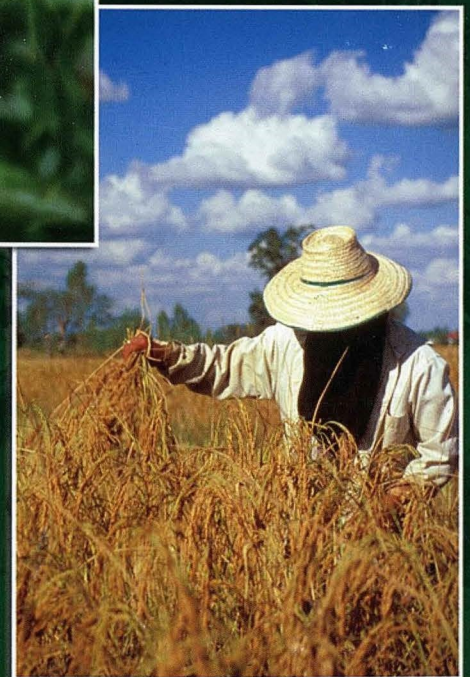


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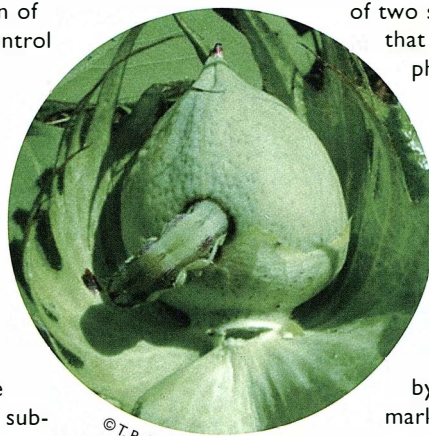
Agronomy
Crops and cropping systems



▲ Tomato fruitworm (*Helicoverpa armigera*) on a tomato plant.

Monitoring pest insect movements to enhance sustainable agrosystem management in sub-Saharan Africa

Understanding the spatial dynamics of pests in agrosystems, which consist of a shifting patchwork of cultivated and noncultivated habitats, facilitates prediction of outbreak risks and planning of targeted control of upsurge hotspots. This knowledge also enables *ex-ante* development of cropping systems in which pests are effectively managed on different time scales (e.g. crop sequences) and spatial scales (e.g. crop associations, cultivated or noncultivated refuge areas). The polyphagous noctuid cotton pest *Helicoverpa armigera* Hbn has developed resistance to pyrethroids. The resistance gene flow patterns must be clarified in order to develop strategies for sustainable management of populations of this pest in sub-Saharan African grassland agrosystems.



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communities known to be potential hosts can be assessed using: (i) isotopic techniques (analysis of the composition of two stable carbon isotopes, i.e. ^{12}C and ^{13}C , that are able to differentiate plants with a C_3 physiology from those with a C_4 physiology, e.g. maize), and (ii) phytochemical tracers such as gossypol, an alkaloid of cotton, and glyco-alkaloids such as tomatine derived from solanaceous plants. Pyrethroid resistance markers (point mutations, resistance levels) can also be used. On a regional scale, analysis of the stable hydrogen isotope composition (^1H and deuterium) and polymorphism in microbial flora (bacteria, yeast) hosted by adult pests, determined using molecular markers, can facilitate study of long-distance adult migratory phenomena and determination of the geographical origins of these populations.

For monitoring movements, a combination of tools is implemented to determine the origin of trapped individuals using landscape ecology based spatial analysis methods. On an agrosystem scale, the contribution of the main plant

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▲ Noctuid caterpillar feeding on a cotton boll.