



Blister beetle, courtesy: Mr. Wanyolke Wamit, National Museum of Kenya, Nairobi



Bugs Courtesy: Subramanian Sevgan, icipe



Wasp Courtesy: Subramanian Sevgan, icipe



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BOOK OF ABSTRACTS

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“Biodiversité et développement durable en
Afrique: contribution de la science des
insectes dans le développement de
l'agriculture et à l'amélioration de la santé ”



Lepidopteran larvae Courtesy: Niassy, Ballou, icipe

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Abdoul Aziz NIANG, Allou KOUASSI, Komina AMÉVOIN, Faiza SALAH, Soulymane NACRO, Fening OKWAE,
Saliou NIASSY, Sevgan SUBRAMANIAN, Nguya Kalemba MANIANIA, Rajinder Kumar SAINI



Mots clés: *Plutella xylostella*, oviposition, cabbage, net

Paper No. OP23

Tritrophic interactions of host plants, *Liriomyza* leafminer species (Diptera: Agromyzidae) and a beneficial parasitoid *Diglyphus isaea* (Hymenoptera: Eulophidae)

Musundire R.^{1,3}, Chabi-Olaye A.^{1†}, Krüger K.² & Salifu D.¹

¹*icipe*—African Insect Science for Food and Health, P.O. Box 30772-00100 Nairobi, Kenya;

²Department of Zoology and Entomology, University of Pretoria, Pretoria, 0002, South Africa;

³Chinhoyi University of Technology, P. Bag 7724 Chinhoyi, Zimbabwe

Three invasive species *Liriomyza huidobrensis*, *L. sativae* and *L. trifolii* cause economic yield losses on high value crops globally. A parasitoid of these species, *Diglyphus isaea* has variable performance according to host plants. This study was therefore conducted to investigate tritrophic interactions between this parasitoid and three *Liriomyza* species reared on *Phaseolus vulgaris*, *Pisum sativum*, *Solanum lycopersicum* and *Vicia faba*. A three-tiered approach was used in laboratory studies done at *icipe*. First, body size was determined as a measure of *Liriomyza* fitness. Secondly, parasitism rate of *D. isaea* was determined in no-choice and choice experiments. Thirdly, role of olfactory cues in host finding by the parasitoid was examined. Results showed that rearing *L. huidobrensis* and *L. sativae* on different plant species did not result in differences in size of adult progeny while *L. trifolii* was significantly larger when reared on *V. faba*. In no-choice tests, *L. huidobrensis* had highest rate of parasitism when reared on *P. vulgaris* (46 %), *L. sativae* when reared on *V. faba* (59 %) and *P. vulgaris* (59 %), and *L. trifolii* when reared on *S. lycopersicum* (68 %). In choice tests, highest rate of parasitism for *L. sativae* was 31 % when reared on *P. vulgaris* while *L. trifolii* reared on *P. sativum* (2 %) had the lowest rate of parasitism. A positive response by parasitoids to all *Liriomyza* spp.-damaged plants suggested that indirect defensive compounds (allomones) were emitted. In conclusion, *Liriomyza* spp. size was not necessarily positively linked with parasitism and there was no discernable pattern between parasitoid response to damaged plants and parasitism on the same plants. Therefore, suitability of *D. isaea* for controlling *Liriomyza* species is variable and depends mostly on host plant species and *Liriomyza* spp. A need therefore exists to identify other suitable biological control candidates to augment this parasitoid.

Key words: *Liriomyza*, *Diglyphus isaea*, plants species, plant-pest-parasitoid interaction

Paper No. OP24

New options for pest management in horticultural crop-based agroecosystems of Sudano-Sahelian Africa in the climate change context

Ratnadass A.^{*}, Zakari-Moussa O., Kadi-Kadi H., Siaka S.A., Salha H., Hamza, Nikiema A., Fatondji D., Kumar S. & Pasternak D.

*ICRISAT-CIRAD, BP 12404 Niamey, Niger

Present address: Cirad, UR HortSys, TA B-103/PS4, F-34398 Montpellier Cedex 5

Email: ratnadass@cirad.fr

In the climate change context, ICRISAT is promoting water-saving cropping systems mixing food and horticultural crops for the Sudano-Sahelian zone of Western Africa. ICRISAT's partners in Niger (CIRAD, the University of Niamey and INRAN) are seeking ways to minimize the impact of crop pests in these systems, using the agroecological approach. Following encouraging earlier results, agroecological management options were further investigated in 2010 for the major pests of okra, jujube tree and watermelon, the major horticultural crops in the water harvesting-based Bio-Reclamation of Degraded Lands (BDL) and Dryland Eco-Farm (DEF) systems. Pigeon pea was evaluated as a trap crop for regulating infestation of okra by the fruit worm *Helicoverpa armigera* in a design with four treatments (unbordered cypermethrin-sprayed and unsprayed controls, and two pigeon pea-bordered unsprayed treatments, with an

