

Use of McPhail traps for sampling adults of Osmylidae (Insecta: Neuroptera)

Uso de trampas McPhail para el muestreo de adultos de Osmylidae (Insecta: Neuroptera)

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Abstract. Recent studies on Osmylidae (Neuroptera) in South America have received significant attention, resulting in the description of 12 new species in the last decade. This growing interest in lance lacewings is closely linked with the increase in specimen collections across South America, primarily conducted using Malaise traps. To address the need for more diverse collections in different locations and considering the heightened interest in this family, we present a new, effective, and cost-efficient method for sampling Osmylidae. Our approach utilizes McPhail traps made from PET bottles, employing passion fruit juice as an attractant. The first collection using this method was carried out in an olive cultivation area (*Olea* spp.) associated with fragments of mixed forest typical of the Atlantic Forest at ranch *Carpe Diem*, Minas Gerais state, Brazil. A total of 269 specimens of *Isostenosmylus pulverulentus* (Gerstaecker, 1894) were collected in five months.

Key words: Abundance; lance lacewings; passion fruit; South America.

Resumen. Estudios recientes sobre Osmylidae (Neuroptera) en América del Sur han recibido una atención significativa, resultando en la descripción de 12 nuevas especies en la última década. Este creciente interés por las crisopas está estrechamente relacionado con el aumento de las recolecciones de especímenes en América del Sur, realizadas principalmente con trampas Malaise. Para abordar la necesidad de realizar recolecciones más diversas en diferentes lugares y considerando el mayor interés en esta familia, se presenta un nuevo método efectivo y económico para muestrear Osmylidae. Este enfoque utiliza trampas McPhail hechas de botellas de PET, empleando jugo de maracuyá como atrayente. La primera colecta con este método se realizó en un área de cultivo de olivo (*Olea* spp.) asociada a fragmentos de bosque mixto típico de la Mata Atlántica en la estancia *Carpe Diem*, estado de Minas Gerais, Brasil. En cinco meses se recolectó un total de 269 especímenes de *Isostenosmylus pulverulentus* (Gerstaecker, 1894).

Palabras clave: Abundancia; maracuyá; osmílicos; Sudamérica.

The Osmylidae, commonly known as “lance lacewings”, comprises approximately 280 species across 25 living and 38 extinct genera, found in all major biogeographical

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regions (Winterton *et al.* 2019). Notably, the Nearctic region currently lacks any living species; however, fossil records suggest that the family has recently gone extinct there (Winterton *et al.* 2019). The extant Neotropical fauna includes 27 species from five genera, with four species recorded in Brazil: *Isostenosmylus barbatus* Martins, Ardila-Camacho, Flint and Stange, 2019; *I. derpi* Martins, Machado and Ardila-Camacho, 2024; *I. pulverulentus* (Gerstaecker, 1894) (Stenosmylinae), and *Gumilla adspersus* Navás, 1912 (Gumillinae) (Martins *et al.* 2016; Machado and Martins 2022, 2024).

Recent studies on the diversity of Osmylidae in the Neotropical region have received significant attention, resulting in the description of 12 new species in the last decade, increasing the total from 15 to 27 (Ardila-Camacho and Noriega 2014; Martins *et al.* 2016, 2019, 2024; Ardila-Camacho *et al.* 2020). Despite this progress, there remains a substantial lack of information about this group, largely due to the challenges of collection and the undersampling of various regions, particularly in Brazil (Machado and Martins 2022).

All Brazilian species of Osmylidae are associated with the Atlantic Forest, as noted by Lara *et al.* (2024) and Martins *et al.* (2024). The limited information on Osmylidae in the Neotropical region, and the loss of natural habitats in Brazil — including Atlantic Forest — (Vancine *et al.* 2024), highlights the urgent need to enhance our understanding of the occurrence and distribution of these insects in the country, which justifies the implementation of comprehensive inventory studies. In this context, the present study aims to present a new, effective, and cost-efficient method for sampling Osmylidae, with the aim of contributing to inventory studies of this family.

