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Originalni naučni rad

ENTOMOFAUNA ON EUPHORBIA »ESULA-VIRGATA COMPLEX« (EUPHORBIACEAE) IN YUGOSLAVIA

Leafy spurge, *Euphorbia »esula-virgata complex«* (*Euphorbiaceae*) is a weed of Eurasian origin, accidentally introduced to the U.S. and Canada, where it has become a serious problem.

In Yugoslavia between 1985—1988 researches were made on the phytophagous insects associated with leafy spurge. Over 32 insect species were found and studied (not all yet identified *Thysanoptera* (at least 2 species), *Aphididae* (4), *Hymenoptera* (2), *Coleoptera* (11), *Lepidoptera* (7), and *Diptera* (3).

Taxonomic position of *Euphorbia »esula-virgata complex«*

Euphorbia esula was named by Linné in 1753 and *Euphorbia virgata* by Waldstein and Kitaibel in 1810. In the United States, where they have been accidentally introduced in last century, they are commonly called leafy spurge.

E. esula and *E. virgata* are dicotyledonous herbaceous perennials of the spurge (*Euphorbiaceae*) family originated from the Caucasus Mountains. According to Croizat 1945 (cit. Dunn, 1979) the Eurasian distribution now extends from Norway, England and Portugal in western Europe, to central and southern Russia, North America and China, according to Bakke, 1936 (cit. Dunn, 1979) represent the extremes of their distribution.

According to the literature published in our country (Domac, 1950., etc.) *E. esula* and *E. virgata*, although very much alike, are not identical. Many Yugoslav, as well as, foreign authors, include different number of subspecies, varieties and forms under those two species (Hayek 1927, Hegi 1928, Fiori 1969, Josifović et al. 1971). The problem of the differentiation among numerous

The investigations were partly funded by the Yugoslav—American Board for Scientific and Technological Cooperation, and in co-operation with U.S.D.A and the Ministry of science of Serbia, Croatia and Vojvodina (Project: P 511)

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THE ENTOMOFAUNA COMPLEX REGISTERED ON CENTAUREA SOLSTITIALIS IN YUGOSLAVIA

This study deals with the indigenous insects which regulate population density of *Centaurea solstitialis* L. in our country. The four-year study has indicated that the insects are significant factor that provides a tolerable population level of these weeds. More than 50 insect species have been registered on *C. solstitialis*. Furthermore *C. solstitialis* appeared to be an exclusive host for some of these insects.

Introduction

The insects, the majority of which are herbivore, are the most common class of animal and they consume about 15% of the entire plant material. In more than one case they were proven to be effective in biological control of weeds. The vast number of examples of a successful control by biological agents is, therefore, related to the control of weeds by insects. Almost all of these examples are related to the "imported" weeds while the control of indigenous weeds by insects is seldom reported as a success. The results of studying reproduction and distribution of natural enemies are few, while we know much more about the species introduced from the geographic origin of particular weed. Jullien (1982) reported that 82 introduced weed species were controlled by 192 introduced insect species, while only 25 native weed species were controlled by the insects.

The investigations were partly funded by the Yugoslav — American Board for Scientific and Technological Cooperation, and in co-operation with U.S.D.A and the Ministry of science of Serbia, Croatia and Vojvodina (Project: P 511).

Ako uleto posle popuštanja delovanja akaricida i dođe do manjih oštećenja lišća, to nema uticaj na prinos jabuke.

Pojava oštećenja ograničena je samo na prvu godinu, dok u drugoj godini zbog niske populacije crvenog pauka takvih oštećenja više nema.

Primena akaricida samo jednom godišnje smanjuje opasnost stvaranja rezistentnih sojeva *Panonychus ulmi*.

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INTEGRATED CONTROL OF RED SPIDER MITE (*PANONYCHUS ULMI* KOCH) IN THE APPLE ORCHARDS IN SLOVENIA

by

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Summary

In the control of the red spider mite (*Panonychus ulmi* Koch) in apple orchards, the threshold level based on the percentage of infested leaves has been used for a number of years in Slovenia. Nevertheless the

acaricide had to be applied from 3 to 5 times in one season which caused the appearance of the resistance to all older acaricides. It is evident that the tolerance level, set in this way, is too low and renders the appearance of predators impossible.

By testing of new acaricides — inhibitors of growth, the possibilities of the introduction of a new tolerance level stemming from Croft and Hoyt (1983) were tested. This tolerance level was also successfully applied by Oberhofer and Waldner (1986) in South Tyrol in Italy. The acaricides based on the chlofentezine (Appolo) and hexithiazox (Nissorun) were tested.

