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MITES (ACARI). BIOLOGICAL CONTROL AGENTS

I. USE IN ORCHARDS AND VINEYARDS

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Summary

Thiw work discloses basic information on the role of mites, harmful but also useful organisms, primarily in agroecosystems and in regard to the reasons of their overpopulation as well as to actualization of the bio-control in contemporary conditions.

Basically, we have analyzed the theoretical assumptions and the empiricial data on the attributes of the successful natural enemies and we have reviewed the status of mites in that context.

We have especially analyzed the predator mites of th Phytoseiidae family from an aspect of the present knowledge in the field of faunistics, taxonomy, ecology, predator's role in the ecosystems (like orchards and vineyards), toxicity of pesticides and the results of selection for resistance to some most commonly used resistant lines of the Metaseiulus occidentalis Nesbitt, Amblyseius fallacis Garman, Typhlodromus pyri Scheuten and Amblyseius andersoni Chant species, by augmentation and/or conventional methods.

We have completed a ceneral review of the role of mites from other Acari groups (fam. Stigmaeidae, Anystidae, Erythracidae, Tydeidae, Cleyletidae, Hemisarcoptidae, Bdellidae and Tarsonemidae when used as biocontrol agents in orchards and vineyards.

And, finally, this work pointed out the perspectives of biocontrol with the "useful" mite species as well as the directions of future research and methods that could be selectively used in practical application.

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(Primljeno 10. 02. 1993.)

TESTING FUNGICIDES TOXICITY ON GERMINATION OF THE *COCHLIOBOLUS SATIVUS* FUNGI CONIDIA

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S u m m a r y

Parasites of the *Cochliobolus* genus are often present on the cereal seeds. *Cochliobolus sativus* (Ito et Kurib) is particularly significant since it is attacking most of the plants from the family of grasses and especially wheat and barley.

Since this parasite is primarily controlled with a fungicide treatment of the seeds, this work dealt with the toxicity of 28 fungicides and their effects on germination of the *C.sativus* fungi conidia.

Tests were done by the Mc Callan method and the obtained results were demonstrated in LD50, LD95 values and by the inclination of the probit regression line.

According to the results expressed in LD_{50} values, the toxicity of fungicides is wide in range; from 0,44 mg/L to 10.000 mg/L. Inclination of the probit regression lines is also of a wide interval and it is very heterogeneous. Particularly interesting is the influence of individual combinations of active ingredients on the probit regression lines inclination.

The obtained results indicate that as far as toxicity effects on germination of *C.sativus* fungi conidia is concerned, the most prominent are the fungicides with contact properties.

The systemic fungicides from the trial group, have demonstrated lower toxicity on the conidia of this fungi, with LD_{95} values unequalling the applied quantities.

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(Primljeno 15. 03. 1993.)

STUDY OF WINTER WHEAT RESISTANCE TO THE SENN PEST *(EURYGASTER AUSTRIACA SCHRK., PENTATOMIDAE, HETEROPTERA)*

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Summary

Sen pest (*E. austriaca*) is among economically important wheat pests in Yugoslavia. In some years this pest causes big damages to the wheat crop. Since chemical control is not a satisfactory solution to the problem, we commenced a study on wheat resistance to the pest aimed at the discovery of sources of resistance which would help reduce damages to a tolerable level.

Wheat resistance to the Senn pest was studied in the field and nursery conditions. The tests were conducted in the period from 1978 to 1982 and 1981-1985, respectively. Each year, we tested the resistance in 144-203 wheat cultivars and lines. For those tests, the cultivars were sown in hills in 1x1 meter plots (Fig. 1), 16 to 20 cultivars per plot, which were covered by 1x1x1,2 meter wire cages in May - June of the next year (Fig. 2). In each cage we placed 30 imagos (15 females and 15 males) which were kept there until harvest, when we analysed wheat grains for the percent of damage. In field conditions, the lowest percentges od damage were found in Bezostaja 1, Kavakaz and Partizanka cultivars (Tab. 1). Balkan, Mačvanka 1 and Sremica cultivars, then PI 285960, Pi 321931 and PI 266157 were with the lowest percentages of damage in a nursery (Tab. 2). It was found for the species *E. integricepts* Put., which is very close to *E. austriaca*, that the morphophysiological characteristics of the wheat cultivar and the chemical composition of wheat grain are important factors of resistance. In this case, the same factors determined the degree of damage in the examined cultivars.

