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MACRO PHOTOGRAPHY AS A TOOL FOR TAXONOMIC IDENTIFICATION AND CONSERVATION OF INSECTS IN COLOMBIA

Macrofotografía como herramienta para la identificación taxonómica y la conservación de insectos en Colombia

A fotografia macro como ferramenta para identificação taxonômica e conservação de insetos na Colômbia

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Introduction

Insects are the most important, diverse, and successful land animals on the planet (Rosas-Echeverría, 2015). They include a wide variety of species whose intense colors, detailed patterns, body shapes, and wing structure make them particularly interesting for amateur photographers, photography, and scientific illustrations (McCullough, Worthington, & Paradise, 2013; Roaux, 2015). With the latest technological advances, macro photography should be understood as a specialized photographic technique that allows us to observe details beyond the naked eye's capacity (Savazzi, 2011). Thus achieving images of tiny objects through special lenses, with which you can achieve full-size images (Cosentino, 2013; Gajski, Solter, & Gašparovic, 2016), reaching a magnification between 1.0 and 50 times (Harcourt, 2002). In addition to delivering details imperceptible to a simple view (Rivas, Bracchitta, & Espinosa, 2017).

These characteristics make macro photography a useful tool for research in entomology and ecology, including observational studies that have traditionally been based on the identification of species in sight (Marshall, 2008; Martínez & Guerrero, 2018; McCullough et al., 2013). Macro photography has also played an important and widely variable role in taxonomy (Steinke, Hanner, & Hebert, 2009). But sometimes such data is not used correctly to contribute to the samples' formal identification or description (Leggett & Kirchoff, 2011). However, the photographs that accompany a publication facilitate the understanding of scientific work, and it also provides a great way to validate it (Marshall, 2008; Sánchez, Palomino, Sumaya, Balois, Jiménez & López, 2015). It is also recognized that field macro photography cannot ensure a correct determination in some situations where closely related individuals have a very similar exterior appearance (Eberhard, 1985). In this case, genitalia exploration is necessary for identification (Córdoba, 2000).

Today, photography is a powerful research and dissemination tool (Gálvez, 2017). Consequently, it allows observing characters so they can be determined or, if applicable, is a complement to its identification when being sent to the specialist of each taxon. In this way, photographic inventory minimizes the excessive collection of individuals. It achieves that so many amateurs photographers, researchers and experts can be in constant communication, for example, through the Naturalist virtual platform (https://colombia.inaturalist.org/), which links to the Biodiversity information System in Colombia (https://sibcolombia.net/).

Based on these ideas, our purpose is to demonstrate the importance of using insect macro photography as a tool for identification. Besides, to publicize these photographic works for the conservation of this group of great biological interest. We see macro photography of insects as a source of visual knowledge that is more attractive and easily accessible when observing, then allowing the non-scientific community to have this information, achieving appropriation, valuation, and conservation of this important group of organisms. To accomplish this goal, we will present photographs of insects that have been determined and corroborated by national and international specialists.

Title: Night stranger
Author: Ricardo Martínez
Date: 14th May 2018

The picture of this insect of the order Neuropteran was taken in the night at La Mesa, Cundinamarca, Colombia. It is a gravid female of the family Mantisipidae. This specie is the *Dicromantispa gracilis (*Erichson, 1839)*,* identified by the specialist Adrian Ardila Camacho, Universidad Nacional Autónoma de México, through this picture sent.

Title: Amazing caterpillar
Author: Ricardo Martínez
Date: 8th August 2018

This image was taken in the Park Ecocenter at San Antonio del Tequendama, Cundinamarca, Colombia. It is a caterpillar of the moth *Manduca Scutata* (Rothschild & Jordan,

1903). It belongs to the family Sphingidae, identified by the specialist Jean Haxaire, Muséum National d'Histoire Naturelle, Paris, France, through this picture sent.

