Mitteilungen aus der Biologischen Bundesanstalt
für Land- und Forstwirtschaft
Berlin-Dahlem

54. Deutsche Pflanzenschutztagung

in Hamburg
20.-23. September 2004

Heft 396
Berlin 2004

Herausgegeben von der
Biologischen Bundesanstalt für Land- und Forstwirtschaft
Berlin und Braunschweig

ISSN 0067-5849 ISBN 3-930037-12-2

Veranstalter:

Biologische Bundesanstalt für Land- und Forstwirtschaft
Pflanzenschutzdienst der Länder
Deutsche Phytomedizinische Gesellschaft e. V.

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Online-Version unter: http://www.bba.de/veroeff/mitt/mittvertrieb.htm

Weitere gedruckte Exemplare gegen Rechnung:

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Die Deutsche Bibliothek - CIP-Einheitsaufnahme
Ein Titeldatensatz für diese Publikation ist bei
Der Deutschen Bibliothek erhältlich

ISBN 3-930037-12-2

Printed in Germany by Arno Brynda, Berlin.

survival was not significant. No significant differences were found on parasitism rate when testing parasitoids reared on whiteflies infested on HP and PMP, respectively.

In olfactometer and wind tunnel bioassays, *E. formosa* significantly preferred the healthy plant-whitefly complex (HP-WF) as compared to the powdery mildew infected plant-whitefly complex (PMP-WF).

Collections of volatiles from HP, PMP, PMP-WF and HP-WF complexes, respectively and analysis by GC and GC-MS revealed that the qualities and quantities of these volatile compounds differed to a large extend (Fig.). Plants significantly increase volatile emission after being attacked by whiteflies or inoculated by powdery mildew. However, plants significantly reduced volatile emissions in PMP-WF co-existing systems.

Our results provide an evidence for existence of a trade-off in the plants coordinate defense system against simultaneous challenge from pathogens and herbivores, and demonstrate that the alter of volatiles released by herbivore damaged plants for trapping parasitoids due to the infections of plant pathogens is the main reason for the reduced efficacy of parasitoids.

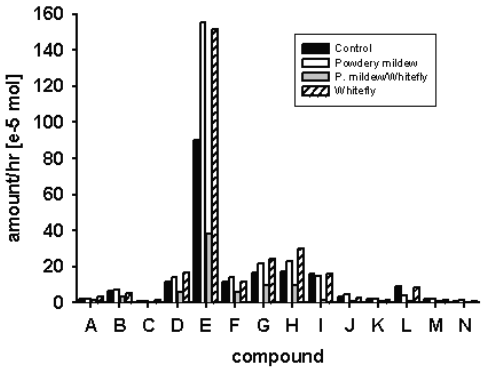

Figure Mean amount of volatile compounds released by 4 treated plants (Controls; powdery mildew plants 3 days after inoculation; powdery mildew plants 3 days after inoculation fed by whiteflies for 24hr; healthy plants fed by whiteflies for 24hr).

Literature

[1] Thaler JS, Fidantsef AL, Duffey SS and Bostock RM 1999.Trade-offs in plant defense against pathogens and herbivores: a field demonstration of chemical elicitors of induced resistance. J. Chem. Ecol. 25,1597-1609.

093 – Al-Zyoud, F.; Blaeser, P.; Sengonca, C.

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Development, mortality and reproduction of the entomophagous ladybird *Serangium parcesetosum* Sicard (Col., Coccinellidae) with *Bemisia tabaci* (GENN.) (Hom., Aleyrodidae) as prey

Bemisia tabaci (Genn.) (Hom., Aleyrodidae), which is formerly being confined to tropical and subtropical regions of the world, has since the late 1980's become important as a pest of greenhouse crops in temperate regions worldwide. Nowadays, B. tabaci has almost spread over the European countries. Prior studies indicated that *Serangium parcesetosum* Sicard (Col., Coccinellidae) seems to be an important predator of this pest. However, sufficient knowledge about the biological parameters of this entomophagous ladybird is still lacking in the literature. Therefore, in the present work, development, mortality and reproduction of S. parcesetosum were studied at different temperatures with *B. tabaci* as prey on cotton or cucumber leaves.

