

# Collection of entomophagous insects

## National Reference Center for Biological Control

Biological collections have a prominent role in the biological control of pests, because they are used as a reference to reveal the exact name of the species under study, and a means to access all the pertinent information thereof. It is worth noting that the success or failure of a biological control program can depend in the correct or incorrect identification of the species under management.

The entomophagous insects collection of the CNRCB (CIE-CNRCB) (Fig. 1) mainly consists of beneficial insects (natural pest enemies) for the agricultural industry. One of the priorities of the CIE is the correct identification of the species by means of morphologic (Fig. 2) and molecular tools. For molecular analyses, the CIE-CNRCB is supported by the CNRCB's molecular biology laboratory for specimen identification. Specific determination of the species not only relies on traditional methods, but also involves the sequencing of different DNA regions. This information supports the development of technological packages for the biological control of pests, and produces properly identified insects for use as reference or consultation material for researchers, technicians, students, and producers (Fig. 3).

The CIE-CNRCB houses approximately 80,000 specimens, collected in 20 of the country's states (Baja California Norte, Coahuila, Colima, Chihuahua, Guanajuato, Hidalgo, Jalisco, Michoacán, Morelos, Nayarit, Oaxaca, Puebla, Quintana Roo, San Luis Potosí, Sinaloa, Sonora, Tamaulipas, Veracruz, Yucatán, and Zacatecas); and 13 types of agroecosystems: avocado, coffee, sugar cane (Fig. 1), tomato, Mexican lime, corn, mango, orange, prickly pear cactus, coconut palm, sorghum, husk tomato, and blackberry. The collection houses insects from 14 orders, 59 families, and 120 genres.

This collection has two spaces for safekeeping: a collection of insects immersed in a 70% alcohol solution and kept in freezers at  $-20^{\circ}\text{C}$ , for use in molecular studies, and a dry collection of insects mounted in pins and slides.

### **Objectives**

- Preserving and protecting the CIE insect collection.
- Determining and describing the insects of the CIE at the species level with morphologic and molecular tools.
- Exploration of agricultural and wild ecosystems for collecting entomophagous fauna of agricultural relevance.
- Creation of bases for developing technology for the biological control of pests.

### **Services**

- Identification of entomophagous insects with potential to become biological control agents.
- Impartation of training courses and workshops.
- Free access insect deposit.
- Research residences for bachelor's degree studies (professional practices and social service), and guide tours of its facilities.

### **Courses and workshops**

- Insect collection and preservation methods.
- Identification, collection, and preservation of the Chalcidoidea (Hymenoptera) superfamily.
- Identification of natural enemies (Insecta) of aphids (Hemiptera: Aphididae).
- Identification of the main species of Chrysopidae (Neuroptera) used for biological pest control.
- Participation in the “Agroecological pest management for sustainable agriculture practices” specialization course-workshop (modules I and II). International Center of Corn and Wheat Improvement (CIMMYT), National Reference Center for Biological Control (SAGARPA-SENASICA), 2015, 2017, and 2018, in Tecomán, Colima, México.

### **Impact-benefit of using the collection materials.**

This collection is focused on the taxonomic identification, through morphologic and molecular tools, of the main natural enemies of pests, and their prey, hosts, host plants, and distribution, with the objective of having the necessary tools to address any emerging phytosanitary issue in our country.

### **Current research lines**

The CIE research lines are focused on learning about the beneficial entomophagous fauna that inhabits the main agroecosystems in Mexico. Learning about the identification, spatial and seasonal distribution, and the relationship between entomophagous insects and their prey, hosts, and the phenology of assorted crops helps support the creation of preventive technology as a biological alternative of pest control.

## Work team



**Beatriz Rodríguez Vélez, PhD  
in entomology**

Functions: Curator and coordinator of the CIE; specialist in parasitoid wasps (Hymenoptera), mainly from the Encyrtidae family. She leads guided tours for preparatory, college, and postgraduate students. She attends to specialists and students that



**Mariza Araceli Sarmiento  
Cordero, PhD in ecophysiology  
and genetic resources**

Functions: Curator of the CIE; specialist in Syrphidae (Diptera), Chrysopidae, Hemerobiidae, and Coniopterigyidae (Neuroptera). She leads guided tours for preparatory, college, and postgraduate students. She attends to specialists and students that visit the collection

visit the collection for consultation purposes.



**José Manuel Rodríguez Vélez, PhD in ecophysiology and genetic resources**

Functions: Curator of the CIE, specialist in the Coccinellidae (Coleoptera) family. She leads guided tours for preparatory, college, and postgraduate students. She attends to specialists and students that visit the collection for consultation purposes.

for consultation purposes.



**Mónica Isabel Barajas Romero, field and laboratory technician**

Functions: Processing, mounting, labeling, and preclassification of specimens, and their incorporation, organization, and maintenance in the CIE. Agroecosystems exploration.



Figure 1. Collection of entomophagous insects.



Figure 2. Determination of insects through morphologic characteristics.





Figure 3. Consultation of the CIE materials.

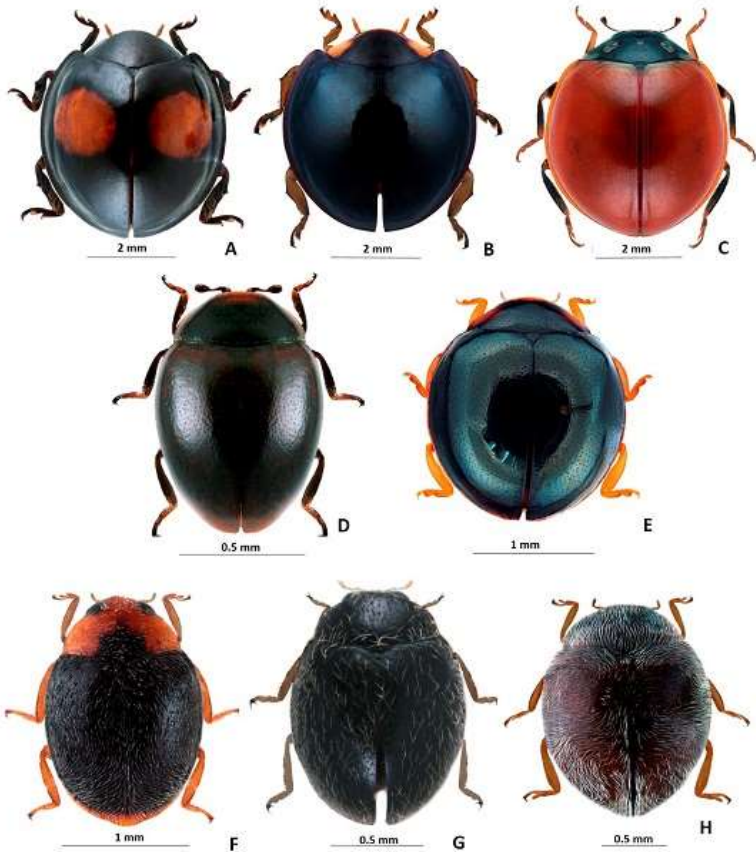


Figure 4. Species of predator Coccinellidae collected on *Cocos nucifera* in Mexico: A) *Chilocorus cacti*; B) *Chilocorus nigrita*; C) *Cycloneda sanguinea sanguinea*; D) *Nipus* sp.; E) *Pentilia insidiosa*; F) *Scymnus (Pullus) dozieri*; G) *Stethorus punctum punctum*; H) *Zagloba* sp. (Rodríguez-Vélez et al., 2019).