

Feature 91/1

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Biological Control of Food Pests

By Jack Keyser

The Nigeria-based International Institute of Tropical Agriculture (IITA) has achieved major success in the biological control of one damaging African food pest, and made progress towards controlling another.

IITA's success in controlling the cassava mealybug has benefitted more than 200 million Africans for whom cassava is a staple food. The benefit:cost ratio of the cassava mealybug program has been calculated at 149:1--\$149 worth of food saved for every \$1 of research or development invested.

"With biological control methods, no extensive pesticides are required, and the small-scale African farmers who depend on crops like cassava and mango to feed their families are freed of a damaging pest by nature itself," says Hans Herren, who directs IITA's biological control program in Africa.

Begun in 1977 to combat two imported pests which attack cassava, the IITA Biological Control Programme scored its first success by finding and introducing natural enemies to combat the devastating cassava mealybug in the late 1980s. The IITA Biological Control Programme's \$3.5 million Benin Research Station was opened near Cotonou, Benin in December 1988. The program had previously operated out of IITA headquarters in Ibadan, Nigeria.

The cassava mealybug, which was accidentally brought to Africa from Latin America in 1971, caused crop losses of up to 80 percent.

A particularly effective parasite wasp, *Epidinocarsis lopezi*, was identified and has been distributed by IITA and its many national program collaborators at over 150 sites in Sub-Saharan Africa countries. The wasp is bringing the cassava mealybug population below damaging levels to crop production and without damaging effects to the environment or the ecological balance.

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Swift action against the mango mealybug, which three years ago threatened mango production across much of West and Central Africa, was patterned after the successful program against the cassava mealybug.

Control of this second imported mealybug pest, *Rastrococcus invadens*, has been made possible by close collaboration among national plant protection services in Benin and Togo, the British-based Commonwealth Institute of Biological Control (CIBC), and the IITA Biological Control Programme.

A parasitic wasp, *Gyranusoidea tebyqi*, which is a natural enemy of the mango mealybug has been released in five of the affected countries. About six months after the release, the mealybug population appears to have dropped substantially.

The meeting will commemorate the 20th anniversary of CGIAR's founding. The CGIAR Chairman will deliver the Crawford Memorial Lecture highlighting the observance on October 31. The lecture is sponsored by the Australian government in honor of the late Sir John Crawford, an eminent agriculturalist, educator, and statesman, who was the first chairman of the CGIAR Technical Advisory Committee.

Other major agenda items during ICW will be devoted to:

- CGIAR's involvement and participation in the "Earth Summit", the 1992 United Nations Conference on Environment and Development (UNCED),
- funding requirements for the CGIAR centers and donor pledges,
- presentations on past and continuing research programs at 10 CGIAR centers,
- establishment of a new center on forestry research, and
- the status of work of the CGIAR's Task Force on Biotechnology (BIOTASK).

The mango mealybug control program included identification of the rapidly spreading pest as an accidental import from Southeast Asia; the discovery of natural enemies of the pest in India by CIBC; and the release of two promising parasitic wasps following their quarantine, testing, and mass-rearing.

Several affected countries where natural "enemies" were released in 1988, enjoyed a mango crop in 1989, following an almost total production loss during the previous two years.

Other food crop pests currently under study at the Benin Research Station include the larger grain borer, a major pest of stored grains, locusts and grasshoppers, and the complex of pests found on cowpea. Certain weeds, such as water hyacinth and the parasitic witchweed are also considered likely candidates for control by biological methods.

For its work on biological control programs, IITA has won the King Baudouin Award from the Consultative Group on International Agricultural Research (CGIAR). The Award was presented at the annual Washington, D.C. meeting of the CGIAR late last year.

The "CGIAR" King Baudouin Award is given every two years to a CGIAR-supported agricultural research center for a particular technology or discovery that has improved the lives of farmers in developing countries. Winners are selected by an international panel of scientists. In 1980, the CGIAR itself won the King Baudouin Prize for International Development, a prize established in commemoration of the first 25 years of the Belgian monarch's reign. The original prize of \$50,000 is held in trust, and the CGIAR King Baudouin Award is made from earnings accrued.