenta* Crantz (Euphorbiaceae) (Figure 9) [5,6].



**Figure 9** The black fig fly *Silba adipata* McAlpine, 1956 (Diptera: Lonchaeidae) as an emerging pest in Tunisia: preliminary data on geographic distribution, bioecology and damage; (Source: <https://www.sciencedirect.com/science/article/abs/pii/S1226861519301980>)

*Dasiops passifloris* infests the fruit of the corky-stemmed passion flower *P. pallida* in the Americas. Species in the genus *Earomyia* are pests of fir and spruce trees, destroying the seeds and cones. The black fig-fly *Silba adipata* McAlpine, 1956, is a pest of *Lonchaea chorea* (Fabricius, 1781) is synanthropic and may become a nuisance pest (Figures 10 and 11) [5,6].





**Figure 10** A parasitized plant, B eggs, C-D fig parasitized external and internal, E larva, F pupa, G-H adult female and male, I ovipositor and L edeago; (Source: Bautista-Martínez N, Meraz-Álvarez R, Valdez-Carrasco JM, López-Bautista E. Black Fig Fly, *Silba adipata* McAlpine, in Backyards of the State of Mexico. *Southwestern Entomologist*. 2021; 46(3), 793-796.)



**Figure 11** Black fly life stages; (Source: [https://ucanr.edu/sites/news/all\\_uc\\_anr\\_blogs/?blogtag=bff&blogasset=75643](https://ucanr.edu/sites/news/all_uc_anr_blogs/?blogtag=bff&blogasset=75643))

The Lonchaeidae family has approximately 536 species grouped into two subfamilies (Dasiopinae and Lonchaeinae) and eight genera (*Chaetolonchaea* Czerny, 1934; *Dasiops* Rondani, 1856; *Earomyia* Zetterstedt, 1842; *Lamprolonchaea* Bezzi, 1920; *Lonchaea* Fallen, 1820; *Neosilba* McAlpine, 1962; *Protearomyia* McAlpine, 1962 and *Silba* Macquart, 1851). The genus *Setisquamalonchaea*, described by Morge in 1963, is currently considered synonymous with *Silba* (Figures 12 and 13) [5,6].

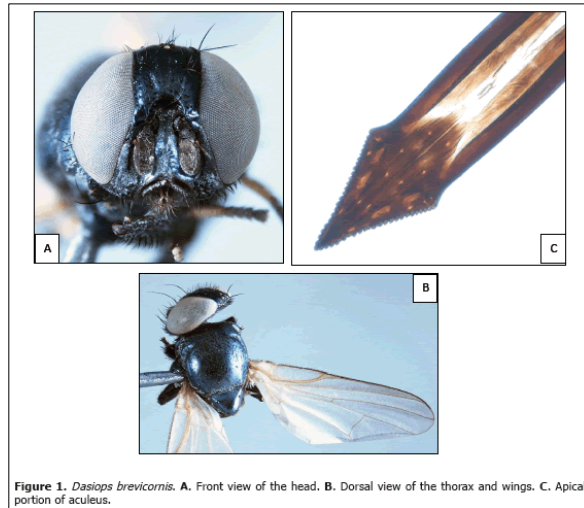


Figure 1. *Dasiops brevicornis*. A. Front view of the head. B. Dorsal view of the thorax and wings. C. Apical portion of aculeus.

Figure 12 Dasiopinae. A frontal of the head, B dorsal view of the thorax, apical portion of aculeus; (Source: [http://www.scielo.org.co/scielo.php?script=sci\\_arttext&pid=S0304-28472012000200012](http://www.scielo.org.co/scielo.php?script=sci_arttext&pid=S0304-28472012000200012))

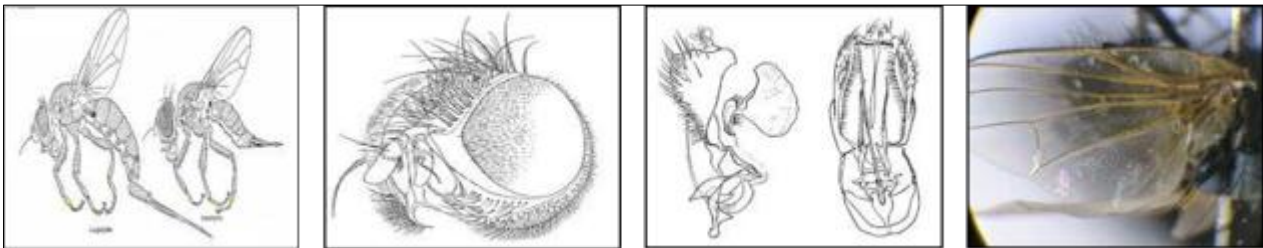


Figure 13 Subfamily Lonchaeinae; (Source:

