

# NEW DATA ON *Philornis seguyi* GARCIA (1952) (DIPTERA, MUSCIDAE)

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(With 13 figures)

## ABSTRACT

*Philornis* Meinert is a very interesting Muscidae (Diptera) genus whose larvae are associated with a wide range of bird species. The existing description of *Philornis seguyi* Garcia (1952), which was reported in Argentina, so far involves only the female. During the 2000-2002 breeding seasons, we collected *Philornis* flies from six bird species in Buenos Aires province, Argentina. All the flies were identified as *P. seguyi*. Based on this material, we describe the larva, puparium, adult male, and male and female terminalia. All the host associations presented here – *Mimus saturninus* (Mimidae), *Troglodytes aedon* (Troglodytidae), *Pitangus sulfuratus* (Tyrannidae), *Pyrocephalus rubinus* (Tyrannidae), *Satrapa icterophrys* (Tyrannidae) and *Molothrus bonariensis* (Icteridae) in nests of *M. saturninus* and *Troglodytes aedon* – are new for *P. seguyi*. We also present some data on the biology of the species.

**Keywords:** Muscidae, botflies, *Philornis seguyi*, parasitism, birds.

## RESUMO

### Novos dados sobre *Philornis seguyi* Garcia (1952) (Diptera, Muscidae)

*Philornis* Meinert é um gênero muito interessante de Muscidae (Diptera), com larvas associadas a várias espécies de aves. *Philornis seguyi* Garcia (1952) foi descrita da Argentina e, até o momento, apenas a descrição da fêmea e a sua associação com uma espécie de aves eram conhecidas. Durante as estações de procriação nos anos de 2000-2002, exemplares de *Philornis* foram coletados em seis espécies de aves na província de Buenos Aires, Argentina. Todos os exemplares foram identificados como *P. seguyi*. O material coletado ensejou a descrição da larva, pupário, macho adulto, e terminália do macho e da fêmea. Todas as associações com hospedeiros assinaladas - *Mimus saturninus* (Mimidae), *Troglodytes aedon* (Troglodytidae), *Pitangus sulfuratus* (Tyrannidae), *Pyrocephalus rubinus* (Tyrannidae), *Satrapa icterophrys* (Tyrannidae), e *Molothrus bonariensis* (Icteridae) em ninhos de *M. saturninus* e *Troglodytes aedon*, são novas para *P. seguyi*. Dados sobre a biologia desta espécie também são apresentados.

**Palavras-chave:** Muscidae, *Philornis*, *Philornis seguyi*, parasitismo, aves.

## INTRODUCTION

*Philornis* Meinert is a very interesting muscid genus whose larvae are present as parasites on birds in distinct forms of associations (from scavengers in the nests to subcutaneous bloodfeeders). The genus

is mainly Neotropical and comprises 50 known species (2 occurring in the southern United States). Only four of these species are known to live freely in nests: *P. aitkeni* Dodge and *P. rufoscutellaris* Couri, which have coprophagous habits, *P. downsi* Dodge & Aitken and *P. falsifica* Dodge & Aitken,

which are semi-hematophagous. All the other species with known larval habits are sub-cutaneous bloodfeeders.

The existing data on the taxonomy of *Philornis*, including a key to species identification, a brief diagnosis, and a discussion on their relations with birds, including a list of parasites and hosts, were published by Couri (1999) and Teixeira (1999). More recently, Carvalho & Couri (2002) reviewed the taxonomy of the Muscidae of the Neotropical region and presented a key to the species, modified from Couri (1999).

*Philornis seguyi* was described by Garcia (1952), from Argentina, based on one adult female. Since the publication of that original description, only catalogues (Pont, 1972 and Carvalho *et al.*, 1993) or keys (Couri, 1999 and Carvalho & Couri, 2002) have made references to this species, and no biological data was heretofore available.