The apple orchard in the area of 2,5 hectares was divided into 3 plots. The first plot (A) in the area of 1 hectare was sprayed by Appolo, the second plot (N) of the same size by Niccorun while the third plot (K) in the area of 0,5 hectare was not at all sprayed with acaricide.

In the entire area the fungicides Captan, Baycor, Bayleton and Topas were used against apple scab while the insecticides Dimilin and Pirimor were used against the codling moth and apple aphids. The population of mite was followed by the counting of motile stages per 100 leaves while the predators also by shaking according to the method of Steiner. The results are illustrated in the table 1 and 2.

On the plot K the red spider mite had appeared substantially, and in summer it caused severe damage of leaves (bronzing), while, later on, the population was dropped. In 1987, the predators *Stethorus punctillum* and *Orius minutus* appeared while the predatory mites *Anthoseius rhenanus* and *Zetzelia mali* appeared only in 1988.

The appearance of predators was also observed on the acaricides plots and, as a rule, in summer when the activity of acaricide was weaker. On the plot A₂ and N which in 1987. were sprayed only once, slight damage of leaves was observed only in the first year while in the second year no damage was noted.

We believe that new acaricides — inhibitors of growth are put into the integrated control of apple orchards. For most of the years, only one application of acaricide is sufficient in spring, while in summer, when the activity of acaricide is weaker, there appear the predators by which the effect is completed. The second application of the acaricide will be only exceptionally carried out. There is no doubt that for such an approach a higher threshold level is urgent. The application of fungicides and insecticides should certainly be entirely directed forwards this goal. As illustrated by the plot K (check) on which acaricide was not applied at all, the population was always below the tolerance level during the second year. It is, therefore, very probable that the application of acaricide will be entirely stopped in many years.

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(Primijeno 21. 03. 1989.)

ACTION OF ACARICIDES INHIBITORS OF DEVELOPMENT ON PHYTOPHAGOUS ACARIDS AND OCCURRENCE OF PREDATORS IN THE APPLE TREE ORCHARD

by

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Summary

The aim of the research was to investigate the action of these acaricides and insecto-acaricides on *P. ulmi* of spring generation, further the speed of renewal of population of phytophagous acarids and the occurrence of predators.

The experiments were laid in the apple-tree orchard "Ušće" at Obrenovac, size 176 ha. The trees are seedlings and their crowns are shaped as oblique palmettos. Their age is 23 resp. 24 years.

For each treatment were used 0,33 ha of apple tree orchard, which makes 6 rows with 25 trees in a row. Acaricides were applied by means of the atomizer "Morava" with 1500 l water per ha. The time of spraying in 1987: on April 21st, with clofentezin and hexythiazox and on April 30 m with flucycloxuron. In 1977: on April 11, clofentezin and hexythiazox and on April 26: flucycloxuron and flufenoxuron.

The data are treated by means of the polynomial curve with 3 resp. 4 polynomials on the computer Apple Macintosh.

The results of the experiment show that that *P. ulmi* reached, in 1987 on the unsprayed part of the apple tree orchard, the maximum value in the course of July, when it causes the bronzing of the apple tree leaves, after which its number rapidly decreases. The polynomial curve shows the spring generation of *P. ulmi* separated from the summer ones (Graph 1).

In 1988, *P. ulmi* showed a similar polynomial curve of development, but, on account of the occurrence of rather numerous *T. urticae* and *A. schlectendali* the leaves of apple trees began to assume the colour of bronze before the numbers individually reached near to economic thresholds.

The most frequently occurring predators (*O. minutum* and *S. punctillum* — Fig. 1) appear in greater numbers from June to October. Predators succeeded in diminishing the numbers of *T. urticae*, but not those of *P. ulmi* (Tab. 1).

After the acaricides had been applied in spring of 1987. and 1988, the renewal of the population of *P. ulmi* began at the end of June to reach the maxima numbers in August resp. September (Graphs 2 and 4). There are among the acaricides no essential differences in the speed with which the population of *P. ulmi* is renewed. On the areas which were sprayed with acaricides has been observed the occurrence of *T. urticae* and *A. schlectendali* in the course of summer, particularly in 1988, when they caused together the bronzing of leaves before the individual numbers were near the economic threshold.

The predators follow the numbers of phytophagous acarids and, consequently, on the areas having been sprayed with acaricides in July and August, the settling occurs in greater numbers.

