



Crop mosaic in a vegetable-producing landscape (Senegal). – T. Brévault

# DIVECOSYS: A scientific partnership platform for ecologically- based pest management in West Africa

Hubert de BON<sup>1</sup>, Thierry BREVAULT<sup>1</sup>,  
David ARODOKOUN<sup>2</sup>, Mariama DIALLO<sup>8</sup>, Karamoko DIARRA<sup>3</sup>,  
Abdoulaye HAMADOUN<sup>4</sup>, Philippe MENOZZI<sup>1</sup>, Dienaba SALL<sup>5</sup>,  
Antonio SINZOGAN<sup>7</sup>, Manuel TAMO<sup>6</sup>, Jean-Francois VAYSSIÈRES<sup>1,6</sup>,  
<sup>1</sup>CIRAD, <sup>2</sup>INRAB, <sup>3</sup>UCAD, <sup>4</sup>IER, <sup>5</sup>ISRA, <sup>6</sup>IITA, <sup>7</sup>UAC, <sup>8</sup>UGB

## The necessity of joint efforts

Crop pests are a major constraint to the intensification of agricultural production in the tropics, with novel issues related to global change, food security and preservation of natural resources and biodiversity. A research, extension and education partnership platform called *DIVECOSYS* (Diversity of cropping systems and ecologically-based pest management in West Africa) was launched in 2010 to synergize applied research actions in response to growing concerns on the vulnerability of agricultural systems to pest management in West Africa.

Its main scientific objective is to explore the potential of biodiversity and ecological processes such as pest regulation, enabling novel ecologically-based models for productive systems, reduction of pesticide use, and adaptation or resilience of farming systems in the face of environmental disruptions.



Palm tree and cassava in lowland Benin- H. de Bon



Participative evaluation of farmers fields in Niayes area (Sénégal) - D. Sall

## Scientific approach

### Combining multiple tactics

DIVECOSYS proposes smart integration of conventional and alternative techniques to significantly reduce the use of pesticides.

### Activating key ecological processes

Dynamics of pest populations and ecological processes involved in biological control are studied from multiple spatial perspectives, from plant to landscape.

### Taking into account socio-ecosystems

Interactions with farmers are needed to collectively identify technical action-levers. From Northern Senegal to Southern Benin, DIVECOSYS explores a wide range of socio-ecological contexts.

## Zoom in on fruit flies in orchards

In the framework of the West African Fruit fly Initiative, an innovative system has been developed to control fruit flies by weaver ants in mango orchards. A study showed that weaver ants presence resulted in a marked reduction in mango damage through predation of adult fruit flies (rare), predation of larvae (frequent) and mainly effect of ant- pheromones on the fruits, so that flies are repelled. Weaver ant technology is cost free, labour saving and requires little intervention.

## Bollworms in cotton landscapes

In Benin, a two-year study highlighted the importance of considering both agricultural practices and landscape context to identify ways to improve the management of the cotton bollworm. It was demonstrated that a high concentration of cotton crops in the surrounding landscape of fields increased bollworm abundance. Other factors such as sowing date, weeding, natural vegetation, nature of the previous crops have also effects on the population of *Helicoverpa armigera*.

## Bacillus thuringiensis and neem treatments rotation in cabbage pest management

In Senegal, it has been demonstrated that applications of *B. thuringiensis* and neem can provide an effective biological control of diamondback moth and to produce safe cabbage crops. The technique is cost-effective and therefore can be recommended to farmers in developing countries.

### References

Thierry Brévault, Alain Renou, Jean-François Vayssières, Guillaume Amadji, Françoise Assogba-Komlan, Mariama Dalanda Diallo, Hubert De Bon, Karamoko Diarra, Abdoulaye Hamadoun, Joël Huat, Pascal Marnotte, Philippe Menozzi, Patrick Prudent, Jean-Yves Rey, Dienaba Sall, Pierre Silvie, Serge Simon, Antonio Sinzogan, Valérie Soti, Manuele Tamo, Pascal Clouvel. 2014. DIVECOSYS: Bringing together researchers to design ecologically-based pest management for small-scale farming systems in West Africa. Crop Protection, (in press).

<http://ur-hortsys.cirad.fr/projets-de-recherche/divecosys>



Weaver ants capturing fruit fly larvae and other pests on a mango fruit - (Benin) - JF Vayssières



Cotton bollworm larva- Cirad



Safe cabbage production with BT and neem, Niayes of senegal

### DPs

**Platforms in Partnership for research and training (Dispositifs de recherche et d'enseignement en partenariat)**

DIVECOSYS is part of the 21 CIRAD DP established worldwide.