A few other *Philornis* species have been recorded in Argentina: *P. angustifrons* (Jeannicke); *P. blanchardi* Garcia, *P. torquans* Nielsen, *P. pici* (Macquart); *P. umanai* Garcia, and some other unidentified species. Table 1 summarizes the

species, localities and hosts of the *Philornis* species found in Argentina.

The aim of this study is to describe the larva, puparium, and male and female terminalia, and to provide some data on the biology and host associations of *P. seguyi*.

## MATERIAL AND METHODS

FLR and JCR collected the material used in this study during the 2000-2002 breeding seasons of the birds (from mid-September to mid-February) in Magdalena, Buenos Aires Province, Argentina (35° 08' S, 57° 25' W). Botflies were collected from seven nests of *Mimus saturninus*, two nests of *Troglodytes aedon*, one nest of *Pitangus sulphuratus*, one nest of *Pyrocephalus rubinus* and one nest of *Satrapa icterophrys*. Three of the *M. saturninus* nests (nests 1-3) contained only *Mimus saturninus* chicks (Fig. 1), while another (nest 4) contained only chicks of the brood parasite *Molothrus bonariensis* (Fig. 2), and in the other three nests (nest 5-7) contained chicks of both species. From the chicks in *M. saturninus* nests we collected 128 botflies (22 from one chick in

TABLE 1  
Localities and hosts of *Philornis* Meinert species recorded in Argentina.

<i>Philornis</i> species	Locality in Argentina	Hosts (references)
<i>P. angustifrons</i>	Tucumán (Monte Bello)	<i>Gallus gallus</i> (1)
<i>P. blanchardi</i>	Corrientes	Not identified (1)
<i>P. pici</i>	Tucumán (Villa Luján)	<i>Sporophila sp</i> (1)
	Córdoba (Monte Cristo)	<i>Pseudoseisura lophotes</i> , <i>Anumbius annumbi</i> (2)
	Santa Fé	Not identified (1)
<i>P. seguyi</i>	Córdoba (Monte Cristo)	<i>Pseudoseisura lophotes</i> , <i>Anumbius annumbi</i> (2)
	Misiones	Not identified (1)
<i>P. torquans</i>	Córdoba (Bell Ville)	<i>Mimus saturninus</i> (1)
<i>P. umanai</i>	Corrientes	Not identified (1)
<i>Philornis</i> sp.	Burruyacu	Not identified (1)
	Corrientes	<i>Synallaxis spixi</i> (1)
	Buenos Aires (Lobos)	<i>Molothrus badius</i> , <i>M. rufiaxillaris</i> , <i>M. bonariensis</i> , <i>Polioptila dumicola</i> , <i>Anumbius annumbi</i> , <i>Mimus saturninus</i> (3)
	Buenos Aires (Magdalena)	<i>Phacellodomus sibilatrix</i> , <i>Anumbius annumbi</i> , <i>Satrapa icterophrys</i> , <i>Troglodytes aedon</i> , <i>Mimus saturninus</i> , <i>Sicalis flaveola</i> , <i>Zonotrichia capensis</i> (4)

1. García (1952); 2. Nores (1995); 3. Fraga (1984); 4. Mason (1985).



**Fig. 1** — Nestlings of *Mimus saturninus* infested with *Philornis seguyi* larvae.



**Fig. 2** — Nestlings of *Molothrus bonariensis* infested with *Philornis seguyi* larvae.

nest 1, two from two chicks in nest 2, 29 from three chicks in nest 3, 21 from two chicks in nest 4, 22 from three chicks in nest 5, 16 from 4 chicks in nest 6, and 16 from three chicks in nest 7). In one of the *T. aedon* nests, we took two botflies from one *M. bonariensis* chick while in the other nest we collected 9 botflies from one *T. aedon* chick. Finally, in the nest of *Pitangus sulphuratus* we collected 4 botflies from two chicks, in the nest of *Pyrocephalus rubinus*, 9 botflies from three chicks and in the nest of *Satrapa icterophrys*, 19 botflies from three chicks.

