

# Scientists mount a 'sting operation' in Thailand to tackle a devastating pest outbreak

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In the start of a carefully crafted emergency campaign to thwart a pest outbreak that is wreaking havoc on Thailand's vital cassava production, agricultural researchers will release a quarter of a million parasitic wasps in the northeastern part of the country.

Thailand's cassava industry alone accounts for more than 60 percent of global exports of this tropical root crop, which is critical for food security and economic growth in many developing countries. About 5 million growers across Southeast Asia supply cassava to domestic and foreign processing industries, which convert the roots to animal feed and biofuels and also extract starch from them for use in a wide variety of food and other products.

Thailand's Department of Agriculture is expected to officially start the release of *Anagyrus lopezi* (the wasp's scientific name) as a form of biological control in the country's northeastern province of Khon Kaen on Saturday (17 July), following two small scale releases to evaluate environmental impact.

"Cassava is an important crop for small-scale farmers in our country, so there's no time to lose in applying the fastest, most reliable solution available, said Amporn Winotai, who is a senior entomologist for Thailand's Department of Agriculture.

"Cassava is a crucial crop in Thailand, generating more than US\$1 billion of income for farmers each year, and more again to industry," said Tin Maung Aye, a cassava agronomist with the International Center for [Tropical Agriculture](#) (CIAT by its Spanish acronym). "Reductions of that magnitude translate into hundreds of millions of dollars in economic losses, especially if the pest is allowed

to spread further."

The pest is the cassava mealybug, known to scientists as *Phenacoccus manihoti*. Originally from South America, it feeds only on cassava, sucking sap from the plants and causing them to shrivel. Also a South American native, cassava was carried by Portuguese traders to Africa and Asia, where it thrived in the absence of the insect pests that inhabit its home territory.

But eventually, the mealybug and others caught up with cassava, devastating crops first in sub-Saharan Africa and now in Southeast Asia. The spread of cassava mealybug to about 200,000 hectares has been confirmed in eastern and northeastern Thailand, where the pest is causing yield losses as high as 50 percent. Since the country's cassava industry generates more than US\$1.5 billion of income each year—and the overall Thai cassava industry is worth US\$ 3bn--reductions of that magnitude could translate into hundreds of millions of dollars in economic losses, especially if the pest is allowed to spread further.

In mounting the emergency campaign, Thai scientists consulted with two organizations - the International Institute of Tropical Agriculture (IITA) branch in Benin and the Colombia-based CIAT, Both centers are supported by the Consultative Group on International Agricultural Research (CGIAR).

IITA, CIAT and various partner organizations curbed mealybug attacks on Africa's cassava crop during the 1980s through a highly successful biocontrol campaign, which staved off a major food security catastrophe, according to IITA entomologist Georg Goergen, who hand-carried a colony of the 500 wasps from Benin to Bangkok last year to start the testing and mass rearing.

Identifying the cassava mealybug species in Thailand was at first complicated, the Thai Department of Agriculture's Winotai said, by its resemblance to another closely related mealybug species, *P. madeirensis*, which is probably also from South America but poses no threat to cassava.

Within a year after confirming the presence of the cassava mealybug, *P. manihoti*, the Thai Department of Agriculture had arranged for importation of the pest's most effective natural enemy, following strict quarantine procedures, and then carried out controlled testing and mass multiplication ready for a possible release.

Early on, researchers discarded the option of containing the mealybug in Thailand with pesticides. "Applying chemicals on such a large scale would be environmental vandalism," said Tony Bellotti, a CIAT entomologist, who has spent 35 years investigating cassava pests. "Sending in the wasps is a proven way to kill the cassava mealybugs quickly and effectively. Think of them as a kind of eco-friendly SWAT team."

Measuring less than 2 millimeters in length, the *A. lopezi* wasp has already shown itself to be a formidable natural enemy of the cassava mealybug in South America and sub-Saharan Africa. Even when infestations are low, female wasps are able to detect and home-in on their prey, injecting their eggs into the mealybugs. The pest population is then gradually reduced, as the wasp larvae grow and as adult females feed on the host insect. The wasps pose no threat to humans, animals, or other insects.

The wasp proved so effective in sub-Saharan Africa that Hans Herren, the scientist who led the biocontrol effort there, was awarded the World Food Prize in 1995. The collaborative effort also earned IITA and CIAT the CGIAR's 1990 King Baudouin Award, which recognizes outstanding contributions to developing country agriculture. The economic benefits resulting from biocontrol of the cassava mealybug in Africa exceeded the cost of the research by a factor of at least 200.

CIAT scientists are investigating reports that that

the cassava mealybug has already spread to Cambodia, Burma, Laos and Vietnam. Bellotti expects that it will soon reach other parts of Southeast Asia as well, including southern China, and eventually to Indonesia and the Philippines.

"It's going to be an international game of cat-and-mouse," he said. "As the cassava mealybug finds its way to new countries and regions, we can send in the wasps." In the long term, Bellotti explained, scientists will also need to develop cassava crops with genetic resistance to mealybugs as part of integrated pest management strategies. To be most effective, biocontrol must be combined with more resilient cassava varieties and better crop management.

"Cassava production in Southeast Asia has enjoyed an extended honeymoon, relatively free of major pest and disease outbreaks," Bellotti continued. "But now it's over. And the mealybug isn't the only cassava pest out there. Mites and whiteflies, for example, are also extremely damaging and there are some worrying diseases as well."

"Thailand's rapid response to stop the cassava mealybug plague shows international agricultural research at its best," said Ruben Echeverria, director general of CIAT. "This is why it's so important for developing countries to have strong research programs working closely with the international centers like CIAT and IITA."

Provided by Burness Communications

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