This methodology utilizes McPhail-type attractive traps constructed from reusable two-liter PET bottles, with three triangular openings approximately 2 centimeters in size (based on Souza *et al.* 2015; Fig. 1A). The attractant consists of a solution made from 200 ml of juice extracted from two fresh *Passiflora* sp. (passion fruit), combined with 200 g of granulated sugar and two liters of water. It is important to note that this methodology has been successfully used for inventorying other insects' groups and was inadvertently observed to be effective for Osmylidae. The traps that collected specimens of Osmylidae were initially deployed for a monitoring study of social wasps (Vespidae) in an olive cultivation area (*Olea* spp.) at ranch *Carpe Diem*. This site is associated with fragments of mixed forest typical of the Atlantic Forest in the Serra da Mantiqueira region, located in Cambuí, southern Minas Gerais state (22°37'30"S; 46°08'54"W) at an altitude of 1,500 meters, characterized by a tropical highland climate (Figs. 1B, C).

The study was conducted from September 2023 to January 2024. A total of 30 McPhail traps were installed on trees approximately 1.5 meters above the ground, distributed in three rows, spaced 60 meters apart, each containing 10 traps separated by approximately 30 meters. The first row of traps was installed on the edge of the Atlantic Forest fragment; the second row in the center of the olive grove; and the last row was installed on the border of the headquarters with the road. The traps were left for a total of seven consecutive days per month.

Over five months of sampling, 269 specimens of *I. pulverulentus* were sampled, the vast majority collected in traps close to the edge of the Atlantic Forest fragment (Fig. 1D). These specimens, which are in good state of conservation, were identified by the fourth author (CCM) and are now deposited in the Edmundo Navarro de Andrade Entomological Collection at the Institute of Biosciences, UNESP, Rio Claro Campus (CENTENA).

To date, studies on Osmylidae have indicated that the Malaise-type flight interception trap and hand net have been the primary methods for collecting lance lacewing specimens. However, when we compare the abundance observed in the present study with findings from others conducted in the Neotropical region, especially Brazil, it is evident that the efficiency of McPhail traps was significantly higher. For more details, see Tab. 1.