Botflies were collected both from individual chicks and from whole infested nests. In the former case, the larvae were removed from chicks that had been infected 3-5 days earlier, by grasping each larva by its caudal spiracle with a small forceps and removing it through the dermal opening in the chick's skin. The larvae removed from each chick were placed in a cylindrical plastic container (10 cm in height, 8 cm in diameter) with 1-2 cm of sand on the bottom and some nest lining on the top. The container was covered with tulle and kept at room temperature. In the latter case, botflies

were collected from infested nests that had been depredated, abandoned or that contained fledged chicks. These nests were removed and placed in 30 cm diameter funnels wrapped in tulle. The funnels containing nests were allowed to stand at room temperature for three weeks, and which the emerged flies were collected.

MSC identified 96 adults (65 from 7 *M. saturninus* nests, 11 from two *T. aedon* nests, three from one *P. sulfuratus* nest, 6 from one *P. rubinus* nest and 11 from one *S. icterophrys* nest. All individuals were identified as *P. seguyi* Garcia and were deposited in the Museu Nacional (Rio de Janeiro, Brazil) and Museo Nacional de Ciencias Naturales Bernardino Rivadavia (Buenos Aires, Argentina) collections.

## RESULTS AND DISCUSSION

### Descriptions

Larvae (Fig. 3): distal surface of all segments with spines, especially dorsal ones; cephalofaringeal skeleton as in Fig. 4; prospiracle with 4 short lobes (Fig. 5); posterior spiracular slits sinuated.

Puparium (Fig. 6): oval, dark brown; caudal segment concave in the perispiracular area, with rugose margins. All segments spiculate. Anal "C" shaped spiracles (Fig. 7).

Adult male (described for the first time):

General coloration: frontal vitta reddish brown, post-pronotum yellowish, antenna yellow, arista yellow at base and brown at apex; cheeks yellow-haired; palpi yellow; mesonotum brown with grayish pollinosity and with four brown vittae; calypter slightly smoke brown; halter yellow; wings hyaline, slightly brown and with a faint brown spot at the r-m cross vein; tegula and basicosta yellow; legs yellow with some gray pollinosity; abdomen brown with grayish pollinosity, tergites 1 + 2 yellow laterally, tergite 3 yellow laterally, at basal longitudinal half.

Length: body 7.5-9 mm; wing, 8-9 mm.

Head: width of frons at the level of the anterior ocelli, about 0.08-0.12 of head width. Inner and outer vertical bristles and ocellar setae medium sized. Frontal row with 12-13 bristles. Flagellomere about twice the length of pedicel; arista plumose with long plume. Palpi slightly flat.

Thorax: acrostichals 0:1; dorsocentrals 2:4; post-pronotals 3; intra-alars 1:1; supra-alars 3;

post-alars 2. Notopleuron with 2 similar bristles; anepisternum with a row of 6-7 bristles; katepisternals 1:2, the posterior upper one stronger; anepimeron ciliated. Posterior spiracle haired at anterior margin. Lower calypter about twice the length of the upper one. Scutellum with a long basal and apical pair of bristles; two pairs of marginals and a short and fine preapical one. Wings with bare veins. Fore femur with a complete anterodorsal, dorsal and anteroventral row of bristles; fore tibia on dorsal surface with 3-4 short bristles on middle third; anteroventral and anterodorsal surfaces with an apical bristle; claws and pulvilli large. Mid-femur with 2 short anterior bristles at middle; posterior surface with 2 pre-apical bristles; mid-tibia with 2-3 posterior bristles at middle third; anteroventral, ventral and posteroventral surfaces with a strong apical bristle. Hind femur with a complete row of bristles at anterodorsal and anteroventral surfaces, stronger on apical half; hind tibia at the anterodorsal surface with 3-4 bristles at middle third, anteroventral surface with 3-4 fine short bristles; dorsal surface with a pre-apical bristle; ventral surface with an apical bristle.