EFFECT OF BARLEY YELLOW DWARF LUTEOVIRUS ON GROWTH AND YIELD OF WHEAT AND BARLEY

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Summary

According to results of our investigations we can conclude:

- There is a harmful effect of Barley yellow dwarf luteovirus on growth and yield of winter and spring wheat and barley in artifical infections under field coditions;
- Harmful effect of the virus was more severe in fall infection than in spring infection of winter crops;
- There are very significant statistical differences in reducing the number of tillers per plant, heads per plant, seeds per head, plant high and yield per plant between uninfected control and inoculated plants of winter crops in fall. In spring infections of these crops, Barley yellow dwarf luteovirus didn't have significant influence in effecting the number of tillers per plant and the number of heads per plant on wheat and the number of seeds per head on barley;
- The statistical analyses established the significant differences between the control and infected plants in reducing the number of tillers per plant, heads per plant and plant high of spring barley and plant high and the number of seeds per plant of spring wheat;
- The harmful effect of virus was especially high on yield per plant. The yield was reduced for 86,42% on winter wheat and for 90,52% on winter barley in fall infection. In the spring infection there was 44,19% yield loss on winter wheat, and 34,5% on winter barley, compared with control which was calculated as 100%. In spring crops, the yield per plant was also reduced for 77,06% for wheat and 69% for barley.

CABBAGE APHIDS AND THEIR DENSITY DYNAMICS

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Summary

Due to an intensive application of insecticedes, the cabbage belongs among the vegetable cultures with the most jeopardized health status (L a z i ć), 1992). Protection of cabbage is often delicate since it requires spraying with insecticides just prior to the harvest. The pesticides used have to be efficient, selective and non-toxic for the humans. Cabbage is a culture whose pests can be controlled with commercial biological preparations (B u r g e r j o n et al., 1981, L i p a, 1976). These microbiological preparations do not affect the aphids and due to that fact, the aphids fully demonstrate their large reproductive potential and the harmfulness to go with it. In our conditions, the mass occurrence of aphids in cabbage production requires application of insecticides 1-4 times a year.

The modern vegetable production standards require a more rational application of the known pesticides followed by the research oriented towards biological control problems. In order to meet these requirements we have to fully understand the aphid population dynamics.

Dur objective was to identify aphid species that occur on cabbage and to determine these insects population dynamics by a multi-year monitoring of their density on the spring and fall cabbage.

We have determined that Brevicoryne brassicae L. is the most numerous and economically the most significant aphid species present on cabbage. It starts inhabiting the young plants at the beginning of June and the aphids stay in the field all through mid-December. In this period of over five months B. brassicae has two density peaks (maximums). The first peak occurs in July, just prior to the harvest. Aphid density above the harmfulness threshold in this period occurred only in two years. Population of the cabbage aphids has been found to be low during 5-8 weeks of the summer. It has started to increase at the end of August. The second peak in October is more significant since it significantly damages the cabbage. In 1987 - a particularly dry year, we recorded the average density of 9.411 aphids per plant.

Second numerous is the aphid Myzus persicae sulz. In 1985 it damaged the newly planted cabbage. Since it feeds primarily on the older (lower) cabbage leaves, just above the soil containing the infective inoculum of the entomophagous fungi, this aphid is very important in transmitting mycoses to B. brassicae that, itself, feeds on the higher - the youngest leaves.

Macrosiphon enphorbiae Thomas does not directly damage the cabbage because it is sparse. The other aphids that occur sporadically are Aulacorthum solani Kalt and Metapolophium dirhodum Walk.

Zaključak

U trogodišnjem periodu proučavanja strukture virulentnosti populacije *Erysiphe graminis hordei*, identifikovane su 72 formule virulentnosti kod 125 izolata.

Ne postoji kontinuitet u pojavi virulentnosti jer je većina formula virulentnosti (63,89%), identifikovano samo u jednoj godini. Ovo ukazuje na veliku varijabilnost *Erysiphe graminis hordei* i teškoće u selekciji na otpornost.

Najvišu frekvenciju virulentnosti u populaciji gljive imao je gen Vg (99,2%), a najnižu gen Va4 (12,8%).

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ERYSIPHE GRAMINIS HORDEI POPULATION VIRULENCE IN THE THREE-YEAR (1989-1991) TESTING PERIOD

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Novi Sad

Summary

Cleistothecium samples were collected from different varietes of the fully matured barley at different locations in Serbia, Vojvodina and Macedonia.

During the period from 1989 to 1991, 125 monocolonial isolates were tested on the 14 different barley varietes and 72 virulences were identified (table 2).

Frequency of these virulences had no continuity. Some of them appeared only in a one year.

Breeding for specific resistance is expected to be a complicated and long effort.

Zaključak

U trogodišnjem periodu proučavanja strukture virulentnosti populacije *Erysiphe graminis hordei*, identifikovane su 72 formule virulentnosti kod 125 izolata.

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MONITORING FLIGHT OF THE APPLE INSECT PESTS WITH PHEROMONES

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S u m m a r y

The application of pheromones in agriculture is present in identification of the pests presence, determination of the timing of the control, monitoring of the migratory species, etc. There is a number of pheromones that have recently become available at our market (Agrisen, DuPont, Ciba Geigy, Zoecon).

