The Potential of Coloured Sticky Traps with Kairomonal Attractants (LUREM-TR) in Management of Thrips on Tomato and French beans

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A Thesis Submitted in Partial fulfillment for the degree of Master of Science in Agricultural Entomology in the Jomo Kenyatta University of Agriculture and Technology

2011

ABSTRACT

Tomato *Lycopersicon esculentum* (Mill) and French beans *Phaseolus vulgaris* (Linnaeus) are among the most income generating vegetable crops for the domestic and the export market in Kenya, respectively. Thrips are among the key pests hampering the production of these crops due to their direct and indirect damage to the crops. Effective monitoring and timely implementation of pest management strategies is important for successful thrips management. Coloured traps and kairomonal attractants have been used widely globally for thrips monitoring but their use and effectiveness has not been evaluated for thrips complex found in Kenya. The effect of the addition of kairomonal attractant, LUREM-TR to increased attraction of adult thrips to commercially available blue and yellow sticky traps was examined in outdoor French beans and tomato production fields. Field experiments for each crop over two cropping periods were carried out in a randomized complete block design with four replicates. Six treatments were adopted: blue, yellow and clear sticky traps either with or without LUREM-TR attractant. In tomato, blue sticky traps caught 1.66 – 5.08 times as many thrips as yellow traps, and upto 13.24 – 59.12 times more than clear traps. In French beans, blue sticky traps caught 2.05 – 3.52 times as many thrips as yellow traps, and 22.07 – 29.31 times more than clear traps. Blue traps were most attractive to *Megalurothrips sjostedti* (Trybom), *Ceratothripoides brunneus* (Bagnall) and *Frankliniella schultzei* (Trybom). *Hydatothrips adolfifriderici* (Karny) were only attracted to yellow traps. Blue and yellow traps were equally attractive to *Frankliniella occidentalis* (Pergande) in tomato while in French beans blue was the most attractive.

Addition of LUREM-TR attractant increased percentage thrips captures between 0.87 - 66.97% on tomato and 29.6 – 158.4% on French beans. However, the attractant did not influence the captures of *C. brunneus*, the key thrips species found on tomato. Dipterans were significantly captured on

blue traps while yellow traps were most attractive to thrips natural enemies, aphids, whiteflies, hoppers, coccinelids and hymenopterans in the two crops. Correlations between total trap captures and absolute measure of thrips estimated by destructive and non-destructive sampling in both crops indicated significant positive correlation on blue traps with LUREM-TR except on first tomato trial where there was no such correlation. Maximum temperature, wind run and sunshine were positively correlated with thrips densities, while minimum temperature and rainfall were negatively correlated with thrips densities. A threshold of 300 thrips was found to be effective in management of thrips and was comparable to weekly applications of Alpha cypermethrin and *Metarhizium anisopliae* (Metsch) in yield/ha. However, due to the higher cost of chemical application than the fungus, the cost benefit ratio with chemical application was much lower than the fungus application. The net income was highest when fungus was applied at a threshold of 300 thrips captured on blue traps with kairomone per week and it decreased at higher thresholds due to the increased damage by the pest. Hence, based on the economic optimization model, the optimum threshold for application of *M. anisopliae* was at 300 thrips captured on blue sticky trap with kairomone per week when net income was maximum. Therefore this study indicates that exploiting the response of pest thrips species to blue trap and LUREM-TR attractant has strong potential for improving monitoring and timely management of thrips in outdoor tomato and French beans production.