— Apollo i Nissorun primenjeni u toku aprila (pre piljenja zimskih jaja) redukuju piljenje zimskih jaja za 21,3 — 84,9% i održavaju brojnost populacije crvenog preglja ispod praga štetnosti više od 60 dana.

— Pored ovicidnog, Apollo i Nissorun ispoljavaju i Larvicidno delovanje.

— Inicijalna toksičnost je znatno niža u poređenju sa standardom. I pored toga što ispoljavaju nižu početnu toksičnost od standarda, ona veoma uspešno regulišu brojnost populacije crvenog preglja za 30 i više dana.

— Primena preparata na bazi clofentezina u heksitiazoksa u zaštiti jabuke i vinove loze od crvenog preglja ima puno opravdanje.

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NEW POSSIBILITIES OF CONTROLLING RED SPIDER MITE *PANONYCHUS ULMI* KOCH (*TETRANYCHIDAE*)

by

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Summary

In the course of 1986 the efficacy of clofentezin (a formulation of Apollo 50 SC) and hexythiazox (a formulation of Nissorun 10 WP and Nissorun 10 EC) was tested for the control of *Panonychus ulmi* Koch on apple trees and vine in several localities of SR Croatia and SR Serbia under different climatic conditions.

Population of *P. ulmi* was very high in 1986. During winter inspection of apple twigs 1 m long, the number of winter eggs averaged 2,670—4,450 and on vine they amounted to 4,260—5,380.

The effect of Apollo and Nissorun on winter eggs and population dynamics of *P. ulmi* was monitored during the growing season, as well as their effect on mobile forms.

Apollo and Nissorun showed a high degree of toxicity to winter eggs of *P. ulmi*, whereas their toxicity to mobile forms was somewhat lower.

Apollo and Nissorun applied in the course of April (before the winter eggs of *P. ulmi* hatch) reduce the hatching of winter eggs by 21.3—84.9% and maintain the population of *P. ulmi* below the economic threshold level for more than 60 days.

In addition to their ovicidal effect, Apollo and Nissorun also show the larvicidal effect. Although their initial toxicity is considerably lower as compared to the standard one, they successfully regulate the population level of *P. ulmi* for 30 days and more.

The application of preparations based on clofentezine and hexythiazox is fully justified for the control of red spider mite on apple trees and vine.

**CLOVER CYST NEMATODE (*HETERODERA TRIFOLLI* GOFFART)
AND ITS DISTRIBUTION IN SERBIA**)**

by

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S u m m a r y

In the last decade, and particularly during the past 5—6 years, a gradual but marked increase has been recorded in the population of this cyst nematode which was until then rather rare in our country.

Its incidence has been mostly noticed in mixed populations with other species of the genus *Heterodera*. However, with increasing frequency, it can be found alone, in pure populations, and with considerable larger number of cysts as well.

The clover cyst nematode has been recorded from 44 localities in Serbia so far.

In order to determine the host plants for this species, several localities have been chosen on the territory of Srem and southern Banat. In these localities, the pathogenic activity of *H. trifolli* has been studied.

Although in the investigated plots with the three-years rotation leguminous plants were not included (actual hosts of this parasitic nematode), a substantial increase in the populations of *H. trifolli* has been recorded.

This was especially evident after the sowing of sugar beet when in the rhizosphere a large number of *H. trifolli* cysts were found with numerous vital and invading larvae. Certain sugar beet plants as well as the whole crop have revealed some changes — leaf curling and slight yellowing.

From the plant material none of the parasitic nematodes have been isolated in any of the development stage.

The presence of other pathogens has not either been reported in the investigated areas.

The experimental investigations to be carried out with several cultivated crops of different varieties are expected to give more precise data regarding the feeding plants. The results obtained in the observations so far are only of a provisional character.

***) The paper was presented at the XVII Meeting of Entomologists of Yugoslavia held in Dojran from 4 to 8 October 1987.

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(Primljeno 26. 01. 1989.)

"THE MOST FREQUENT FUNGI OCCURRING IN PLANTATIONS
LARCH, SCOTS PINE AND MACEDONIAN PINE ON KOPAONIK"

by

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S u m m a r y

In Serbia the study of the most important diseases in coniferous plantations has recently become especially relevant, having in mind the significance of these species, which has been increasing due to the establishment of new plantings in accordance with long-term afforestation program for barrens and deforested areas.

