

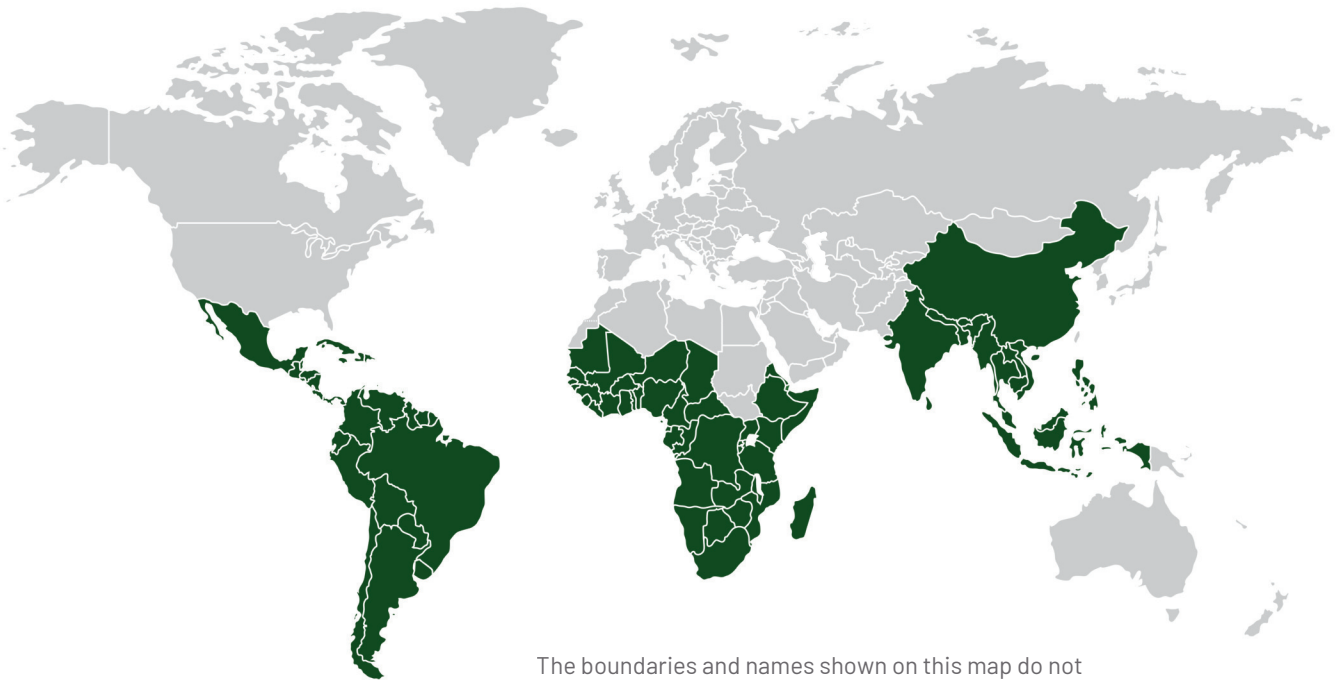
Goal

The Bean and Cassava Entomology Laboratory provides tools for identification and management of insects and other arthropod pests associated to these crops. This will help us, as part of our institution's mission, reduce hunger and poverty and improve human health in the tropics by increasing the eco-efficiency of agriculture.



Where we work

The laboratory conducts research at the Palmira campus and provides support to colleagues in the Alliance of Bioversity International and CIAT in Africa, Asia, Latin America and the Caribbean, as well as other partners.



The boundaries and names shown on this map do not imply official endorsement or acceptance by the Alliance of Bioversity International and CIAT.

How we do it



Arthropods identification: The laboratory houses the CIAT Arthropod Reference Collection (CIATARC), which contains more than 590,000 specimens collected since 1946 from cassava, bean, rice, and forage crops, as well as other economically important plants. Each specimen undergoes a complete curation process that includes mounting, identification, labeling, and cataloging.



Arthropods rearing: Using standardized methods, we mass rear various insects and other arthropods required for research at our Palmira campus. Our experience allows us to support other institutions and colleagues in developing rearing methodologies for their arthropods of interest.



Pest management: In addition to identification, our research focuses on finding alternatives for pest management, for which we carry out:

- Biology and ecology studies of pest arthropods and their natural controllers
- Transmission studies of plant diseases through insect vectors
- Risk analysis of pests based on distribution models and life tables
- Evaluation of new generation pesticides and botanical extracts for pest management
- Phenotyping resistance in cassava and beans to diverse arthropods that affect their productivity
- Training and support for partners in implementing phenotyping methodologies, pesticides evaluation, and other topics

The impact



High-throughput phenotyping of whitefly resistance in cassava has been standardized using automated methodologies. This provides an essential tool for plant breeders, accelerating selection both by reducing the time and resources required and by allowing the development of molecular marker-assisted selection.



Through collaborative work with regional partners and various organizations, invasive pest management has been achieved on different continents through the implementation of morphological and molecular identification, monitoring and surveillance, biological control, varietal resistance, and proper pesticide management, among other practices.

Actions for innovation



Use of artificial intelligence to recognize resistance variables to different arthropods, allowing for rapid and reliable characterization of breeding lines and resistance source materials in pre-breeding processes.



High-throughput phenotyping methods for various emerging pests and those where procedures are not yet standardized.



More efficient and reliable pest identification tools.



Technologies

Nymphstar: A set of Java macros for ImageJ that enable insect counting and leaf area estimation for the automated assessment of cassava resistance to different whitefly species. The phenotyping process includes plant propagation, infestation, and sample collection under greenhouse conditions, and the use of a light box (Photobox) to control lighting conditions during photo capture and subsequent analysis using Nymphstar.

To know more about the program, visit us:



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