Traps for specimen collection of insect in Brazil

Carlos Henrique Marchiori

1 Instituto Federal Goiano

Abstract

The objective of this study was to study the collection techniques and capture insects of Diptera and Hymenoptera Orders in Goiás. It presents the most effective methods in capture of Diptera and Hymenoptera, their advantages, disadvantages and suggests standardization for each method: sampling with: Malaise traps, Moericke traps, containers metallic traps and pitfall traps. This work is concluded that these four types of traps are important to collect insects of Diptera and Hymenoptera Orders.

Key Word: flies, parasitoids, sampling, Brazil

Introduction

One of the best ways to study insects is to take excursions to observe their habits and collect them. Handling and collection reveal information through direct observation, which is often not recorded in scientific books or articles (RAFAEL, 2002). All collection techniques tend to be more or less selective. To remedy this difficulty, one must then use different techniques to collect greater diversity and quantity (RAFAEL, 2002).

To standardize collections, some common procedures are required, such as selecting areas in reserves or ecological stations or research stations, which have not yet been significantly altered by man and have minimal logistical infrastructure; have facilities for transportation of material; use the same techniques, same number of equipment, same collection effort, and have a team of trained personnel to set up traps and sort material (NAKANO; LEITE, 2000; RAFAEL, 2002; GULLAN; CRANSTON, 2007).

1- Moericke Trap (yellow bowl, tray or dish).

Moericke Traps (Fig. 1) (yellow bowls or trays) is a method used for insect lifting that should be economical, easy to use and efficient. This methodology has been widely used
Trays are usually placed on the floor; however, some authors have performed traps surveys arranged at different heights (RAMIRO et al., 2011). These traps consist of yellow basins, approximately 30 cm in diameter, where a mixture of 2 liters of water, 2 ml of detergent and 2 ml of formaldehyde is deposited. The insects, attracted by the yellow color (the yellow color for Diptera is very efficient) from the basin, fall into this mixture and die by drowning and are then collected using a fine sieve and fixed in 70% alcohol for later identification. (MARCHIORI et al., 2003)

2- Malaise Traps.
The Malaise trap (Fig. 2) captures insects by intercepting the flight. They are constructed using black bands of fabric, which intercept the insects, leading them through two white bands to the top, where there are two plastic bottles (200ml) linked together by a lid. threaded In the bottle below, there is fixative liquid (Dietrich's solution: 600 ml of 96º alcohol, 300 ml of distilled water, 100 ml of 40% formaldehyde and 20 ml of acetic acid), where the insects fall and stay fixed there. These vials are positioned north to better attract parasitoids.

The attracted insects fall into this mixture, being collected using a fine sieve and fixed in 70% alcohol for later identification (MARCHIORI, 2007; MARCHIORI et al. 2007a).

The method has the disadvantage of overflow caused by rainfall; daily material removal and liquid evaporation in hot places. To solve these problems, small holes with mesh are recommended just below the top of the plate or tray that allow the liquid to leak, while retaining the insects. To suppress the daily removal of the material, water must be replaced by ethylene glycol (10%), which acts as a low volatile fixative liquid and remains efficient for more than one month (RAFAEL, 2002).

Today, all tent-type traps that collect insects that tend to rise when they encounter a vertical obstacle are known as Malaise traps. It consists of an open tent with a septum (or more septa in the case of a multidirectional trap) in the middle, preferably dark (RAFAEL, 2002).

They are excellent for catching flying insects, especially Diptera and Hymenoptera. These traps can be set indefinitely, day and night. The disadvantages: they are selective and
insects that are poorly flying or that close their wings when encountering an obstacle and fall (for example, Coleoptera) are hardly ever collected (RAFAEL, 2002). Malaise.

3- Metal Container Traps.
Traps made of metal containers (Fig. 3) have the advantages of low cost and easy preparation. However, as it is constructed by the user, the lack of standardization can occur and be considered a disadvantage (SOUZA et al., 2009).

As a disadvantage there is the collapse of the collecting plastic bag during rain or wind and the agglomeration associated with the increase of moisture produced by the bait evapotranspiration, damaging some specimens and making their identification difficult (GUIMARÃES; GUIMARÃES, 2003).

This trap can be used in various environments, whether in forests, grasslands or urban areas (GUIMARÃES; GUIMARÃES, 2003).

The adultrap® trap (DONATTI; GOMES, 2007), originally designed to capture adult forms of Aedes aegypti L., (Diptera: Culicidae) has characteristics that allow the capture of other insects, such as muscoid dipterans, presenting as advantages their standardization, low cost and possible reuse. However, their potential for capturing these dipterans has not yet been evaluated (SOUZA et al., 2009).

There are traps that are built with a metal container (cooking oil can) (FERREIRA, 1978), externally painted with matte black paint, measuring about 20 cm high by 9 cm in diameter, with two Venetian openings, made in the lower third to allow insects to enter. At the top of the trap, a paper funnel is attached, open at the ends, with the base facing down and wrapped in a plastic bag, used for collecting the dipterans and parasitoids. Baits deposited inside metal containers on a layer of earth are used.

Adults are sacrificed with ethyl ether and preserved in 70% alcohol for later identification. These traps are used to study Diptera and Parasitic Hymenoptera (MARCHIORI et al. 2007b).

4- Pitfall type traps.
Pitfall traps (Fig. 4) are those that capture insects, especially those that inhabit the soil, where they fall and, once collected, can no longer escape (FEIRE et al., 2011). According to SILVA; CARVALHO (2000), soil traps constitute a passive method of collection, which
depends on insect activity, providing a rough estimate of the total number of species in a community, as well as being a simple and inexpensive methodology for ecological studies.