[https://lonchaeinae.myspecies.info/taxonomy/term/1717/media?type=All&page=3&hashcash=views\\_exposed\\_form](https://lonchaeinae.myspecies.info/taxonomy/term/1717/media?type=All&page=3&hashcash=views_exposed_form))

The genus *Chaetolonchaea* (seven species) occurs in the Nearctic and Palearctic regions. *Dasiops* (128 species) is the second largest genus in the family, being frequently found in the Nearctic region, however there are records of species of the genus in the Palearctic and Neotropical, still occurring in Africa, Asia and Australasia. *Earomyia* (23 species) is restricted to the Nearctic and Palearctic regions (Figure 14) [5,6,7].

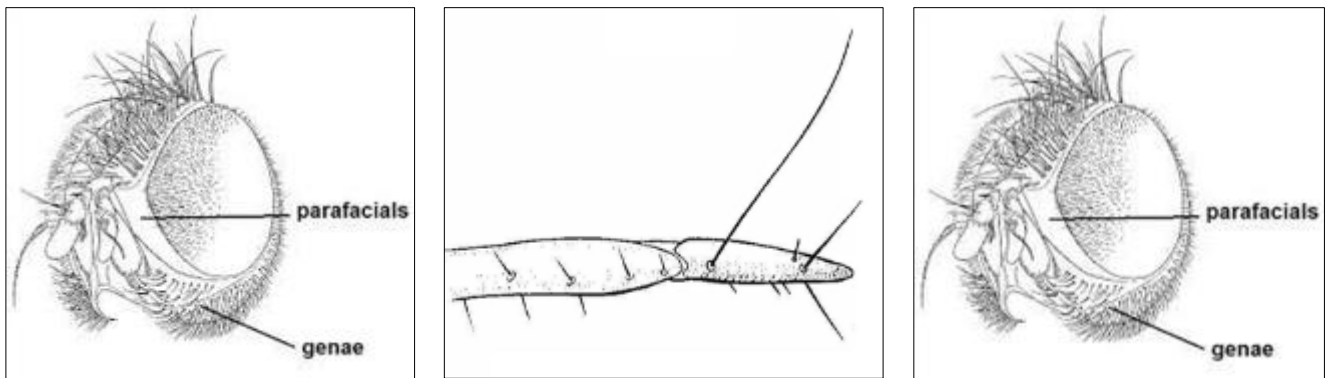
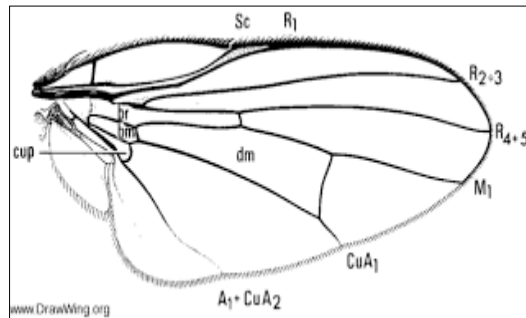


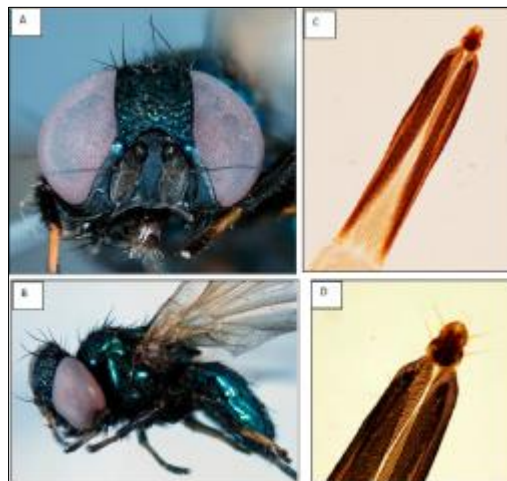
Figure 14 Genus *Chaetolonchaea* head, leg and larvae; (Source:

<https://lonchaeinae.myspecies.info/category/lonchaeidae-classification-and-species-info/lonchaeidae/lonchaeinae/chaetolonchaea>)

While the genus *Lamprolonchaea* brings together about 20 species that occurs mainly in the Eastern region and Australasia, with species known from Africa, Mediterranean and Northern Europe (Holland and Germany) the genre *Lonchaea* contain 216 species, being the genus with the largest number of known species, distributed in boreal forest zones in the Palearctic region and North America, occurring also in the Neotropical region (Figures 15 and 16) [5,6,7, 8].