Title: Artwork
Author: William Rincón
Date: 20th July 2018

This photo was taken in Cali Colombia, its colors and position make for a very striking natural portrait. It is a female from *Hypoleria ocalea ocalea* (E. Doubleday, 1847) identified by the entomologist Renato Mattei from Venezuela. This photo was sent and determined by him.

Title: Unexpected visit
Author: William Rincón
Date: 3rd November 2019

This photo was taken in Los Tunos natural park, Cundinamarca, Colombia. At night it appears unnoticed, attracting attention to its color. This specimen belongs to the species *Archandra glabra* (Degeer, 1774), Cerambycidae, which was identified using this photograph by the entomologist Celso Godinho from Brazil.

Title: Colorful jumper
Author: William Rincón
Date: 16th July 2019

This photograph was taken in San Luis Antioquia. The combination of colors that nature offers us is always impressive. The specimen belongs to the species *Homeomastax dereixi* (Descamps, 1971). The collar was determined using this photo by Juan Manuel Cardona Granda from Colombia.

References

Cosentino, A. (2013). Macro photography for reflectance transformation imaging: A practical guide to the highlights method. *E-conservation Journal*, *1*, 70-85. https://doi.org/10.18236/econs1.201310

Córdoba, A. (2000). Evolución y diversidad de la morfología de los genitales masculinos en insectos. *Folia entomológica mexicana*, *110*, 95-111.

Eberhard, W. G. (1985*). Sexual Selection and Animal Genitalia*. Harvard University Press.

Gajski, D., Solter, A., & Gašparovic, M. (2016). Applications of macro photogrammetry in archaeology. *The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences*, 41-B5, 263-266. https//doi.org10.5194/isprsarchives-XLI-B5-263-2016

Gálvez, D. V. (2017). La fotografía científica. Historia y vínculo con la divulgación. *Revista Digital Universitaria*, *18*(5), 2-17.

Harcourt, P. (2002). *Macrofotografía* [Trad. F. Rosés, reimpresión español]. Omega.

Leggett, R., & Kirchoff, B. K. (2011). Image use in field guides and identification keys: review and recommendations. *AoB Plants*, plr 004, 1-37.

Marshall, S. A. (2008). Field Photography and the Democratization of Arthropod Taxonomy. *American Entomologist*, *54*(4), 207-210.

McCullough, C., Worthington, C., & Paradise, C. J. (2013). Using Digital Macrophotography to Measure Biodiversity, Identify Insects, and Enhance Outreach and Education. *American Entomologist*, *59*(3),176-182.

Martínez, G. R., & Guerrero, F. L. (2018). Macrofotografía: Recurso visual para documentar algunos insectos presentes en el municipio de Quipile, Cundinamarca. *Biografía, 11*(21),154-155.

Sánchez-Herrera, M. L, Palomino-Hermosillo P. M., Sumaya, M. T., Balois, M. R., Jiménez-Ruíz, E. D., & López-Banda, A. V. (2015). Fotografía: Arte como elemento científico. *Revista Fuente nueva época*, *6*(20), 61-70.

Savazzi, E. (2011). *Digital Photography for Science. Close-up Photography, Macrophotography and Photomacrography*. Lulu.com.

Steinke, D., Hanner, R. H., & Hebert, P. D. N. (2009). Rapid high-quality imaging of fishes using a flat-bed scanner. *Ichthyological Research*, *56*(2), 210-211.

Rivas, V., Bracchitta, D., & Espinosa, F. (2017). La macrofotografía en el diagnóstico de cuerpos momificados con biodeterioro. *Revista Conserva*, *22*,105-112.

Roaux, J. (2015). Dibujando bichos: la ilustración científica en la entomología. *Revista Museo*, *27*, 25-32.

Rosas-Echeverría, M. V. (2015). El papel de los insectos en la conservación. In V. H. Toledo-Hernández, *Retos y herramientas para el estudio de la biodiversidad* (130-144). México D.C.: Universidad Autónoma de Morelos.

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