The experiments were carried out under laboratory conditions of 18±1°C and 30±1°C, with 60±10% RH and a photoperiod of 16:8h (L:D) on cotton or cucumber leaves. For the development, newly laid eggs were kept singly on cotton or cucumber leaves, infested with *B. tabaci*, in round Plexiglas cages and observed daily for embryonic and immature stages development as well as for mortality. To determine fecundity, newly emerged a pair of adults was kept in the round Plexiglas cages and provided with *B. tabaci* immatures on cotton or cucumber leaves and incubated until they died. The predatory individuals were transferred daily to new round Plexiglas cages containing *B. tabaci* and the number of laid eggs was recorded.

The results showed that S. parsecetosum was able to develop with *B. tabaci* as prey and reach the adult stage at both temperatures and plant species tested. Mean developmental duration of all stages and mean total for both sexes was significantly longer at 18°C than 30°C on both plant species. Mortality occurred during all the developmental stages of S. parcesetosum at both temperatures and plant species. Total mortality was higher at 18°C than 30°C on both plant species, and it was higher on cotton than cucumber. Adult females began oviposition 13 and 17 days after emergence on cotton and cucumber, respectively, where the daily fecundity fluctuated between zero and 1.3 eggs/&. Egg-laying has finished after the 197th and 88th days of longevity on cotton and cucumber, respectively.

094 – Mendoza, A.; Sikora, R. A.; Kiewnick, S.

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The role of organic matter in the population dynamics of *Paecilomyces lilacinus* (strain 251) and the vertical movement of its conidia in different soil substrates

Paecilomyces lilacinus (Thom) Samson is a facultative egg pathogenic fungus of sedentary nematodes and the most extensively field tested biological control agent (BCA). It has been reported to reduce nematode populations and is considered one of the most promising and practicable BCA for the management of plant parasitic nematodes. The persistence of a fungal biocontrol agent and the vertical movement of propagules in the soil are important parameters to determine the efficacy of a biocontrol agent. Additionally, it is important to prevent contamination of drinking water or other non-target sites by introduced organisms. In this study the effect of organic matter on the persistence of *P. lilacinus*, strain 251 and the vertical movement oft its conidia in different substrates was studied. A commercial WDG formulated product of the fungus was incorporated in 730 ml pots filled with sterilized sand and sand supplemented with 0.5, 2, 5, 10, 25 and 50% sterilized seedling substrate (v/v) as a source of organic matter. Samples were collected for a period of seven months. In another experiment, the vertical movement of *P. lilacinus* conidia through a 35 cm long soil column was evaluated. The columns were made up of 5 cm wide polyvinyl chloride tubes and filled field soil, field soil + sand (1:1 v/v) and sand supplemented with 2, 5, 10 and 25% organic matter and treated with a simulate 25, 50 and 100 mm rainfall per hour. This study demonstrates that the *P. lilacinus* population in the soil significantly decreases by over ninety nine percent over a period of 210 days under greenhouse conditions. In all treatments where sand was supplemented with organic matter to determine persistence of *P. lilacinus*, the population density of the fungus was reduced to levels below 10^6 cfu/g of soil – the optimal value to achieve effective biocontrol - after 6 weeks. However, the results demonstrate that increasing amounts of organic matter positively affect the persistence of *P. lilacinus* in soil. It could also be demonstrated that the movement of *P. lilacinus* conidia in 100 % field soil is restricted, while through columns with field soil-sand (1:1) and with 2 and 5 percent of organic matter was less restricted. In all treatments, more than 65 % of the viable cfu were recovered from the first 10 cm of the substrate. In addition, irrespective of the substrate, increasing the water volume to simulate different rainfall events did not significantly affect the vertical movement of conidia below 20 cm depth. The restriction of the vertical movement of *P. lilacinus* in columns filled with sand supplemented with different OM contents could be due to a sponge effect of the organic matter, associated with the physical and chemical characteristics of the substrates as well as the formulated conidia