

***Gnathopleura quadridentata* Wharton, 1986  
(Hymenoptera; Braconidae; Alysiniinae) and their hosts  
collected in different substrates in Caldas Novas, Goiás**

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(With 1 figure)

The Diptera are an excellent model for studying synanthropy, not only because their ecological importance, but also because their medical-veterinary characteristics as vectors for etiological agents such as ameba cysts, helminth eggs, pathogenic enterobacteria, viruses and fungi (Greenberg, 1971; D'Almeida, 1992).

It is known that fly control using insecticides usually selects resistant populations. Mendes and Linhares (1993) stated that new methods for fly control are needed, and one possible method for controlling these insects is the use of natural enemies such as parasitoids. Such agents may be responsible for reducing the sizes of synanthropic fly populations in nature.

The Hymenoptera are one of the largest orders of insects and one of the most important groups of parasitoids that develop in or on immature forms (egg, larvae, pupae, or adults) of other arthropods. Approximately 50% of all Hymenoptera are parasitoids, and they are of considerable importance as control agents for insect pests (Askew, 1971).

The Braconidae are one of the largest Hymenoptera families, with approximately 40,000 species (Sharkey, 1993), divided into 45 subfamilies (Achterberg, 1992). The most common hosts of braconids are the larvae of Lepidoptera, Coleoptera and Diptera.

The Alysiniinae are a large subfamily of Braconidae containing over 1,000 described species worldwide. All alysiines are koinobiont endoparasitoids of cyclorhaphous Diptera (Wharton, 1984). They larviposit or oviposit on the host, the larvae penetrate into the host and the adults emerge from the puparia.

The species definition of *Gnathopleura quadridentata* Wharton (Hymenoptera; Braconidae; Alysiniinae) is based on the following characteristics: mandible border between teeth 1 and 2 swollen to form a fourth tooth; parallel vein arising near upper edge of brachial cell; post-nervellus well developed, extending more than halfway towards the wing margin as a pigmented vein (Penteado-Dias, 1995); and abdomen entirely black in both sexes, with only petiole and occasionally terga 2 + 3 orange (Figure 1).

The objective of this note is to report on the occurrence of the parasitoid of *G. quadridentata* in different substrates in the Park of the mountain range of Caldas Novas, State of Goiás.

The study was conducted in a wooded area of the Park of the mountain range of Caldas Novas State of Goiás, located in the vicinity of the city of Caldas Novas, State of Goiás (18° 25' S and 49° 13' W), Brazil. The flies were attracted to traps consisting of dark-colored cylindrical metal cans, measuring 19 cm height and 9 cm diameter, with two openings measuring 30 mm in width, located in the lower third of the can, to allow flies to enter. A more detailed description of the traps is given by Ferreira (1978). Human feces, fish, bovine liver, and chicken served as bait for attracting the flies. Sixteen traps were used, spaced two meters apart. These were hung on trees at a height of one meter above the ground. Four traps were utilized for each type of bait. The collected insects were taken to the laboratory, sacrificed using ethyl ether and kept in 70% alcohol for further identification. The baits were removed from the traps and placed in plastic containers with a layer of sand to form the substratum for the larvae to pupate in. The sand was then sifted to collect the pupae. These were then placed individually in gelatin capsules (00 number) and kept until the emergence of the flies or their parasitoids.

The specimens were stored in the Biology Laboratory of Instituto Luterano de Ensino Superior de Itumbiara, GO, Brazil. The parasitism percentage was calculated using the following formula:  $P = (n^\circ \text{ of parasitized pupae} / \text{total pupae}) \times 100$ . The host preference of the parasitoid *G. quadridentata* was evaluated using the chi-squared statistical test.

Between August 2003 and July 2004, 958 puparia of three species of Diptera were collected. From these, 104 specimens of the parasitoid *G. quadridentata* emerged (Table 1). The percentage of parasitism obtained was 10.9%.

*Gnathopleura quadridentata* shows preference for calyptrate muscoid flies, especially sarcophagids (Shenefelt, 1974). This parasitoid is solitary and emerges from the puparium of the host. Species of *Gnathopleura*

**Table 1.** *Gnathopleura quadridentata* and its hosts, collected from various substrates in Caldas Novas, State of Goiás, between August 2003 and July 2004.

Substrate/Diptera species	Frequency	Specie	Frequency	N° of parasitized pupae	Percentage (%)
<b>Human feces</b>					
<i>Oxysarcodexia thornax</i>	169	<i>G. quadridentata</i>	25	25	14.8
<i>Sarcodexia lambens</i>	50	<i>G. quadridentata</i>	28	28	56.0
<b>Bovine liver</b>					
<i>Oxysarcodexia thornax</i>	166	<i>G. quadridentata</i>	1	1	0.6
<i>Peckia chrysostoma</i>	99	<i>G. quadridentata</i>	4	4	4.0
<b>Chicken</b>					
<i>Oxysarcodexia thornax</i>	101	<i>G. quadridentata</i>	17	17	16.8
<i>Peckia chrysostoma</i>	160	<i>G. quadridentata</i>	20	20	12.5
<b>Fish</b>					
<i>Oxysarcodexia thornax</i>	213	<i>G. quadridentata</i>	9	9	4.2
Total	958		104	104	10.9

**Figure 1.** General aspect of *Gnathopleura quadridentata*.

have been released for biological control of sarcophagids and muscids (Wharton, 1979).

The greatest numbers of parasitoids (28 specimens) and the greatest frequency of parasitism (56.0%) were found in bovine liver, in the host *Sarcodexia lambens* (Diptera; Sarcophagidae). This was probably due to variations in quality and availability of food resources. *Sarcodexia lambens* is widely distributed in the Americas, and is found from the South of the United States of America to Argentina (Lopes and Leite, 1989). This species colonizes organic material of animal nature that is used as bait, such as human feces, bovine faces and bovine liver (Rocha and Mendes, 1996; Marchiori et al., 2000).

The species with the second greatest frequency of parasitism was *Oxysarcodexia thornax* (Walker) (Diptera: Sarcophagidae), with a rate of 16.8%. This species was also collected from all the bait types utilized. This was

possibly because of its capacity to colonize many different types of substrate of animal origin. *Oxysarcodexia thornax* has also been collected from bait in Itumbiara, State of Goiás: 23 specimens from human feces, 31 from fish and 46 from bovine kidneys. Previously, this species had been collected from the same municipality, from bovine liver and feces (Marchiori, 2000; Marchiori et al., 2000).

*Peckia chrysostoma* (Wiedemann) (Diptera: Sarcophagidae) is a widely distributed neotropical synanthropic species (Ferraz, 1995). In Rio de Janeiro, this species has shown preference for environments inhabited by humans, and it is primarily attracted to raw fish (D'Almeida, 1984).

*Gnathopleura quadridentata* has presented preference for *S. lambens* in human feces; for *P. chrysostoma* in bovine liver and chicken; and for *O. thornax* in fish ( $X^2 = 69.26$ ; GL: 6;  $p < 0.05$ ).

The use of chemical substances to control this fly may result in high production costs. Moreover, this may render fruit unfit for exportation, cause damage to the environment and harm human health as well. Thus, searching for effective natural enemies may provide a viable alternative method for containing this pest through a long-term control program.

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