Integrated Pest Management in Multiple Cropping Systems

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Multiple cropping allows for crop intensification in two dimensions, vertical and horizontal (Fig. 1). We think of yield per crop as the vertical dimension and yield per year as the horizontal dimension. Yield per crop can be increased by planting high-yielding varieties, using fertilizers and pesticides, planting denser stands, irrigating, and intercropping. Sequential and relay cropping are means of intensifying yield in the horizontal dimension. The goal of research is to increase food production in both dimensions, even in existing multiple cropping patterns. It has been well documented (Rivnay, 1964, 1972; Smith, 1972; Nickel, 1973) that pests and their populations change in response to the inputs associated with the vertical dimension of intensive cropping.

DEVELOPMENT OF TECHNOLOGY

The challenge to pest management specialists is to assist in the development of technology to produce higher-yielding cropping patterns without creating conditions that favor equally higher potentials for pests. It is expected that pests and the technology used in dealing with them will change in kind and degree in conjunction with the adoption of new cropping patterns (Pradan, 1968; Paharia & Mehta, 1970). These changes in crop combinations will require more sophisticated management decisions on the part of the farmer (Harwood & Price, 1976).

A researcher concerned with pest problems will need to widen his research perspective in order to be effective (Harwood, 1974a). Research on pests has normally been done on a single crop basis. In multiple cropping, it

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