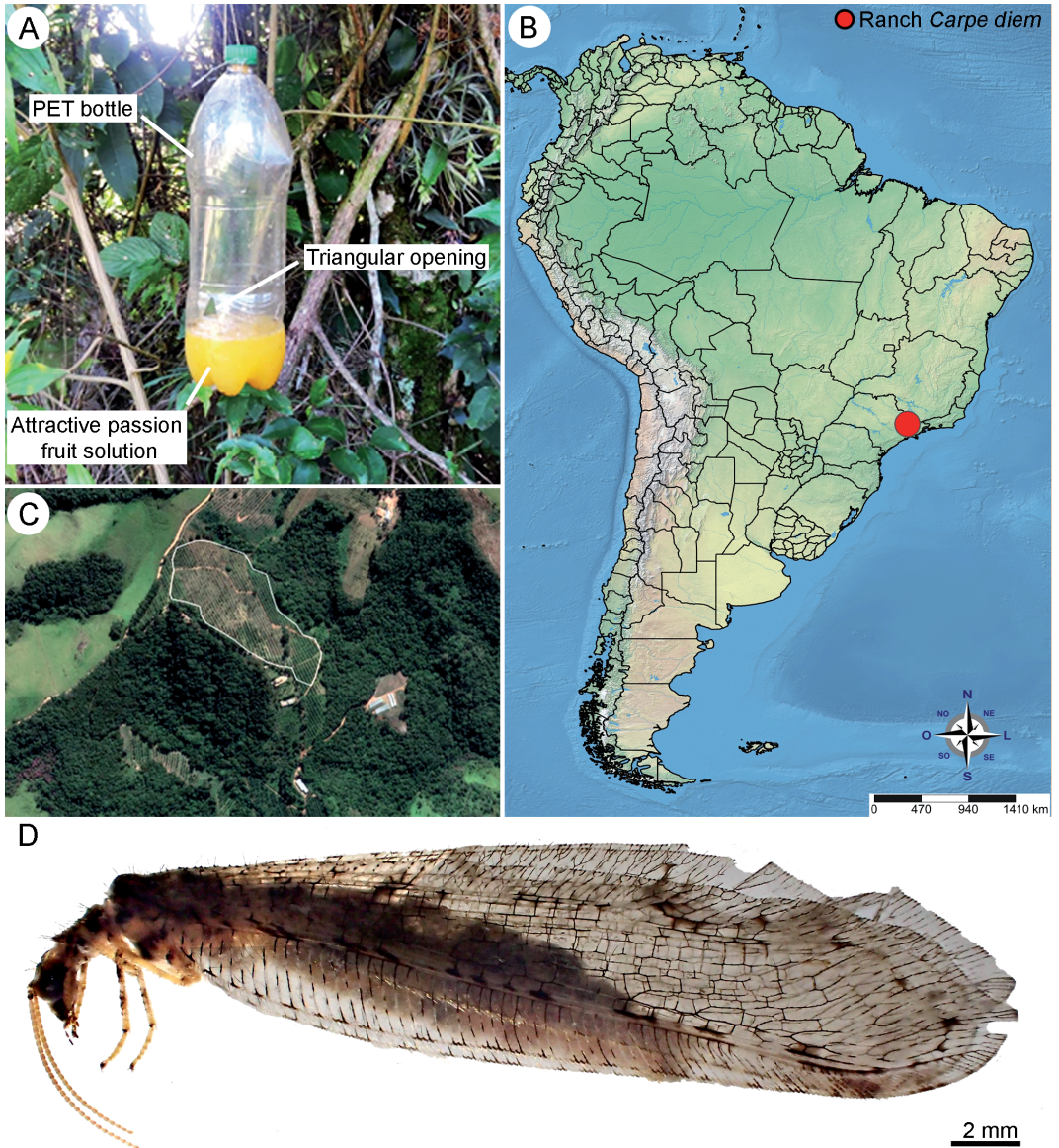


Figure 1. Collection of Osmylidae (Neuroptera) specimens. **A.** McPhail trap with passion fruit bait adapted from Souza *et al.* (2015). **B.** Location on Brazilian map. **C.** Detail of olive tree (*Olea* spp.) cultivation area associated with fragments of mixed forest (Atlantic Forest), ranch Carpe Diem municipality of Cambuí, Minas Gerais states, Brazil. **D.** Lateral habitus of *Isostenosmylus pulverulentus* (Gerstaecker, 1894) (Stenosmylinae). / **Figura 1.** Recolección de ejemplares de Osmylidae (Neuroptera). **A.** Trampa McPhail con cebo de maracuyá adaptado de Souza *et al.* (2015). **B.** Ubicación en el mapa brasileño. **C.** Detalle del área de cultivo de olivo (*Olea* spp.) asociada a fragmentos de bosque mixto (Mata Atlántica), hacienda Carpe Diem, municipio de Cambuí, estado de Minas Gerais, Brasil. **D.** *Habitus* lateral de *Isostenosmylus pulverulentus* (Gerstaecker, 1894) (Stenosmylinae).

Table 1. Main studies on Osmyliidae (Neuroptera) collected in Neotropical region with abundance, trap and period of sampling. / **Tabla 1.** Principales estudios donde se recolectaron Osmyliidae (Neuroptera) en la región neotropical con abundancia, metodología y periodo de muestreo.

Study	Abundance	Collection method	Period
Ardila-Camacho and Noriega (2014)	10	Malaise trap	Not informed
Martins <i>et al.</i> (2016)	43	Malaise trap	Not informed
Martins <i>et al.</i> (2019)	60	Manual collection, Malaise trap, and Light trap	Not informed
Ardila-Camacho <i>et al.</i> (2020)	02	Hand net	Not informed
Schuster and Machado (2021)	04	Light trap	One Year
Lara <i>et al.</i> (2024)	73	Malaise trap	Three Years
Martins <i>et al.</i> (2024)	02	Malaise trap	Not informed
This study	269	McPhail trap	Five months

Another advantage of McPhail traps is their low construction cost. A total of 40 reais (7.00 USD) was spent to build and maintain 30 traps for one month, whereas a Malaise-type flight interception trap averages around 500 reais (87.00 USD) and hand nets averages 200 reais (35.00 USD) (Log Nature 2024). Given the high efficiency demonstrated by McPhail traps in collecting lance lacewings, along with their excellent cost-effectiveness, we recommend using these traps in conjunction with Malaise traps or hand nets for sampling Osmyliidae. Alternatively, if budget constraints prevent the purchase of Malaise traps and hand nets, we suggest the use of McPhail traps.

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Author Contributions

ANP, RHC, TBG, MMS: Conceptualization. **ANP, RHC, TBG, MMS:** Methodology. **CCM, MMS:** Validation, data curation and resources, writing - review & editing, and supervision. **MMS:** Designed the research. **ANP, RHC, TBG:** Collected and organized the specimens. **CCM:** Identified the specimens. **MMS, CCM:** Wrote and approved the manuscript. All authors have read and agreed to the final version of the manuscript.

