05-Spatial ecology of *Dermolepida albohirtum*, a major pest of sugarcane in Queensland: importance of a landscape approach

François-Régis Goebel [1] and Nader Sallam[2]
[1] CIRAD, UR Systèmes Cultures Annuels, Montpellier ; [2] BSES Limited, Q Crops, Gordonvale, Australia
E-mail: goebel@cirad.fr

Ecology has become increasingly permeated by the notion that everything takes place within a spatial context and that the distribution of habitat may strongly impact on distribution, dynamics and evolution of natural populations. In the agricultural context, understanding the influence of landscape structure (i.e. arrangement, connectivity and quality of habitat patches) on the movements of insect pests and pest outbreaks has become essential for implementing good pest management strategies. The subterranean habitat of white grubs ("larvae") and ability of beetles ("adult") to fly through the landscape once emerged make these insects difficult to manage. Adult dispersal depends on spatial and environmental factors that are generally poorly understood in agricultural systems. Beetles spend much of each year as larvae, feeding actively on many roots of food crops (sugarcane, rice, sorghum, vegetables, grain legumes, pastures, etc.) as well as garden lawns and turf of golf courses.
In Australia, 19 species of scarab beetles ('canegrubs') attack sugarcane and the greyback canegrub *Dermolepida albohirtum* Waterhouse (Coleoptera: Scarabaeidae) is the most devastating pest, with estimated annual losses of AU$10 million. Information on the population dynamics is available at the field scale but studies have mainly focused on grubs and chemical management strategies for many years. However, information is scattered in many sources, particularly information on the adult behaviour at both the field and landscape scale. Major factors such as flight behaviour, feeding, resting, mating and oviposition sites in sugarcane, other crops and trees are little documented and mainly rely on old field observations. The lack of information on beetle behaviour impedes understanding of the distribution of this pest and hence application of efficient control methods. This paper provides an overview of the information already available on the ecology of this pest and present new tools that are currently used to investigate adult movement and damage distribution and the influence of the vegetation surrounding the sugarcane areas.

06-Combination of field margin manipulation and genetic resistance to limit Aphis gossypii outbreaks and virus epidemics in melon crops

Alexandra Schoeny[1], Patrick Gognalons[1], Nathalie Boissot[2], Pascale Mistral[2], Virginie Chareyron[2], Catherine Wipf-Scheibel[1], and Hervé Lecoq[1]
[1]INRA, UR 407 Pathologie Végétale, Avignon; [2]INRA, UR 1052 Génétique et Amélioration des Fruits et Légumes, Avignon
E-mail : alexandra.schoeny@avignon.inra.fr

Aphis gossypii is a major pest of Cucurbitaceae crops as much by causing primary damages (sap uptake) as by being an important vector of viruses. The Vat gene confers to the melon a resistance to the colonization by *A. gossypii* as well as a resistance to the not persistent viruses (CMV, WMV,..) transmitted by these aphids. It is however ineffective to block the transmission of the viruses carried by other aphid species. The use of Vat is thus generally coupled with aphicid treatments to limit the viral transmission by the not colonizing aphids. However, the progressive reduction of the usage of the phytosanitary products in the crop protection imposed by the evolution of the regulation (plan Ecophyto 2018) leads to look for new strategies integrating cultural practices and genetics for the management of the bioagressors.
The bibliography suggests that the management of field margins (strips sown with non host grass or flower mixtures) could be an effective option to decrease 1) the aphid pressure (and thus the risk of bypassing Vat) by favoring the development of natural enemies and 2) the virus pressure by constituting a filter reducing the viral load of aphids before they reach the crop. The hypothesis tested in this project is that an adequate manipulation of the environment of the crop can contribute to regulate the populations of aphids and\or their viral load and therefore to reduce the risk of viral epidemics. The effect of three types of field margins (naked soil, grassy strips and flower strips) is evaluated on the efficiency of the Vat-mediated resistance.