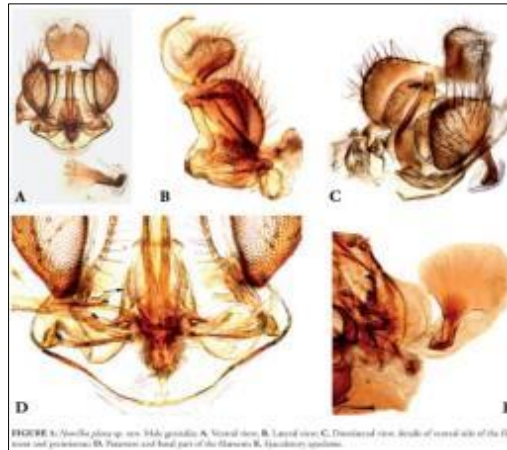
**Figure 15** Wing of male of *Lonchaea* and lunule with setulae, antennal postpedicel usually significantly longer than deep; (Source: <https://lonchaeidae.myspecies.info/key-genera>)



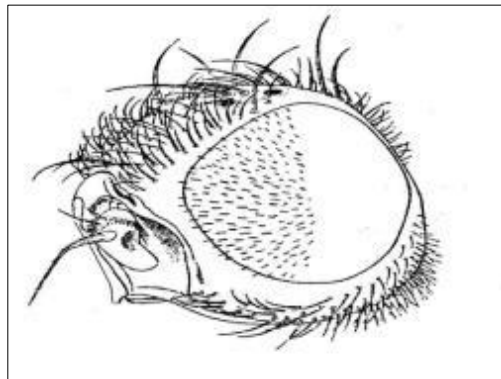
**Figure 16** Genus *Dasiops*; (Source: <https://www.semanticscholar.org/topic/Dasiops/3316333>)

*Neosilba* (40 species) occurs in the Neotropical region, mainly in the Caribbean, Mexico, Colombia and Brazil, with only two species recorded in the Nearctic region. *Protearomyia* (11 species) has representatives in the Nearctic region and Europe. *Silba* (100 species) occurs, mainly in Africa, Eastern region and Australasia, with at least one species known from South America (Figures 17, 18, 19 and 20) [7,8,9].

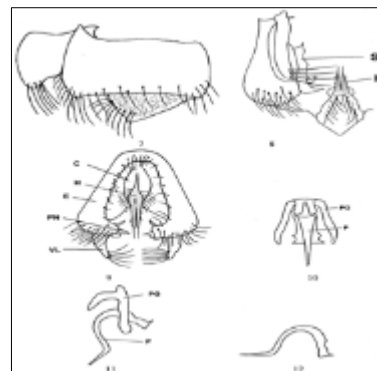
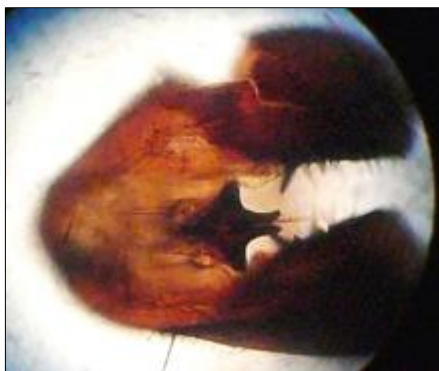