early and an extra-early cultivar). On the other hand, the foliage of 4 trees in a jujube orchard was sprayed with GF-120 (mixture of food attractant and biological insecticide) with 2 trees remaining unsprayed. White linen sheets were placed under the sprayed trees, in view of collecting the flies that would have ingested the bait, and ripe jujube fruits were harvested and weighed. Results on okra suggested a new "top-down" regulation process, further to the mere "bottom-up" trap-cropping effect, which questions the relevance of both attempting to reinforce the "pull" trap-cropping effect with a "push" effect using insect-repellent sprays on the main okra crop, and playing on a barrier effect of the perimeter trap crop against piercing-sucking homopteran pests. Results on jujube suggested that GF-120 could be used both as a repellent to protect jujube trees from the fruit fly *Carpomya incompleta*, and as an attractant to protect water melon, which is part of the DEF system, from *Dacus* spp., thus killing two birds with one stone.

Mots clés: *Abelmoschus esculentus*, *Cajanus cajan*, *Ziziphus mauritiana*, *Helicoverpa armigera*, *Carpomya incompleta*, agroecology, rainwater harvesting, trap cropping, spot spraying

Figure 1. 01/2010

Développement de la méthodologie d'étude de l'implantation optimale de plantes-pièges pour la régulation des infestations et dégâts des ravageurs des cultures maraîchères en Afrique sahélienne

Zakari-Moussa O., Ratnadass A., Yabo O., Katiella Liman A., Salha H., Grechi I., Ryckewaert P., Kumar S. & Pasternak D.

Université Abdou Moumouni, Faculté d'Agronomie, BP 10960 Niamey, Niger

Email: ousmane.zakari-moussa@auf.org

Dans le contexte actuel de changement climatique, l'ICRISAT et ses partenaires au Niger, particulièrement l'AVRDC (World Vegetable Center) et la Fédération des Coopératives Maraîchères du Niger (FCMN-Niya) promeuvent des systèmes de culture maraîchers économes en eau, soit à base d'irrigation goutte-à-goutte comme le Jardin Potager Africain, soit à base d'infiltration des eaux de pluie comme le système de Biorécupération des Terres Dégradées. Les cultures de tomate et de gombo y subissant d'importants dégâts d'insectes ravageurs, le CIRAD, l'Université Abdou moumouni de Niamey et l'INRAN cherchent des moyens de minimiser ces dégâts et l'utilisation des pesticides de synthèse, avec une approche agroécologique, fondée notamment sur l'utilisation de plantes-pièges. Des essais ont ainsi été conduits à cette fin de 2008 à 2010 sur la station de l'ICRISAT à Sadoré, en appui à d'autres études menées parallèlement sur la station de l'INRAN à Birni N'Konni. Ils ont notamment impliqué des piègages d'insectes (pièges lumineux, pièges jaunes, pièges à phéromones), des suivis de développement et de phénologie des cultures et plantes-pièges. Bien que la pression de la noctuelle *Helicoverpa armigera* (principal ravageur de la tomate et du gombo) ait été faible au niveau des essais conduits à Sadoré, des résultats intéressants ont été obtenus, apportant un nouvel éclairage, d'une part sur la définition de stratégies de lutte : détermination de la pertinence de la recherche d'effets « barrière » et/ou du recours à des répulsifs, en complément de l'effet attractif de plantes-pièges, dans une approche de type « push-pull assisté ». D'autre part, ces résultats contribuent à l'optimisation des modalités d'implantation spatio-temporelle de plantes-pièges par rapport aux cultures à protéger, et au développement de la méthodologie d'étude surtout par rapport à l'intérêt de l'infestation artificielle en cas de faible pression de ravageurs.

Mots clés: Agroécologie, *Helicoverpa armigera*, push-pull, Niger, gombo, tomate, pois d'angole

Figure 1. 01/2010

Disseminating technology with farmers, not to farmers: Implementing push-pull for control of *Eldana saccharina* in Kwazulu-Natal, South Africa

Cockburn J.J.^{*1,2}, Van Den Berg J.², Conlong D.E.^{1,3} & Coetzee H.C.²

¹Crop Biology Resource Centre, South African Sugarcane Research Institute, Private Bag X02, Mount Edgecombe, 4300, South Africa;

²School of Environmental Sciences and Development, North-West University,