Abdomen: tergite 5 with scattered discal bristles; sternite 5 with a slight curvature on posterior margin and with many bristles (Fig. 8).

Terminalia. Cercal plate with a deep anterior incision, surtsili long with round apex (Figs. 9-10). Aedeagus as in Fig. 11.

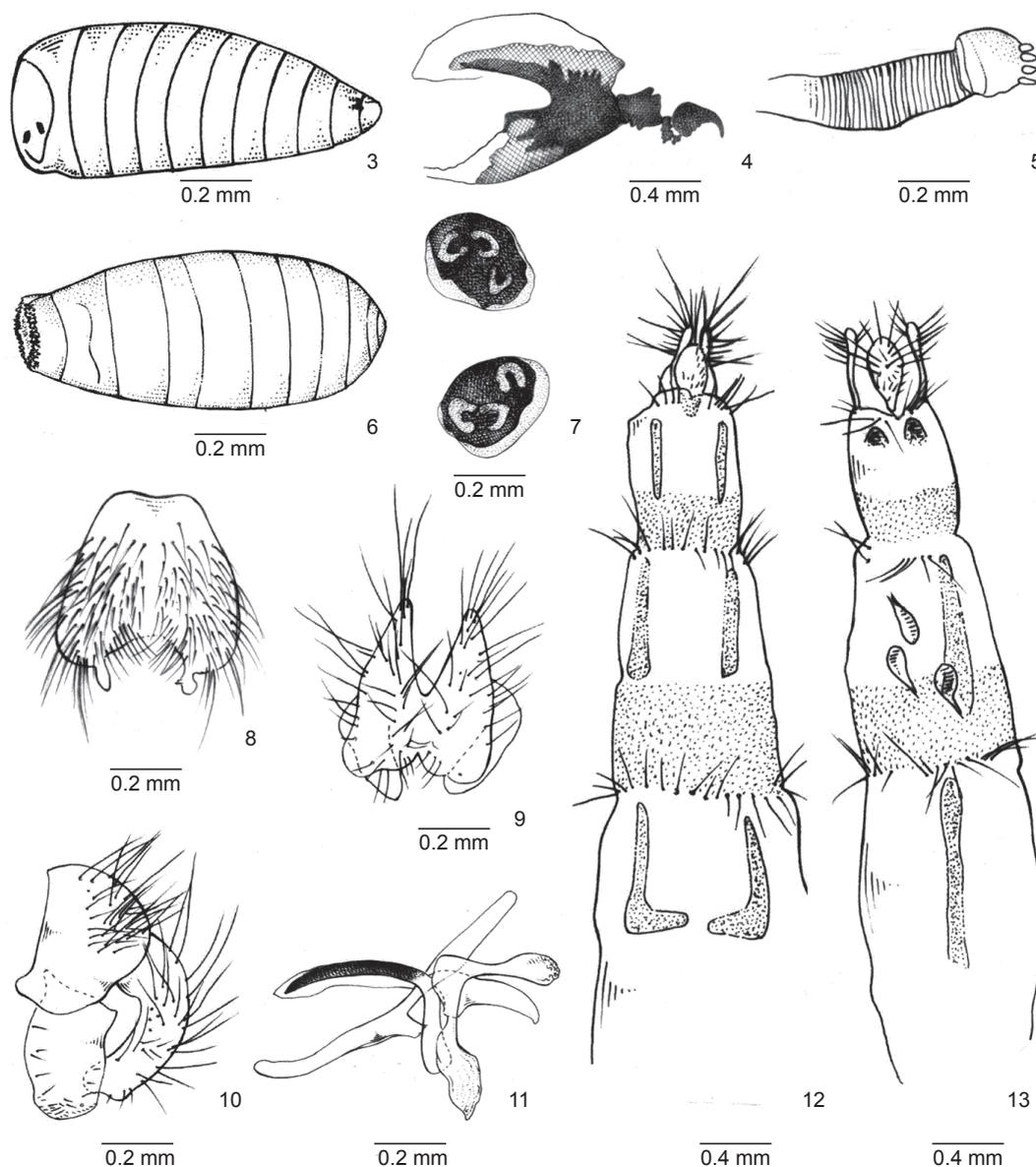
Female terminalia: Ovipositor long, with microtrichia; cerci long and fine (Figs. 12-14). Spermatheca pear-shaped (Fig. 13).