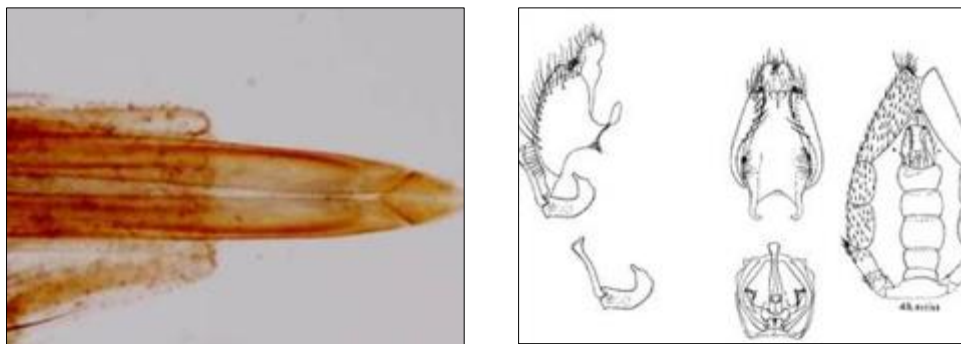
**Figure 17** Genu *Neosilba* could be recognized by the 4 anterior setulae to basal scutellar bristle; circular male terminalia in ventral view and hemispherical in lateral view and larvae; Source: [https://www.agrolink.com.br/problemas/mosca-do-broto\\_3191.html](https://www.agrolink.com.br/problemas/mosca-do-broto_3191.html))



**Figure 18** Genus *Earomyia* head side view and front view; (Source: <https://lonchaeidae.myspecies.info/taxonomy/term/1924>)



**Figure 19** *Protearomyia rameli* sp. nov. Male genitalia. 7. Epandrium and associated structures, lateral view. 8. Same, ventral view (partial). 9. Same, posterior view. 10. Phallus and phallic guide ventral view. 11. Same, lateral view. 12. Phallus lateral view. Abbreviations; C = cercus, E= epandrium, H = hypoproct, P = phallus. PG = phallic guide, PN = prensisetae, S = surstylus, VL = ventral lobe; (Source: [https://www.researchgate.net/figure/FIGURES-7-12-Protearomyia-rameli-spec-nov-Male-genitalia-7-Epandrium-and-associated\\_fig2\\_262696066](https://www.researchgate.net/figure/FIGURES-7-12-Protearomyia-rameli-spec-nov-Male-genitalia-7-Epandrium-and-associated_fig2_262696066))



**Figure 20** Genus *Silba* abdomen and male genitalia; (Source: <https://lonchaeidae.myspecies.info/category/lonchaeidae-classification-and-species-info/lonchaeidae/lonchaeinae/silba/silba-excisa>)

## 2. Material

The method used to prepare this mini review was Marchiori 2021 methodology [10].

## 3. Studies conducted and selected

### 3.1 Study 1

#### 3.1.1. Damage and management of the cassava shoot fly: *Neosilba perezii* (Romero; Ruppel,1973) (Diptera: Lonchaeidae)

The female cassava shoot fly measures approximately 4 mm in length, is black in color with metallic blue reflections and has a robust ovipositor at the end of the abdomen, absent in males. Laying is done at the point of growth of the plant between unexpanded leaves, or in small cavities made with the ovipositor in the tenderest and softest part of the bud. The larvae, when they hatch, pierce the tissue and penetrate the bud, where they feed. The attacked bud may contain more than one larva, which has a whitish color and is worm-like (Figure 21).



**Figure 21** *Neosilba perezii* (Romero; Ruppel,1973) (Diptera: Lonchaeidae); (Source: <https://en.wikipedia.org/wiki/Lonchaeidae>)

The larval stage lasts an average of 23 days, when the larva leaves to pupate in the soil, from where new adult flies emerge. The pupal stage lasts around 26 days, followed by the emergence of the adult, which is more active on hot, sunny days. The complete biological cycle of the pest varies from 40 to 50 days. Despite its wide distribution in Brazil, the high prevalence in cassava crops and the fact that it is the subject of some studies, many aspects of the bioecology of the sprout fly are unknown. In Colombia, attacks were reported when cassava was planted next to banana plantations or close to tree species that produce shade.

