Good bugs to fight bad ones in developing countries

ITHACA, NY — Safe, cost-effective alternatives to chemical pesticides can now be home-grown by subsistence farmers in developing countries, according to microbial control specialists at the Boyce Thompson Institute for Plant Research.

By lending a human hand to naturally occurring diseases that affect insect pests, farmers in cash-poor areas of Africa, Latin America, and Asia can save their crops by encouraging good "bugs" to fight the bad ones.

Techniques for discovering and mass-producing microbial enemies of harmful insects can also aid in the battle against the Colorado potato beetle, a veteran of the chemical pesticide wars in the U.S.

Microbial diseases — including those from bacteria, viruses, and fungi — control insects without harming plants or humans. The Boyce Thompson Institute advocates of biological control maintain that the effectiveness of such control comes without a disturbing after-effect of many synthetic chemical pesticides. BTI scientists claim that there is virtually no evidence of microbial pest control producing a hardier generation of insects from those that survive the treatments.

"This approach is particularly important in nations with balance-of-payment problems," says Donald W. Roberts, a BTI insect pathologist. "Unlike most chemical pesticides, the fungi can be produced with local materials and labor and with a minimum of capital equipment."

Roberts is the principal investigator in a collaborative research project between the U.S. Agency for International Development (AID) and the Brazilian National Rice and Bean Research Center. Concentrating on insects that affect cowpeas — a legume that is a major subsistence crop in poverty-stricken north and northeast Brazil — the program's researchers have discovered and tested more than 100 types of fungi that produce disease in the cowpea insect pests. One fungus that shows great promise is Erynia radicans, and the BTI researchers are demonstrating that the fungal preparation can be easily mass-produced for use in cowpea and bean farms in Brazil.

The BTI project is one of 18 in 10 institutions funded through the federal "Famine Prevention and Freedom from Hunger Act." The goal of the Bean-Cowpea Collaborative Research Support Program is to reduce hunger and malnutrition by production and utilization of two crops that can be grown in many areas of Africa and Latin America, beans (Phaseolus vulgaris) and cowpeas (Vigna ungiculata).

BTI's strategy is to foster controlled epizootics, or epidemics of disease in insect pests. Treatments of fungus preparations can be one part of a more comprehensive integrated pest management effort, the microbial control advocates believe.

Another collaborative research program at BTI, sponsored by AID and the International Rice Research Institute, is aimed at discovering and developing microbial enemies in the Philippines of the most important threat to Asian rice crops, the brown planthopper. This devastating insect is outwitting man's best efforts with chemical insecticides and resistant rice varieties, but is affected by several fungi, including Hirsutella citriformis and Metarhizium flavovidide. Because fungal diseases often occur too late to protect the rice crops, the BTI researchers want to apply treatments to rice fields earlier in the growth cycle. Preliminary tests of the fungi diseases on brown leafhopper populations in laboratory conditions are being termed "very promising."

The disease-producing fungus Metarhizium anisopliae was first introduced in Brazil in 1979 by BTI researchers, and is being tested in India, Sri Lanka, and the Philippines.

The same strategy is being directed against the Colorado potato beetle, an insecticide-tolerant pest in tomatoes, eggplant, and potatoes in the northeast U.S. Boyce Thompson Institute tests of the fungus Beauveria bassiana are showing the fungal preparation to be at least as effective in future generations.

A crude method of microbial control is already practiced in Brazil, where soybean farmers collect caterpillars naturally infected by an insect-specific virus, grind up the insects, and spread the preparation on the soybean fields.

"Awareness of microbial control is high and is improving in Brazil, so it is an appropriate location for our project," insect pathologist Roberts reports. "We are training Brazilians in insect pathology, both here and in their country. Several sugarcane growers' associations produce their own fungal microbial control material, and they are treating for spittlebugs in the field."

Like talent scouts searching for stars of the future, the American and Brazilian microbial control specialists have traveled to every region of that huge country, collecting new strains of fungi. Certain ones are proving to be effective against several insect species in widely separated parts of the world.

Microbial control, part of integrated pest management strategy, isn't necessarily the complete answer to insect pest problems, Roberts notes, but it is gaining recognition as an important component. Before the researchers recommend a particular microbial control strategy, though, they must be certain the treatment is compatible with insect parasites and predators that also help control harmful populations.

Plant scientists are increasing their understanding of naturally occurring diseases as regulating factors in insect populations, and they are finding opportunities to restore the balance that was tipped by human interference. One example is the brown leafhopper, now considered to be a man-made pest and a product of the "green revolution." Better varieties of rice in Asia are providing more food not only for humans but for insects, and as many as 2,000 brown leafhoppers per plant are found thriving within the protective canopies of rice fields. The insect swept through Asia in the 1970s, reversing many of the gains of the green revolution.

The Boyce Thompson Institute scientists envision the answer to insect plagues yet to come — not from chemical factories in foreign countires — but from local cottage industries, where farmers' and growers' associations can utilize safe, simple technology to produce their own microbial control preparations.

With instruction from insect pathologists who are trained by U.S. institutions such as Boyce Thompson Institute and Cornell University, the farmers can learn the production and application of one of the world's most abundant resources — beneficial microorganisms.

Baughman to retire

CHAMBERSBURG — The Franklin County ASC Committee has announced the retirement of D. Merle Baughman, County Executive Director of the Franklin County Agricultural Stabilization and Conservation Service (ASCS). He will retire effective Jan. 4, 1985.

Baughman began his career with ASCS in 1943, when he was first elected a ASCS Community Commiteeman. One of his first jobs with ASCS, forty years ago, he recalls, was measuring acreage of potato fields throughout the county. In 1957, Baughman was appointed County Compliance Supervisor. In this capacity, he trained reporters to do field work for ASCS. In 1960, after completing the County Executive Trainee Course, he served as State compliance Supervisor, under the supervision of the Pennsylvania State ASC Commiteee. As State Compliance Supervisor, he served in 24 counties in the western part of Pennsylvania.

In March of 1963, the Franklin County ASC Committee hired Baughman as County Executive Director of the ASCS Office. As Director, Baughman directs the day-to-day operations of the County Office. ASCS administers Federal Farm Programs as passed by Congress. The Franklin County ASCS Office is located at 550 Cleveland Avenue, Chambersburg, Penna.

Merle and his wife Marie are the parents of one daughter and three sons and live at 377 Musser Road, Shippensburg, Penna.