Material examined: Argentina, Buenos Aires, Magdalena, 35° 08', 57° 25' W, Rabuffetti, F. L. & Reboresda, J. C. col, Ex nest of *Mimus saturninus* with nestlings of *M. saturninus* and *Molothrus bonariensis*: 18 males, 10 females; *M. saturninus* only: 20 males, 4 females; *Molothrus bonariensis* only: 6 males, 7 females; *Pitangus sulphuratus*: 2 males, 1 female; *Satrpa icterophrys*: 10 males, 1 female, 3 pupae; *Pyrocephalus rubinus*: 6 males; *Troglodytes aedon*: 4 males, 7 females, four larvae, one pupa.

Geographical distribution: Argentina.

### Biology of the species

Although the majority of *Philornis* flies with known larval habits are subcutaneous hematophagous, this habit is known only for 18 species. These



**Figs. 3-13** — *Philornis seguyi*. 3) larva of third instar, lateral view; 4) larva of third instar, cephalopharyngeal skeleton; 5) larva of third instar, anterior spiracle; 6) puparium; 7) puparium, posterior spiracle; 8) sternite 5 (male); 9) cercal plate and surstyli (dorsal view, male); 10) cercal plate and surstylus (lateral view, male); 11) aedeagus complex (lateral view, male); 12) ovipositor (dorsal view, female); and 13) ovipositor (ventral view, female).

species do not show specificity, parasitizing several host species. Table 2 shows the species recorded as *P. seguyi* hosts, and the other *Philornis* species recorded so far for the same hosts.

Most of the data presented in this section were collected from *M. saturninus* nests during a study on the factors that affect the reproductive

success of this species (Rafuffetti & Reboreda unpub. data). The percentage of *M. saturninus* nests infested with *P. seguyi* (prevalence of parasitism) was on average 37.5 (27-72 nests). The prevalence of parasitism increased with time of breeding, reaching values of close to 100% at the end of *M. saturninus* breeding season (mid-January to early

**TABLE 2**  
**Hosts recorded for *Philornis seguyi* Garcia and other species recorded for the same hosts.**

<b>Icteridae</b>	
<i>Molothrus bonariensis</i>	<i>P. angustifrons</i>
	<i>P. downsi</i>
	<i>P. gagei</i>
	<i>P. glaucinis</i>
	<i>P. masoni</i>
	<i>P. obscura</i>
	<i>P. pici</i>
	<i>P. seguyi</i> (NEW RECORD)
	<i>P. trinitensis</i>
<b>Troglodytidae</b>	
<i>Troglodytes aedon</i>	<i>P. carinatus</i> (Young 1993)
	<i>P. seguyi</i> (NEW RECORD)
<b>Mimidae</b>	
<i>Mimus saturninus</i>	<i>P. glaucinis</i>
	<i>P. seguyi</i> (NEW RECORD)
	<i>P. torquans</i>
<b>Tyraniidae</b>	
<i>Pitangus sulphuratus</i>	<i>P. angustifrons</i>
	<i>P. deceptiva</i>
	<i>P. downsi</i>
	<i>P. sanguinis</i>
	<i>P. seguyi</i> (NEW RECORD)
	<i>P. torquans</i>
	<i>P. trinitensis</i>
<i>Satrapa icterophrys</i> *	<i>P. seguyi</i> (NEW RECORD)
<i>Pyrocephalus rubinis</i> *	<i>P. seguyi</i> (NEW RECORD)

\*First records as *Philornis* hosts.

