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Fruit Flies: Solutions to Food Crop Losses and Opportunities for Business Development

Dick Drew

Paper prepared for presentation at the “Prosper or Perish: Asian Poverty and the Australian Economy” conference conducted by the Crawford Fund for International Agricultural Research, Parliament House, Canberra, Australia, June 28, 2001

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Fruit Flies: Solutions to Food Crop Losses and Opportunities for Business Development

Case study presentation

DICK DREW

Fruit flies are the major insect pests of fruit and vegetable production, worldwide. In developing countries, fruit crop losses are so large that they contribute significantly to reduced household food security, poor human nutrition and poverty. In addition to the direct crop losses, many countries lose export trade opportunities if they have major pest fruit fly species, while others spend considerable sums on quarantine detection and eradication procedures in order to remain free of fruit fly. Indeed, fruit flies rate with some of the major animal diseases in terms of economic losses and quarantine problems.

DICK DREW, Project Leader, ACIAR, Griffith University, Brisbane is regarded worldwide as one of the leading authorities on the taxonomy and biology of dactylo fruit flies. Having worked in the Queensland Department of Primary Industries for over two decades, Professor Drew has been involved in various aspects of pure and applied research on this group of insects. He now holds a personal chair at Griffith University to continue his work of over three decades in this field. His keen interest in developing ecologically sustainable/ environmentally friendly methods of pest management in the context of the Australasian horticultural industry has earned him numerous accolades including the Clunies Ross National Science and Technology Award (2000), Order of Australia (1995) and the Ian Mackerras Medal (1990). He was integrally involved in the development of the Northern Australian Quarantine Strategy (NAQS) for fruit flies to minimise the risks of potential fruit fly incursions from Asia, and the Australian Quarantine Inspection Services (AQIS) fruit fly quarantine network to facilitate early detection and warning of invading fruit fly species.

Australian overseas aid projects on fruit flies

For over a decade, Australian scientists have worked on simple, environmentally sound solutions to fruit fly problems in developing countries in our region²². These projects have been supported by ACIAR, AusAID and the Crawford Fund, each making extremely important contributions. Besides the provision of funding, these aid organisations are responsible for building vital linkages and infrastructure that enable the scientists and technical workers to achieve project goals.

The fruit fly projects have been conducted in some South Pacific and South East Asian countries. The primary aims of the projects are to—

1. Increase food crop production through fruit fly field pest management;
2. Develop opportunities for export trade by assisting countries to overcome fruit-fly-induced trade restrictions;
3. Build quarantine security programs to

²² Drew, Dick and Allwood, Allan (1997) Fruit fly control: arrest of a pest. *Partners* 10, 2-7 (ACIAR, Canberra)

- prevent the introduction and establishment of new major pest species in countries; and
4. Conduct training programs for agriculture officers and farmers in all aspects of fruit fly pest management, eradication of introduced species and quarantine procedures.

An important goal of the fruit fly projects has been to work with and train agriculture personnel and farmers at all levels.

Field pest management of fruit flies

The most environmentally sound method of reducing field crop losses to fruit flies is the protein bait system. This involves regular weekly applications of very small quantities of protein plus insecticide to foliage of fruiting plants. The flies are attracted to feed on the protein and are killed by the insecticide. This method results in negligible amounts of chemical in food crops and the environment, and a buildup of populations of beneficial insects such as pollinators and biocontrol agents.

Although simple, this method requires precise application strategies and availability of inexpensive protein. The application procedures have been taught to farmers through the training workshop programs but the lack of protein in most developing countries has resulted in the methodology not being widely adopted. To overcome this problem, ACIAR supported a project in Tonga to develop a method, and establish a prototype manufacturing plant, to produce yeast protein from brewery yeast waste. This project resulted in a method of converting the yeast waste to a protein formulation that is attractive to fruit flies, and a prototype commercial manufacturing plant. The protein can also be used as a supplement in stockfood which is in short supply in many developing countries.

New project in Vietnam

A new project in Vietnam, to begin in late 2001, will build on the results of the Tongan project and establish a large commercial protein manufacturing plant in Vietnam. The project will be supported by ACIAR, AusAID and the Crawford Fund in a joint venture with Aventis and the Australian Fosters Brewery. The brewery owned by Fosters is in a town called My Tho in the Mekong Delta. The plant will process 3 to 5 tonnes of yeast waste per week, and the protein product will be available for distribution throughout Vietnam and for export to neighbouring countries. The protein can be used for both fruit fly field pest management and stock food supplements.

Expected outcomes of project

The new project in Vietnam will have the following positive results–

1. Collaboration between ACIAR, AusAID, the Crawford Fund, Vietnam government and Australian industry partners (Fosters Brewery and Aventis);
2. Production of yeast protein for agricultural purposes;
3. Environmental benefits in (a) reduction of pesticide usage in field control of fruit flies and (b) prevention of dumping of yeast waste by the brewery into environmentally sensitive areas;
4. Employment of people at the manufacturing plant;
5. An export market opportunity for Vietnam through sales of protein nationally and internationally;
6. Assistance for poor rural communities in Vietnam through increased production of fruit and vegetable crops for consumption and marketing;
7. Education and training for rural communities, particularly in horticultural and pest management practices; and

8. Benefits to Australia in (a) knowledge of South East Asian fruit fly species that are targets for our quarantine detection systems, and (b) savings in fruit fly eradication programs when new incursions do occur, e.g. it was estimated that a saving of \$10 million in the northern Queensland Asian Papaya Fruit Fly Eradication Campaign resulted from information gained in ACIAR projects in Malaysia and Thailand.

Following the successful completion of the Vietnam program, it is expected that protein manufacturing can be expanded in other breweries within the country and in some other South East Asian countries. This may involve new industry partners and some initial support from aid agencies., Once established, however, the manufacturing plants should be financially sustainable.