FRENGH SUGARGANE EXPERISE





AGROECOLOGICAL MANAGEMENT OF SUGARCANE PESTS

Agroecological management of sugarcane pests is going to play a key role in pest control solutions. This control strategy appears more complicated to implement in the field, as agroecology is based on fine knowledge of ecological processes (e.g. pest-crop-natural enemy interactions), and of how agricultural and environmental factors influence population dynamics. Here are some examples of what could be done to control insect pests, which cause 10 to 30% of crop losses, depending on infestation levels.

MANAGEMENT OF THE STEM BORER

Erianthus arundinaceus: a trap crop for the spotted sugarcane stem borer

Using trap crops is an agroecological protection strategy for regulating populations of sugarcane stem borers.

The grass *Erianthus arundinaceum* is a close relative of sugarcane. The females of the spotted sugarcane stem borer *Chilo sacchariphagus* prefer to lay their eggs on *E. arundinaceum* rather than on sugarcane, while the survival of the larvae on that grass is very low. Studies on Reunion island have shown that planting a row of Erianthus around sugarcane plots reduces damage in the cane.

Nitrogen and silicon are key elements affecting borer infestation

Recent studies on three borer species, *Eldana saccharina* (Ivory Coast, Senegal, South Africa) *Diatraea* spp. (Argentina and Panama) and *Chilo sacchariphagus* (Indonesia) have shown that these pests are very sensitive to silicon and nitrogen contents in the plant. For example, using silicon-based products in our experiments significantly reduced borer damage levels by up to 50%, confirming the positive effect of silicon as a physical barrier to borer penetration. On the other hand, excessive nitrogen rates applied to the soil led to a reverse situation, attracting borer populations and increasing damage. Over-application of nitrogen is common in sugarcane growing and it is essential to conduct soil analyses to check nitrogen levels in the soil before applying this fertilizer.

KNOWLEDGE OF FUNCTIONAL BIODIVERSITY IN CANE FIELDS

As part of the Sustainable Territory project, data are being collected on arthropod fauna present in cane fields, thanks to a trapping device, installed on several sites in Petite-île (South of Reunion Island).

Predators and parasitoids involved in the biocontrol of cane pests, including stem borers, will be studied in terms of richness and abundance, in relation to cultural practices and crop diversification.

BIOCONTROL OF THE WHITE GRUB

Tracking a myco-insecticide in the field

The persistence and diffusion of myco-insecticides in agroecosystems are poorly known. Cirad Reunion has been developed to describe the genetic diversity of a commercial strain of the fungus *Beauveria hoplocheli* and keep track of fungus populations in the soil. This entomopathogenic fungus was introduced on Reunion Island and used throughout the sugarcane growing area for 30 years to control the white grub *Hoplochelus marginalis*. The work at Cirad Reunion involved spatio-temporal monitoring of the myco-insecticide in sugarcane fields over successive sugarcane crop cycles, providing key information on the durability of this biological control strategy.

26



The sugarcane white grub, Hoplochelus marginalis



White grub *Hoplochelus marginalis* mummified by the entomopathogenic fungus *Beauveria hoplocheli*



Pitfall trap (Barber pot) for the capture of crawling insects. The stone prevents the plastic shelter from flying away



Observation and survey of the interception trap, collection of samples



Ladybug aphid predator - *Cheilomenes sulphurea* in Congo



Predatory spider on cane leaf - *Neoscona moreli* in Reunion

Cirad: Valérie SOTI Pierre MARTIN Laurent COSTET Samuel NIBOUCHE François-Régis GOFB