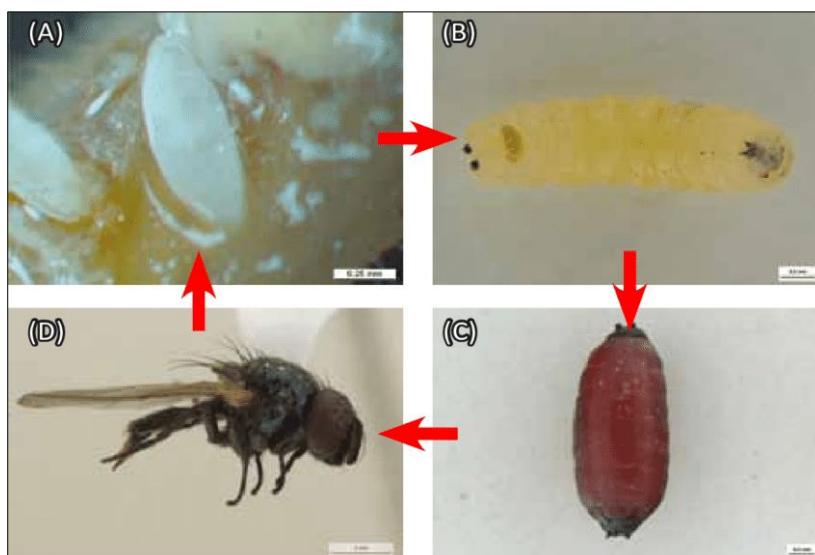
Despite its wide distribution in Brazil, the high prevalence in cassava crops and the fact that it is the subject of some studies, many aspects of the bioecology of the sprout fly are unknown. In Colombia, attacks were reported when cassava

was planted next to banana plantations or close to tree species that produce shade. sprout fly damage on cassava. The larva, when penetrating the plant tissue, promotes the exudation of a yellowish substance (Figures 22, 23 and 24).



**Figure 22** Sprout fly: cassava fly, sapling borer; (Source: <https://www.embrapa.br/busca-de-imagens/-/midia/4998001/pragas-em-mandioca>)

Over time, this substance becomes brown in color, even having a cork appearance when it dries. The larval penetration site can also favor infection by phytopathogenic microorganisms. Attacked end up drying out and dying, causing a break in the apical dominance of the plant, which stimulates the budding of the lateral buds, which, in turn, can also be attacked. When the plants are young, up to three months old, and the pest population is high, they can acquire a broom-like appearance, with short internodes and dwarfism.



**Figure 23** Life cycle of *Neosilba perezii* (Romero; Ruppel,1973): A) egg; B) larva; C) pupa and D) adult; (Source: [https://www.researchgate.net/figure/Figura-2-Ciclo-de-vida-de-N-perezii-A-ovo-B-larva-C-pupa-e-D-adulto\\_fig2\\_314192997](https://www.researchgate.net/figure/Figura-2-Ciclo-de-vida-de-N-perezii-A-ovo-B-larva-C-pupa-e-D-adulto_fig2_314192997))

Despite its wide distribution in Brazil, the high prevalence in cassava crops and the fact that it is the subject of some studies, many aspects of the bioecology of the sprout fly are unknown. In Colombia, attacks were reported when cassava was planted next to banana plantations or close to tree species that produce shade sprout fly damage on cassava.



**Figure 24** Larvae of the cassava shoot fly: *Neosilba perezii* (Romero; Ruppel, 1973) (Diptera: Lonchaeidae); (Source: <https://www.embrapa.br/busca-de-imagens/-/midia/4998001/pragas-em-mandioca>)

As for the natural enemies of the bud fly, observed the presence of *Aganaspis pelleranoi* Brethes, 1924 (Hymenoptera: Figitidae) parasitizing larvae. A new species of braconid, *Phaenocarpa neosilba* Arouca & Penteado-Dias, 2006 (Hymenoptera: Braconidae: Alysiniinae), was also reported parasitizing larvae in the interior of São Paulo [11,12,13].

### 3.2 Study 2

Due to the scarcity of information about the Lonchaeidae family, this manuscript aims to disclose new records of loncheids for the Brazilian Amazon, obtained from wild fruits and cultivated during the activities of the Amazonian Fruit Flies Research Network (Figure 25).



**Figure 25** *Neosilba glaberrima* (Wiedemann, 1830); (Source: <https://www.projectnoah.org/spotting/431256028>)

During the fruit sampling, loncheids were obtained in the states of Acre, Amapá, Pará, Rondônia and Roraima. Thirteen species were identified, of which three are in the process of being description and/or publication (*Neosilba* morphotypes AM1, AP2 and RR2). Amapá is the state with the largest number of loncheid species (11), followed by Roraima (6). *Neosilba glaberrima* (Wiedemann, 1830) and *Neosilba* sp. are the most frequent species. *Neosilba zadolicha* McAlpine & Steyskal, 1982 species of economic expression, was recorded in the states of Amapá, Acre, Amazonas, Pará and Rondônia. In the states of Amazonas and Tocantins, further studies are needed to expand knowledge on the Lonchaeidae (Figure 26).