Soil traps (CECHIN; MARTINS, 2000) constitute a passive collection method that depends on insect activity, providing a rough estimate of the total number of species in a community, and is a simple and inexpensive methodology for ecological studies (SILVA; CARVALHO, 2000). These ground traps are especially aimed at insects that walk the ground, by flight or by disability preference.

These traps can have their effectiveness increased by the presence of lures such as bait and should be placed at ground level to avoid being perceived by animals and to aid in capture. These traps can be used to capture different groups of animals, from invertebrates to small mammals (FREIRE et al., 2011).

The pitfall trap consists of a 15 cm diameter by 10 cm high plastic container. This container, containing one liter of water, 20 ml of detergent and 2 ml of formaldehyde, is buried until its opening is at ground level. A 150 ml beaker is used as a support for the bait and is attached to the container by a thin wire, pierced at its edge, which keeps it hanging and centered in the trap. The trap is protected from excessive sun and rain by placing a cardboard roof on a wire that is 10 cm above the floor. This trap is used to capture Diptera and Hymenoptera parasitoid (MARCHIORI et al., 2007c).

This manuscript is important for verifying which traps in this study are most valuable for collecting insects of the orders Diptera and Hymenoptera. These techniques may contribute to further studies aimed at collecting other groups of insects.

This work concludes that these four types of traps are important for collecting insects of the orders Diptera and Hymenoptera.

References

Cechin, S.Z.; Martins, M. Eficiência de armadilhas de queda (pitfall traps) em amostragens de anfíbios e répteis no Brasil. Revista Brasileira de Zoologia, v.7, n.3, p.29-740, 2000.

Donatti, J.E.; Gomes, A.C. Adultrap: descrição de armadilha para adulto de Aedes aegypti (Diptera, Culicidae). Revista Brasileira de Entomologia, v.51, n.2, p.255-256, 2007.

Ferreira, M.J.M. Sinantropia de dípteros muscoideos de Curitiba, Paraná: Calliphoridae. Revista Brasileira de Biologia, v.38, p.445-454, 1978.
Freire, E.S.; Batista, T.F.C.; Santos, J.D.V.; Figueiredo, M.P.; Oliveira, M.S.L.; Gusmão, S.A.L. Eficácia de armadilhas pitfall no controle de Neocurtia sp. (Orthoptera: Grillotalpidae) em hortas orgânica. V.6, n.2, p. 1-4, 2011. Trabalho apresentado. no CONGRESSO BRASILEIRO DE AGROECOLOGIA, 7., 2011, Fortaleza. Resumos.

Guimarães, R.R.; Guimarães, R.R. Armadilhas usadas para coleta de dipteros muscoideos (Insecta: Diptera). Boletín de la Sociedad Entomológica Aragonesa, v.33, p.281-283, 2003.

Gullan, P.J.; Cranston, P.S. Os insetos: um resumo de Entomologia. São Paulo: ROCA, 2007.440p.

Marchiori, C.H. Study of the community of flies at different altitudes in the Serra da Caldas Novas Park, Goiás, Brazil. Brazilian Journal of Biology, v.67, p.271-272, 2007.

Marchiori, C.H.; Marco A.L.; Rosa, D.C., Martins-Dias, A.M.P. Parasitoid Hymenoptera collected during the diurnal and nocturnal periods in Itumbiara, Goiás. Brazilian Journal of Biology, v.67, p.581-582, 2007a.

Marchiori, C.H.; Leles, A.S.; Carvalho, S.A., Rodrigues, R.F. Parasitóides de dípteros muscoideos coletados no matadouro Alvorada em Itumbiara, Sul de Goiás, Brasil.

Marchiori, C.H.; Silva Filho, O.M.; Borges, M.P.; Alvarenga, V.A. Parasitóides de moscas coletados usando armadilhas pitfall em Itumbiara, Goiás. Biotemas, v.20, p.115-118, 2007c.

Marchiori, C.H.; Silva Filho, O.M.; Brito, B.M.C., Silva, M.H.O.; Díaz, N. B.; Gallardo, F. Espécies de Eucoilinae (Hymenoptera: Figitidae) coletadas em armadilhas de bacias do tipo amarelas e Malaise, em Itumbiara, Goiás. Acta Ambiental Catarinense, v.2, p.82-85, 2003.

Nakano, O.; Leite, C.A. Armadilhas para insetos. Piracicaba: FEALQ, 2000. 76p.

Rafael, J.A. A amostragem. Protocolo e técnicas de captura de Díptera. 2th. ed., Zaragoza: PriBES, 2002. p.301-304.

Ramiro Z.A.; Paulo, E.M.; Montes, S.M.N.M; Imperato, R. Eficácia da altura de armadilhas de Moericke na coleta de himenópteros parasitoides na cultura de café. in. SICONBIOL, Simpósio de Controle Biológico, 12., 2011, São Paulo, SP. Resumos. São Paulo: 2011, p.376.

Silva, R.A. Da; Carvalho, G.S. Ocorrência de insetos na cultura do milho em sistema de plantio direto, coletados com armadilhas de solo. Ciência Rural, v.30, n.2, p. 199-2003, 2000.

Souza, F.S.; Fonseca, A.H.; Pereira, M.J.S. Validação da armadilha adultrap para captura de dípteros muscoideos. Revista Brasileira de Parasitologia Veterinária, v.18, n.1, p.66-68, 2009.
Source: Biológico, São Paulo, v.78, n.1, p.1-5, jan./jun., 2016 - English version

Figure - 1- Moericke Trap (yellow bowl, tray or dish).

Figure - 2- Malaise Traps.
Figure 3: Metal Container Traps.

Figure 4: Pitfall type traps.