It has been our aim to determine their efficiency and the possible practical application in signalizing the occurence of pests. We tested pheromones for *Cydia pomonella* L., *Phyllonorycter blancardella*, F., *Ph. corylifoliella* Hb., *Pandemis heparana* D. et S., *Adoxophyes orana* F.v.R., *Synathedon myopaeformis* Borkh. and *Aspidiotus perniciosus* Comst.

We have compared the obtained results with the results of other methods of monitoring pests (visual check-up, inspection of 100 branches with 100 randomly chosen plants, 100 shaking method and the inspection of 1000 apple fruits).

Testing pheromones has been done in three (3) localities: Zemun, Subotica and Sremska Mitrovica. We have concluded that:

- for *C. pomonella* we can use Delta traps, and the PCT (the pheromone catch threshold) equals 3 butterflies for 6 days. It has two generations. Flight of the overwintering one has started on April 29 (Zemun, May 5 (Subotica) and May 11 (S. Mitrovica).

- for *Ph. blancardella* and *Ph. corylifoliella* we can use Delta traps and in the conditions of the sandy soil the Funnel traps are applicable. PCT equals 200 caught males for both species.

- for *Torticidae* (*P. heparana* and *A. orana*) we can use Delta traps, PCT equaling 20 males for 6 days. Since these species are defoliators and the carpophagous pests, PCT is higher that in C. pomonella due to the character of the damage they cause.

- for *S. myopaeformis* Delta traps are applicable. PCT is 150 caught males in 6 days. The flight lasted from May 26 to August 14 in Subotica but below PCT (max. 47 butterflies on June 24) and there was no need for control.

- for *A. perniciosus* we can use Jackson traps, PCT equaling i male. During the flight, the density of males decreased, most probably due to the influence of parasitoids and the chemical treatment against other pests.

PSEUDOMONAS SYRINGAE PV. TOMATO, THE PATHOGEN OF TOMATO TRANSPLANTS

by

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Summary

Three investigated bacterial strains, originating from the diseased tomato transplants, manifest a series of common characteristics of pathogenic, cultural and biochemical properties.

On the tobacco and Pelargonium leaves as well as on string beam pods, they cause hypersensitive reaction and typical necrotic halo spots on the leaves and fruits of inoculated tomato plants and do not produce changes on inoculated lemon fruits.

The bacteria are rod-chaped with polar flagellation, gram negative and asporogenous, the colonies are pearl-white, shining, rounded and convex.

They produce the green fluorescent pigment on King's medium B.

They produce katalase, they do not hydrolyse starch, liquefy gelatine, they crete NH3, do not produce H2S, indole and nitrite from nitrate.

During the first week of the development, the acids are produced from arabinose, glucose, lactose, mannitol, rafinose and sacharose.

Levan production was positive, but oxidase, potato rot and arginine dichydrolase test were negative and tobacco hypersensitivity positive.

According LOPAT test they show these characteristics: +---+

On the basis of pathogenicity, morphological, cultural and biochemical characteristics it was shown that investigated strains originated from tomato transplants belong to *Pseudomonas syringae pv. tomato* bacterium.

pregrizajući ih u nivou hipokotila, neposredno ispod površine zemlje. Na tom delu parcele bilo je oštećeno ili uništeno do 20% biljaka, te je izvedeno i hemijsko suzbijanje monokrotofosom.

Mada su ovakve pojave prava retkost, treba obratiti pažnju u slučajevima kada se šećerna repa seje iza strnina koje su više godina bile u monokulturi, ili nakon preoravanja ozimih strnina rano u proleće, usled jakih šteta od larvi žitnog bauljara.

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THE CORN GROUND BEETLE AS A SUGARBEET PEST

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Summary

The corn ground beetle (*Zabrus tenebrioides* Goeze, *Carabidae, Coleoptera*) is a typical pest of small grains, mostly of wheat and barley, and to some extent of rye. Being an oligophagous species, it also feeds on some meadow grasses. The larva may feed on freshly emerged corn plants, without a chance of completing its life cycle on that host plant.

In spring 1989, a small-scale (2 ha) but intensive attack of corn ground beetle larvae on sugarbeet was registered in the location of Bečej (near Novi Sad). In the infested plot, wheat preceded sugarbeet for two consecutive years. The frequency of the larvae was 0.5 per m2. The infested sugarbeet plants were at the cotyledon stage. The larvae would cut the hypocotyl just below soil surface. In the more heavily infested part of the plot, 15 to 20% of sugarbeet plants were damaged or destroyed. Consequently, the pest had to be treated with Monokrotofos. The effect of the treatment was satisfactory.

Although such infestations are uncommon, they indicate that increased attention must be devoted to sugarbeet grown after a prolonged cereal monoculture, especially if an intensive occurrence of the corn ground beetle had been registered. Furhtermore, fields under winter cereals that had to be plowed up in spring because of an intensive attack by the pest, are not recommended for sugarbeet growing. As indicated in literature the same recommendation stands for corn.