Poster
Pflanzenschutz in den Tropen/Subtropen

105 - Biocontrol of the root-knot nematode *Meloidogyne incognita* in Kenyan tomato varieties using habitat-adapted endophytes

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Plant parasitic nematodes, especially root-knot nematodes, pose a major threat to the increasingly important tomato production in the coastal humid tropics of East Africa. Tomato endophytes collected from Kenya were identified and screened for their biocontrol activities in the tomato cultivar moneymaker, various local Kenyan varieties and AVRDC accessions. In particular, *Trichoderma* and *Fusarium oxysporum* isolates could significantly reduce root-knot nematode egg densities when compared to the non-inoculated control. Split-root experiments and synchronized infection studies have shown that the fungus initiates certain systemic plant defense responses that affect both penetration and overall development of the nematode. In order to gain a deeper understanding of the induced defense responses leading to this reduction in nematode infection, specific tomato mutants that are impaired in particular defense pathways are analyzed with respect to root-knot nematode colonization in the presence and absence of the beneficial endophytes. At the same time, the expression of several marker genes and the activity of certain enzymes, all involved in the various induced defense responses, are being monitored. In addition, the effects of fungal metabolites on *M. incognita* and the initiation of defense responses is being studied. The use of habitat-adapted endophytic fungi may provide a safe, efficient, reliable and affordable approach to control root-knot nematodes.

106 - Environmental Considerations in Crop Protection Research

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In Sudan high crop losses are encountered due to the attack by different pests and diseases. Cotton (Main cash crop is attacked by numerous insect pest complex, e.g. early season pests (Cotton Flea Beetle, The cotton Jassid) Mid season pests (The African bollworm) and late season pests (The cotton whitefly and the cotton aphids). An example of the economic importance of the damage caused by some of these pests was studied and the results showed that the African bollworm could cause 65% shedding of fruits. On the other hand Vegetables crops (e.g. Tomato) are also seriously attacked by various insect pests, e.g. The African bollworm. As a result both the main cash crop (cotton) and the main vegetable food crop (Tomato) are heavily sprayed with insecticides. At Present the main Method to combat insect pest is Chemical Control using pesticides. However this strategy has a negative impact on the environment evident through environmental contamination, development of insecticide resistance, side effects on beneficial and non target organisms. Efforts should focus on an area-wide integrated pest management approach to enhance pest management. This is important for food security, introduction of sustainable agricultural systems, reduce losses and pesticide use and preserve biological diversity. Organic farming is an important approach to environmentally combating agricultural pests. In this approach weeds

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 neonicotnioid 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.