**Figure 26** Frugivorous fly (Lonchaeidae); (Source: [https://zeoserver.pb.gov.br/gestaounificada/gu/acl\\_users/credentials\\_cookie\\_auth/require\\_login?came\\_from=https%3A//zeoserver.pb.gov.br/gestaounificada/gu/emepa/publicacoes/revista-tca-emepa/edicoes/volume-01-2007/volume-1-numero-2-dezembro-2007/tca05\\_mosca\\_frugivora.pdf](https://zeoserver.pb.gov.br/gestaounificada/gu/acl_users/credentials_cookie_auth/require_login?came_from=https%3A//zeoserver.pb.gov.br/gestaounificada/gu/emepa/publicacoes/revista-tca-emepa/edicoes/volume-01-2007/volume-1-numero-2-dezembro-2007/tca05_mosca_frugivora.pdf))

In the Brazilian Amazon, loncheids have a large number of native hosts and exotic species, many of which are found only in wild environments. However, species plants of the Fabaceae Family are the ones with the highest rates of infestation by loncheids and in some cases, they are considered primary invaders (Figure 27).



**Figure 27** *Neosilba zadolicha* McAlpine & Steyskal, 1982; (Source: <https://twitter.com/hashtag/Neosilba?src=hash>)

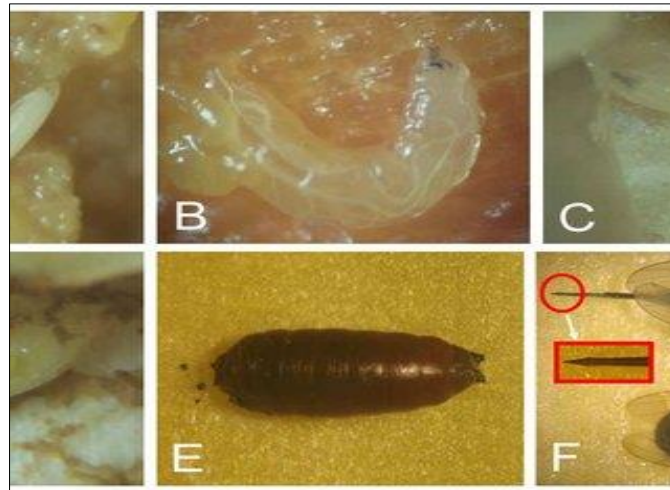
The ingá-cipó *Inga edulis* Martius (Fabaceae) showed the highest richness in loncheid species. Six of the 16 records have already been reported in this plant species. *N. glaberrima* and *N. zadolicha* are predominant and, together with *Anastrepha distincta* Greene, 1934 (Tephritidae), cause the greatest damage to this host.

The species of Lonchaeidae widely distributed in the Amazon region are: *N. glaberrima*, *N. zadolicha* and *Neosilba* sp. They are also the most polyphagous, being associated with 20, 17 and 34 hosts, respectively.

However, they have a preference for Fabaceae specie one must emphasize that *N. zadolicha* and *N. glaberrima* are also the species of this genus with the widest geographic distribution and host diversity in Brazil. The great diversity of botanical families attacked by *N. glaberrima* and *N. zadolicha* implies that they are natural candidates for monitoring their populations, as they also appear in fruits commercials. For example, *N. zadolicha* is an important pest of *Citrus reticulata* Blanco (Rutaceae) in the State of Paraíba. In the present chapter, this species was recorded in *Citrus sinensis* L. (orange), together with *Neosilba bella* Strikis & Prado, 2008, but it occurred in a low population density, not having been possible to characterize it as a pest in oranges in the region.

*Dasiops inedulis* Steyskal, 1982 and *Neosilba* morphotypes (AP2, AM1, RR2) have only a single now host. *Neosilba peltae* McAlpine & Steyskal, 1982 and *Neosilba* morphotype AP2 were obtained from floral buds of *Passiflora edulis* Sims (Passifloraceae) and *Eschweilera odor* (Eyma) (Lecythidaceae), respectively. These are the first records of *Neosilba* species in flower buds (Figure 28)





**Figure 28** Life stages of *Dasiops* sp. A. Eggs; B. First instar larvae; C. Second instar larvae; D. Third instar larvae; E. Pupa; F. Adults. Up female. Note lance-shaped ovipositor (see circle and red box). Down male; (Source: Photos by A. Delgado)

*Dasiops inedulis* is the only species of the genus, assigned to the Amazon, which has a known host. It was obtained from passion fruit flower buds (*P. edulis*), collected in Pará. Second these authors, in some municipalities of the State, the losses caused by species of Lonchaeidae to the passion fruit crops can reach 100%, which reveals the damage potential of these insects, being *D. inedulis* the most commonly observed species [14,15,16,17].