February). The first records of a *M. saturninus* chick infested with *P. seguyi* were on November 11, 2000 and on November 25, 2001. In both years, the last record of infested chicks was in the second week of February.

We observed nestlings infested with botflies as early as 24 h after hatching of the first chick. Larvae on recently infested chicks (24-48 hs.) had caudal spiracles of 1-2 mm in diameter. In some cases, the area around the larva spiracle showed slight internal bleeding and edema. On average, the time elapsed between the hatching of the first chick and infestation of the nest was  $4.2 \pm 0.63$  days ( $n = 19$  nests, range 1 to 8 days).

In every *M. saturninus* nest parasitized with botflies, all the chicks were infested. The number of larvae per chick (intensity of parasitism) was on average  $21.4 \pm 4.3$  (range 1-79,  $n = 23$  nests). In most of the infested chicks, the intensity of parasitism increased during the first three or four days after we detected the first larvae. In some cases, this increase was associated with the death of the nestmates. We estimated that the larvae lived on *M. saturninus* chicks for approximately five to seven days. The puparia were found glued with white frothy material at the bottom of the nest. The stage from puparia to the emergence of the adult fly lasted approximately 14 to 16 days.

With regard to the other hosts, we found botflies infesting two out of nine *T. aedon* nests, one out of five *P. rubinus* nests, one out of one *S. icterophrys* nest and one out of three *P. sulphuratus* nests.

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## REFERENCES

- CARVALHO, C. J. B., COURI, M. S., PONT, A. C., PAMPLONA, D. & LOPES, S. M., 1993, Part II. Muscidae, 201 pp. In: CARVALHO, C. J. B. (ed.), *A Catalogue of the Fanniidae and Muscidae (Diptera) of the Neotropical region.*, Sociedade Brasileira de Entomologia, São Paulo.
- CARVALHO, C. J. B. & COURI, M. S., 2002, Part I. Basal Groups, pp. 17-132. In: CARVALHO, C. J. B. (ed), *Muscidae (Diptera) of the Neotropical Region: Taxonomy*, 287 p., Editora Universidade Federal do Paraná, Curitiba.
- COURI, M. S., 1999, Myiasis caused by obligatory parasites. Ia. *Philornis* Meinert (Muscidae): 51-70 pp. In: GUIMARÃES, J. H. & PAPAVERO, N., *Myiasis in man and animals in the Neotropical Region. Bibliographic database*, 308 p., Editora Pleaide, FAPESP, São Paulo.
- FRAGA, R. M., 1984, Bay-winged cowbirds *Molothrus badius* remove ectoparasites from their brood parasites the screaming cowbirds *Molothrus rufoaxillaris*. *Biotropica* 16: 223-226.
- GARCIA, P. C., 1952, Las especies argentinas de género *Philornis* Mein., con descripción de especies nuevas (Diptera, Anthom.). *Revta Soc. Ent. argent.* 15: 277-293.
- MASON, P., 1985, The nesting biology of some passerines of Buenos Aires, Argentina. *Ornithological monographs* 36: 954-972.
- NORES, A. I., 1995, Botfly ectoparasitism of brown cacholote and the firewood-gatherer. *Wilson Bulletin* 107: 734-738.
- PONT, A.C., 1972, Family Muscidae. In: *A Catalogue of the Diptera of the Americas South of the United States*, 97, 111 p. Museu de Zoologia, Universidade de São Paulo, São Paulo.
- TEIXEIRA, D. M., 1999, Myiasis caused by obligatory parasites. Ib. General observations on the biology of the species of the genus *Philornis* Meinert, 1890 (Diptera, Muscidae). In: GUIMARÃES, J. H. & PAPAVERO, N., *Myiasis in man and animals in the Neotropical Region. Bibliographic database*, 308 p., Editora Pleaide, FAPESP, São Paulo.
- YOUNG B. E., 1993, Effects of the parasitic botfly *Philornis carinatus* on nestling house wrens, *Troglodytes aedon*, in Costa Rica. *Oecologia* 93: 256-262.