

are controlled mechanically; manure is used for fertilization; and insects are controlled with pheromones, crop variety selection and parasite releases. Experience from organic farmers shows that alternate methods of insect control can work economically. Examples can be found in every segment of agricultural production. Integrated Pest Management (IPM) techniques are also very important tool for pest management. They include the use biological controls and selective insecticides as well as, tillage, mowing, planting resistant crop varieties (for example, Bt. cotton), altering planting and harvest dates, and rotating crops. More research have to be done to see what insect controls would actually work. The elements of IPM will be discussed in the paper.

107 - Preventive and curative measures to control flea beetle, *Podagrica* spp. (Diptera: Halticidae) on cotton in the Sudan

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Seed treatment promotes seedling establishment, helps ensure yield and reduce quality either or losses. Only early-season insect pests and diseases is of importance to ensure a healthy and strong establishment of this strategic crop. The present study tried to measure the susceptibility of cotton flea beetles (*Podagrica* spp.), as indicator of early insect pests, to the most commonly used neonicotinoid insecticide imidacloprid as a single seed treatment or in mixture with two antimicrobial fungicide as preventive control, measure against early season pest of cotton in Sudan. Three different kinds of experiments: Visual yield infestation count choice semi-field laboratory tests and choice laboratory tests were used to evaluate the effects of seed dressing treatments. Flea beetle damage was assessed by counting shot-holes resulting from adult feeding. Results showed that using the antimicrobial bronopol alone did not prevent flea beetle damage. Treatments containing imidacloprid reduced damage in the three experiments, but not 10 weeks after sowing in field experiments. The study also included two experiments to study the susceptibility of field collected adult flea beetle to foliar application of different doses of are they recommended for F.B. control to serve as a possible curative control strategy when needed. The percentage reduction of damage in treatment relative to the control was calculated. The results showed an increase in the numbers of dead beetles and/or decrease in damage to tested leaves as with the dosage rate increase. The dose re once of endosulfan show, I.C50 and I.C99 values of 20.41 and 2862ppm, respectively, whic can be taken as indication of a good performance of endosulfan against the adult flea beetle, since the I.C99 is still lower than the field recommended dosage rate of endosulfan (5000 ppm). The dose response of dimethoate showed LC50 and LC99 of 29.8 and 2610.7 ppm, respectively. These values indicated that the field recommended rate of dimethoate (2560) is slightly lower than LC99 measured during the recent study.