The pathogenous fungus *Lachnellula wilikommii*, agent of larch canker, was first observed in Serbia, on the Mountain Kopaonik (locality "Markova stena"). The degree of infection was very high: cca 48% trees had the disease symptoms, and 6% trees were dry. The apothecia are formed during the summer and usually occur on the dead bark and in the crevices of the canker.

In plantations of Scots pine, the pathogenous fungus *Gremmeniella abietina* was first observed in Serbia. The fruitbodies (pycnidia and apothecia) are formed on stems, shoots, needles, but also and on Scots pine cone scales.

The following fungi occur very frequently in coniferous plantations on Kopaonik: *Cenangium ferruginosum*, *Cyclaneusma minus*, *Lachnellula occidentalis*, *L. suecica*, *Lophodermium pinastri*, *L. seditiosum*, *Sclerophoma pithyophila* and *Therrya fuckelii*. The most of these fungi do not have great importance as they occur mainly on dry branches (*C. ferruginosum*, *Lachnellula* spp., *Therrya fuckelii*) or old needles (*C. minus*, *Lophodermium* spp. and *S. pithyophila*).

Zaključak

Na osnovu onoga što je izneto u radu mogu se izvući sledeći zaključci:

Helminthosporium teres se u Jugoslaviji javlja skoro svake godine i pričinja manje ili veće štete.

Simptomi bolesti na biljkama su uglavnom tipični, ali se javljaju i atipične pege sa određenom hlorozom i nekrozom.

Najuspešnija inokulacija biljaka u staklari i u polju obavlja se suspenzijom infekcionih čestica (spore, čestice micelije) čija je koncentracija 2.000 do 10.000 po ml.

Populacija gljive je heterogena, što je ustanovljeno na hranljivim podlogama i diferencijalnim sortama. Identifikovano je jedanaest formula virulentnosti.

Reakcija sorti prema izolatima bila je različita. Ustanovljen je određeni broj koji se može koristiti kao izvor otpornosti.

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(Primljeno 13. 02. 1989.)

SOME CHARACTERS OF *HELMINTHOSPORIUM TERES* (NET BLOTCH OF BARLEY) AND SOURCES OF RESISTANCE

by

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Summary

Helminthosporium teres (Net blotch of barley) occurs in Yugoslavia almost at any year. There are no exact data on yield losses but one can expect to be high enough in case of epidemics.

The following characters of the fungus have been studied: influence of artificial infection of seed and leaves, concentration of inoculum and degree of humidity on symptoms expression, cultural characters on artificial media, variability of the fungus, and sources of resistance.

On artificially inoculated plants the typical net blotches occurred but several atypical symptoms were revealed as well.

The inoculum concentration from 6.000—10.000 infective particles/ml are the optimal range for inducing clear-cut reactions on barley seedlings.

High humidity after inoculation is necessary. The minimum time of humid treatment for infection was 12 hrs. The maximum infection rate was obtained after 24 hrs of high humid treatment of plants.

Differential testing showed that the isolates of the pathogen varied their cultural characteristics and pathogenicity.

Eleven virulence combinations of 40 isolates of the fungus were found.

Reactions of tested barley varieties and lines were different. Out of 444 entries, 158 were very, and 286 moderately resistant. No immune varieties have been found in a collection.

Some of the tested varieties reported to be resistant elsewhere, have been found susceptible to our isolates.

Thiram), karboksini (Vitavax), pentachloronitrobenzen (Evershield RTU-PCNB) — and their combinations with insecticides A-7457 C (Promet), Metiokarb (Mesurol WP-50), captan + malation (Evershield Captan Malathion).

The trial included two treatments: a) seed of single-cross hybrid ZPSC 704 (dent type of kernel) and b) seed of three-way cross hybrid ZPTC 196 (flint type of kernel). Studies were conducted in field and laboratory conditions.

Fungicides in combination with insecticides were found to disturb seed germination. If pure fungicides were applied, seed germination was higher or comparable to control. In laboratory conditions combinations of compounds reduced germination energy (Vitavax + Promet and Evershield + Thiram by 78% and 95%, respectively). In seed of ZPTC 196 the application of Radotiram + Mesurol and Evershield + Thiram resulted in 74.5 and 99.7% early vigour, respectively. Total germination ranged between 86.5% (Evershield Captan + Malathion) to 97.7% (Evershield Thiram).

In 1987 the number of emerged plants of ZPSC 704 ranged from 67% (control — untreated seed) to 94.7% (Vitavax + Promet), whereas in ZPTC 196 it varied from 73.7% (control) to 96.3% (Radotiram + Mesurol). In 1988 emerged plants ranged from 60.2% (control) to 89.8% (Radotiram + Promet) and from 60.8% (control) to 76.5% (Radotiram + Mesurol) for ZPSC 704 and ZPTC 196, respectively.

