

Biological Control Case Study

Cassava Mealybug

Cassava (also known as manioc) came to Africa from South America in the 16th century. In the following four hundred years its starchy, thickened roots became the main staple food for hundreds of millions of Africans, providing up to 70% of their daily energy intake.

Challenge

When cassava came from the Americas many of its indigenous insects (mites and plant diseases alike) were left behind. But in the 1970s a terrible pest was observed simultaneously in both the Republic of Congo and what is now the Democratic Republic of Congo. It was the cassava mealybug and it appeared to have been accidentally introduced from Latin America. In its area of origin, the mealybug is a rare insect, but in Africa it spread rapidly over the entire cassava growing area of the continent. It had no natural enemies and within a decade became the most important pest insect on cassava, causing crop losses of up to 80%.

Intervention

IITA scientists, working with teams from CIAT our sister institute in South America and with the Commonwealth Institute of Biological Control (CIBC) in Trinidad, studied how the mealybug was kept under control in South America. Eventually a tiny wasp (smaller than the head of a pin), which laid its eggs on the mealybug, was discovered. As they grow inside the mealybug, the wasp larvae kill the mealybug.

This could be the key to control that scientists were looking for, but first they had to be sure it would not get out of control if it were released on the African continent, causing some other, unpredictable environmental damage. In conjunction with CABI Bioscience the candidate wasps were quarantined in the UK where they were tested to see how specific they were to the mealybug host. If the wasps could parasitize other important species in Africa, they might be too dangerous to release there. The tests showed the wasps were highly specific to the mealybugs and so some were imported into Nigeria for mass rearing and eventual release into the wild.

Impact

The results were spectacular. All over the cassava belt of Africa the wasps controlled the mealybugs very quickly and today, more than a decade later the mealybugs and wasps live in a natural balance with mealybug populations down to maximum 10% of what they had been at the peak of the infestation. Today cassava grows with little mealybug damage.

For the farmers of Africa the economic impact has also been spectacular. Every pound of donor investment in the mealybug control work has returned between 200 and 500 pounds in terms of an annual cassava production alone. The extra benefits to the environment and human health from this environmentally sound solution with no costs to farmers are difficult to calculate, but are nevertheless very real.