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INTEGRATED PEST MANAGEMENT IN COFFEE THE JAMAICAN EXPERIENCE

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ABSTRACT

The discovery of coffee berry borer, ***Hypothenemus hampei*** in Jamaica in 1978 and its subsequent development as an economic pest, provided an opportunity for a multifaceted approach to integrated coffee pest management in that country. In 1986 coffee leaf rust ***Hemileia vastatrix*** was also discovered and control activities were incorporated into those for the berry borer.

The integrated approach to the management of these pests resulted in the reduction of borer infestation level from 33.7% in 1982 to 4.5% in 1987 and the effective containment and control of coffee leaf rust.

In addition to chemical and non-chemical control measures against coffee berry borer and leaf rust, the integrated pest management approach is supported by the promotion of a farm gate price incentive for the collection and processing of good quality coffee.

BACKGROUND ON COFFEE INDUSTRY

Jamaica earns approximately US$10m annually from the export of coffee. Annual export is 20-25 thousand 60 kg bags compared to such countries as Brazil 18 million bags and Colombia 10 million bags: Jamaica's high profile on the international trade exists because of the demand for the high quality and flavour derived from its coffee and particularly Blue Mountain Coffee.

The Jamaican coffee industry is divided into:

1). The Cooperative Group which is comprises of approximately 25,000 small farmers organized into 19 Coffee Cooperatives. The farmers in this group are characterized by small acreage of less than 10 hectares and practice mixed cropping systems. Farm inputs are generally low and result in low productivity and income from any single crop.

2). The Private Commercial Group is comprised of approximately 500 farmers who produce coffee as a monocrop on farms of over 10 hectares in size. Productivity is high because of higher levels of input and technology. Most of these farmers are professionals in various fields other than agriculture and do not depend entirely on the income from coffee.

Since 1982 a number of Projects and Programmes have been put in place in a coordinated effort to expand production and develop new technologies. In that regard invaluable support have been obtained from Agencies such as the United Agency for International Development (USAID), Commonwealth Development Cooperation (CDC), the Overseas Economic Co-operation Fund (OECF) of Japan, the International Fund for Agricultural Development (IFAD), the European Economic Community (EEC) Interamerican Institute for Co-operation in Agriculture (IICA) and the Overseas Development Agency (ODA) of the United Kingdom (UK). These institutions working together have focussed on the industry to keep its conspicuous position despite its small relative size in the international trade.

INTEGRATED PEST MANAGEMENT IN COFFEE

Prior to 1978 the use of chemicals in coffee in Jamaica was minimal because:

a) coffee was only one of the various crops in the mixed cropping system described earlier.

b) the relatively low incidence of pest and disease generally did not warrant chemical sprays.

c) the absence of major pests of coffee in Jamaica except for sporadic outbreaks of leaf minor *Leucoptera coffeella*

However that situation changed in 1978 when the most notorious known pest the coffee berry borer (*Hypothenemus hampei*) was observed for the first time in Jamaica. Then in 1986 the coffee leaf rust (*Hemeleia vastatrix*) was detected for the first time.

Four years after the berry borer appeared, the pest was found in all coffee growing areas and bean damage had reached 33%.

CONTROL STRATEGY

In a coordinated effort with the Caribbean Agricultural Research and Development Institute (CARDI), the Jamaican Ministry of Agriculture, the University of the West Indies (UWI) and the Coffee Industry Board, the following steps were taken.

(a) Field surveys to establish the geographical distribution of the pest.

(b) Pesticide assay to determine which of the 15 - 20 chemicals available were most effective against the pest.

(c) Restricted routing of coffee to minimize distribution of the pest.

(d) Initiate research on the development of an effective integrated control programme.

(e) Public education utilizing the media (print and electronic), meetings with farmers and school communities.

(f) Co-operation and liaison with International Agencies and institutions in an effort to better understand the pest and how to manage it in the local situation.

All the above measures were consolidated into a National Control Programme with the major objective being to reduce the infestation levels to below 5% in five years.

CHEMICAL CONTROL

Chemical control was effected through the application of one or two applications of enclosulfan annually. As of 1986 copper oxychloride was incorporated into the spray mixture for control of Coffee Leaf Rust.

Two applications at 4-6 week internals were made where borer infestation was high and coffee production significant. Where infestation was low and production less significant one application of spray mixture would be done.

The spray programme was organized on a national basis and involved the employment, training and supervision of spray personnel on a district or village basis. Spray applications would commence when 30% of the expected crop had reached the susceptible stage of infestation. That is, when young berries attained 2 mm in size.

Monitoring information was obtained through a communication network involving CARDI and CIB extension staff using two way VHF radio link-up as well as by way of formal written reports.

NON-CHEMICAL CONTROL

CARDI developed a post harvest programme which was very effective, but even more importantly, sustainable with minimum financial input by the small coffee farmers. The emphasis was on the removal of residual berries from the trees and the ground, at the end of the commercial reaping period. The effort was supported by manipulation of the canopy of trees by pruning to improve productivity and create

easier access to spray applications and improved plant fertility by use of organic and inorganic fertilizers.

In order to maximize farmer participation, the extension services intensified its education process and by so doing motivated more farmers to undertake the post-harvest sanitation.

QUALITY INCENTIVE

Collaboration efforts between CARDI, CIB and the co-operatives developed a programme to encourage the elimination of poor coffee berries by a floatation process. Those cooperatives and farmers with low float percentages got a higher farm gate price for coffee than those with high float percentages. The peer pressure which resulted from this approach was mostly responsible for farmers taking greater care and attention to their coffee.

PERFORMANCE OF THE NATIONAL CONTROL PROGRAMME

The mean bean damage level of the 1987/88 coffee crop was recorded as 4.3%. At the same time field observations showed that Coffee Leaf Rust was effectively contained. There were few reports of defoliation caused by rust and high infection levels were observed only in fields that were poorly kept and low producing.

One negative result has been the observed increased incidence of leaf miner (*Leucoptera coffeella*) in many areas. During 1990 to 1991 leaf miner infestations had reached epidemic proportion in many areas. Prolonged drought during this period has been suggested as a major factor, but the depletion of natural enemies which result from enclosulfan applications is also an important contributing factor.

CONCLUSION

1. Natural enemies operating in a low intensive farming system contributed significantly to the low endemic of pest and diseases in Jamaica prior to 1978. This points to the need for

future work on Integrated Pest Management to take into consideration the importance of indigenous farming systems.

2. A well coordinated and executed Integrated Pest Management System in coffee has facilitated.

   a) Effective control of the coffee berry borer

   b) Containment and control of coffee leaf rust

   c) Selective and controlled use of pesticides

   d) The development of appropriate control measures relevant to a sustainable cropping system

   e) Increase returns to farmers

   f) A more informed farming community

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