### 3.3 Study 3

#### 3.3.1. Pest alert – black fig fly

**Diptera: Lonchaeidae:** *Silba adipata* McAlpine, 1956.

*Invasive fig pest recently discovered in Southern California.*

#### Overview

Fig growers need to be aware of the black fig fly (BFF), an invasive insect that was recently discovered infesting figs in multiple counties in southern California. The BFF has been reported in the following counties: Los Angeles, Orange, Riverside, Santa Barbara, San Bernardino, San Diego and Ventura. Movement of figs from these counties is strongly discouraged to prevent any artificial spread of BFF to other areas of the state. University of California Cooperative Extension personnel are currently working with the California Department of Food and Agriculture to further delineate populations, as well as develop improved monitoring and management strategies.

#### Life Cycle

The BFF only attacks figs and prefers unripe and unfertilized fruits. The adult female deposits eggs into the fruit through the ostiole (Figure 29).



**Figure 29** Attacks figs and prefers unripe and unfertilized fruits; (Source: [https://ucanr.edu/sites/news/all\\_uc\\_anr\\_blogs/?blogtag=bff&blogasset=75643](https://ucanr.edu/sites/news/all_uc_anr_blogs/?blogtag=bff&blogasset=75643))

larvae subsequently feed internally on the fruit (Figure 30).



**Figure 30** Larvae subsequently feed internally on the fruit; (Source: [https://ucanr.edu/sites/news/all\\_uc\\_anr\\_blogs/?blogtag=bff&blogasset=75643](https://ucanr.edu/sites/news/all_uc_anr_blogs/?blogtag=bff&blogasset=75643))

This feeding damages the fruit and causes it to prematurely drop from the tree. Upon completion of development, the BFF larvae make their way out of the fruit (Figure 31).



**Figure 31** BFF larvae make their way out of the fruit; (Source: [https://ucanr.edu/sites/news/all\\_uc\\_anr\\_blogs/?blogtag=bff&blogasset=75643](https://ucanr.edu/sites/news/all_uc_anr_blogs/?blogtag=bff&blogasset=75643))

drop to the soil and pupate. In some cases, BFF pupae have been recovered inside of fruits as well (Figure 32).



**Figure 32** Pupae have been recovered inside of fruits as well; (Source: [https://ucanr.edu/sites/news/all\\_uc\\_anr\\_blogs/?blogtag=bff&blogasset=75643](https://ucanr.edu/sites/news/all_uc_anr_blogs/?blogtag=bff&blogasset=75643))

Black fig flies overwinter as pupae in the soil. In the spring they emerge, mate and begin to attack figs. The BFF can have between 4 to 6 generations per year (more in warmer areas, fewer in cooler areas).

## Management

Biological control appears to be limited and there are currently no chemical controls registered specifically for this pest on California figs. As such, orchard sanitation is critical, and growers should make sure to remove and destroy any BFF-infested fruits. Larvae in infested fruit are protected from pesticide sprays and there are no effective soil drenches for pupal control. Insecticidal baits may be useful for control of adult (Figure 33) [18].



**Figure 33** McPhail-type traps; (Source: [https://ucanr.edu/sites/news/all\\_uc\\_anr\\_blogs/?blogtag=bff&blogasset=75643](https://ucanr.edu/sites/news/all_uc_anr_blogs/?blogtag=bff&blogasset=75643))

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## 4. Conclusion

Flies are found on trunks of trees, logs, cut wood, leaves of shrubs, and in grass. Some species are agricultural pests. The polyphagous and oligophagous species of the family Tephritidae (also called fruit flies) and Lonchaeidae are the main pests of horticulture in the neotropical region. Also, in the neotropics, *Neosilba perezii* (Romero & Ruppel, 1973), known as the cassava shoot fly, is a pest of cassava *Manihot esculenta* Crantz (Euphorbiaceae).

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