Literature Cited

Ardila-Camacho, A. and Noriega, J.A. (2014) First record of Osmyliidae (Neuroptera) from Colombia and description of two new species of *Isostenosmylus* Krüger, 1913. *Zootaxa*, 3826(2): 315-328. <https://doi.org/10.11646/zootaxa.3826.2.2>

Ardila-Camacho, A., Martins, C.C. and Noriega, J.A. (2020) *Isostenosmylus ammirabilis* sp. nov., a remarkable new species of lance lacewing (Neuroptera: Osmyliidae) from the Colombian Andes. *Zootaxa*, 4803(3): 561-575. <https://doi.org/10.11646/zootaxa.4803.3.10>

- Lara, R.I.R., Perieto, N.W. and Martins, C.C. (2024)** Osmylidae (Insecta: Neuroptera) from Atlantic rainforest in southeastern Brazil and new records for *Gumilla adspersus* Navás, 1912. *Revista Chilena de Entomología*, 50(1): 41-50. <https://doi.org/10.35249/rche.50.1.24.06>
- Machado, R.J.P. and Martins, C.C. (2022)** The extant fauna of Neuroptera (Insecta) from Brazil: diversity, distribution and history. *Revista Brasileira de Entomologia*, 66(spe): e20220083. <https://doi.org/10.1590/1806-9665-RBENT-2022-0083>
- Machado, R.J.P. and Martins, C.C. (2024)** Osmylidae. In: Catálogo Taxonômico da Fauna do Brasil. PNUD. Accessed on: 07 July 2024. Available at: <http://fauna.jbrj.gov.br/fauna/faunadobrasil/31125>
- Martins, C.C., Ardila-Camacho, A. and Aspöck, U. (2016)** Neotropical osmylids (Neuroptera, Osmylidae): three new species of *Isostenosmylus* Krüger, 1913, new distributional records, redescrptions, checklist and key for the Neotropical species. *Zootaxa*, 4149(1): 1-66. <https://doi.org/10.11646/zootaxa.4149.1.1>
- Martins, C.C., Machado, R.J.P. and Ardila-Camacho, A. (2024)** An unexpected new species of *Isostenosmylus* Krüger, 1913 (Neuroptera: Osmylidae), from the Brazilian Northeast. *Revista Brasileira de Entomologia*, 68(1): e2023009. <https://doi.org/10.1590/1806-9665-RBENT-2023-0098>
- Martins, C.C., Ardila-Camacho, A., Machado, R.J.P., Flint Junior, O.S. and Stange, L.A. (2019)** Unraveling the most diverse lance lacewing genus from the New World, *Isostenosmylus* Krüger (Neuroptera: Osmylidae). *Invertebrate Systematics*, 33(1): 849-891. <https://doi.org/10.1071/IS18079>
- Schuster, P.A. and Machado, R.J.P. (2021)** Unknown diversity: survey of Neuroptera (Insecta) in Paraná, southern Brazil, reveals 14 species newly recorded from the state and country. *Check List*, 17(3): 993-1005. <https://doi.org/10.15560/17.3.993>
- Souza, M.M., Perillo, L.N., Barbosa, B.C. and Prezoto, F. (2015)** Use of flight interception traps of Malaise type and attractive traps for social wasps record (Vespidae: Polistinae). *Sociobiology*, 62(3): 450-456. <https://doi.org/10.13102/sociobiology.v62i3.708>
- Vancine, M.H., Muylaert, R.L., Niebuhr, B.B., Oshima, J.E.F., Tonetti, V., Bernardo, R., Angelo, C., Rosa, M.R., Grohmann, C.H. and Ribeiro, M.C. (2024)** The Atlantic Forest of South America: spatiotemporal dynamics of the vegetation and implications for conservation. *Biological Conservation*, 291: 110499. <https://doi.org/10.1016/j.biocon.2024.110499>
- Winterton, S.L., Martins, C.C., Makarkin, V., Ardila-Camacho, A. and Wang, Y. (2019)** Lance lacewings of the world (Neuroptera: Archeosmylidae, Osmylidae & Saucrosmylidae): a review of living and fossil genera. *Zootaxa*, 4581(1): 1-99. <https://doi.org/10.11646/zootaxa.4581.1.1>