Grain yield as the final indicator of protection of seed, seedlings and young plants from the complex of biotic factors showed that the best results were given by the combination of TMTD and Vitavax with Mesurol (7.648 t/ha), followed by the fungicide and insecticide combination (7.013 t/ha) and untreated control (6.179 t/ha).

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EFFECT OF FUNGICIDES AND THEIR COMBINATIONS WITH INSECTICIDES ON EARLY GROWTH AND YIELD OF SEED MAIZE

by

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Summary

The effect of seed dressing chemicals for disease and pest control in seed is accompanied by the problem of their effect on the maize plant.

The objective of the present investigation was to study the effect of fungicides and their combination with insecticides on germination, emergence rate and yield of seed maize.

Trials were conducted during 1987 and 1988. and included four contact fungicide compounds — tiram (Radotiram 'TS, Evershield

EFFECT OF THE TIME AND NUMBER OF APPLICATIONS ON THE
EFFICIENCY OF SOME FUNGICIDES IN CONTROLLING THE
CAUSAL ORGANISMS OF MAJOR WHEAT DISEASES

by

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S u m m a r y

An experiment has been conducted in conditions of Vojvodina province on two domestic wheat varieties (Jugoslavija and Skopljanka) to assess the effect of the time and number of applications on the efficiency of some fungicides in controlling *Erysiphe graminis tritici*, *Puccinia recondita tritici*, *Septoria* spp. and *Fusarium graminis* as an agent the fusariosis of wheat spike. There were three experimental variants of fungicide application: a single spraying at the stage of flag leaf forming, a single spraying at the beginning of wheat flowering, and two sprayings, one at the stage flag leaf forming and another one at the beginning of wheat flowering.

Two-year research results indicated that one application of a combination of fungicides at the beginning of wheat flowering was most efficient. The casual organisms were efficiently controlled as confirmed by high wheat yields. A single fungicide application at the stage of flag leaf forming did not provide a satisfactory level of protection against the fusariosis of wheat spike. The variant of two fungicide applications was not economical.

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ANATOMY: FACTORS OF ROSE CULTIVARS RESISTANCE
TO INFECTION OF *SPHAEROTHECA PANNOSA* VAR. *ROSAE*
WORONICHINE

by

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S u m m a r y

On the basis of the estimates of epidermal cell wall thickness and observing the rose powdery mildew on ten rose cultivars, the following could be concluded:

— Among the examined cultivars there are statistically significant differences in the epidermal cell wall thickness.

— The thick epidermal cell wall group of the cultivars is more resistant to rose powdery mildew.

— The thin epidermal cell wall group is very susceptible to rose powdery mildew.

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REACTION OF SOME *CAPSICUM SPECIES* TO SOME TOBACCO MOSAIC VIRUS ISOLATES FROM PEPPER

by

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Summary

Through March, 1988, on temperature ranges of 25°C has been investigated reaction of 56 accessions of pepper, representatives of different *Capsicum* species to isolates M—5, N—3 and P—11 of Tobacco mosaic virus isolated from pepper.

Most of the investigated accessions have been given thanks to kindness of Dr M. L. Gomez Guilamon and Dr. R. G. Ortega from Spain. Material was tested by method of mechanical inoculations with strains M—5 and N—3 isolated from domestic diseased plants of pepper with symptoms of mosaic and necrosis, and isolate P—11 also from pepper provided thanks to kindness of Dr ATH B. Rast from Holland.

Reaction of investigated accessions to strains of TMV expressed on the next way.

Out of 56 tested accessions, 20 showed resistance to all 3 strains, 32 resistance to isolates N—3 and M—5, and susceptibility on P—11. Only one genotype showed resistance on strain N—3 and susceptibility on M—5 and P—11.

Resistance of tested accessions showed by hypersensitive reactions. Susceptibility on all 3 strains expressed 3 accessions and it was manifested by appearance of local and systemic symptoms on inoculated plants.

Zaključak

Iz rezultata dobijenih ispitivanjem zaraženosti određenih sorti nekim od značajnijih virusa krompira može se zaključiti sledeće:

— Analizom ukupnog zdravstvenog stanja usjeva krompira bez obzira na individualni, društveni sektor i stepen reprodukcije (merkantilna i sjemenska proizvodnja), dat je cjelovitiji prikaz zaraženosti krompira virusima u ispitivanom području.

— S obzirom da se radi o području sa raširenom proizvodnjom sjemenskog krompira, utvrđeno prisustvo nekih virusa je vrlo visoko te predstavlja značajan problem u dobijanju i održavanju nivoa zdravstvenog stanja sjemenskog krompira.

— Ispitivanja su pokazala da su najrasprostranjeniji virus uviđenosti lišća krompira (PLRV), virus crtičastog mozaika krompira (PVY) i S virus krompira (PVS).

— U budućem radu bilo bi neophodno osvrnuti se na ovu problematiku sa aspekta SR Srbije i šire.

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SPREAD OF SOME POTATO VIRUS DISEASES ON THE TERRITORY OF WEST SERBIA

by

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Summary

In the course of 1986, 1987, and 1988, were examined potato plants, tubers and germs in order to determine the presence of potato viruses. They were detected by ELISA test. Various materials were tested in order to complete our current knowledge about actuals spread of potato viruses in the West Serbia.

The investigation pointed out as the most wide spread the potato leaf-roller virus (PLRV), potato virus Y (PVY) and potato virus S (PVS). The cultivars were infektet by PLRV in following percentages: Desiree 54,6% (17,8 — 93,3^o/_o), Jelica 97,6% (93,3% — 100^o/_o), Ostara 5,7^o/_o (0,0 — 10,0^o/_o) Kennebec 95,1^o/_o (90,4 — 100%) and Russet-Burbank 71,1^o/_o (62,0 — 82,5%). The percentage of registered PVY as follows: Desiree 58,5% (17,8 — 96,6^o/_o), Jelica 24,8% (16,7 — 33,3^o/_o), Ostara 80,0% (66,7 — 90,0^o/_o), Kennebec 78,0% (61,9 — 95,0^o/_o) and Russet-Burbank 66,6^o/_o (50,0 — 80,0%. The highest reported percentage for PVS was recorded from Russet-Burbank, Dragačevka and the hybrid Rasna (100%). The other cultivars were infected by this virus as described bellow: Desiree 16,4% (10,0 — 16,7^o/_o), Jelica 62,4^o/_o (50,0 — 68,6%), Ostara 34,3^o/_o (26,7 — 40,0%) and Kennebec 58,5% (52,4 — 65,0^o/_o). A slightly lower percentage was reported for PVA: Desiree 17,4^o/_o (3,3 — 36,6%), Jelica 4,8% (0,0 — 10,0%), Ostara 2,8^o/_o (0,0 — 5,0%), Kennebec 4,8^o/_o (4,8 — 5,0%) and Russet-Burbank 28,8^o/_o (28 — 30,0^o/_o). Infected by PVX were: Desiree 5,8^o/_o (0,0 — 15,0%), Jelica 0,8^o/_o (0,0 — 3,3%) and Russet-Burbank 22,3^o/_o (20,0 — 24,0%).

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SOME NEW KNOWLEDGE ON THE APPLYING OF METHYLBROMIDE IN THE TOBACCO NURSERIES

by

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Summary

The basic pesticide in the production of the tobacco seedlings in Yugoslavia is methylbromide. Its unprofessional and uncontrolled application can cause some undesirable consequences due to the accumulation of anorganic bromides in the soil and their capability to cause phytotoxicity in some species of plants.

According to the investigations, the quantity of 184 mg/kg of bromides in a heavier soil (the loam) have negatively affected the growth and the development of tobacco seedlings of the varieties »Podravina« and »Culinec«. The negative effect has even been more expressed in the variety »Podravina« what indicates its greater sensibility.

The seedlings of tobacco were growing well in the presence of bromides in the quantity of 117,8 mg/kg what coincides to the quotations in the literature which are that methylbromide affects the growth and the development of plant species, acting stimulatory, in case when the harmful residues have not been accumulated there yet.

The results of the research figure that the threshold level of bromides negatively affecting the growth and the development of the tobacco seedlings spreads between 117,8 mg/kg and 184 mg/kg for the investigated varieties of tobacco and the types of soils.

According to the achieved results, it is suggested to analyse obligatory the soil on the presence of the bromides in the nurseries where the fumigation by methylbromide has been performed for years. If the quantity of the bromides comes over 100 mg/kg, the dose of methylbromide should be decreased to the limit of the biological activity and the time of waiting should be prolonged in order to renew the micro-biotic activity of the soil by leaching of the soil with a high quantity of water or it is necessary to change the place of the nursery.