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(Primljeno 23. 11. 1988.)

EFFECT OF CROP ROTATION, DATE OF SOWING, MINERAL FERTILISATION AND PLANT POPULATION ON THE OCCURENCE OF SCLEROTINIA ROOT AND BASAL ROT OF SUNFLOWER

by

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Summary

Sclerotinia root and basal rot is one of the most important disease of sunflower in the country. It appears every year causing great damages in Vojvodina, the main producing area of this crop in Yugoslavia.

The effect of different agrotechnical measures related to the occurrence of the disease, has been studied during the two years period in microtrials on the Experimental Station R. Šančevi and on commercial fields of two agricultural estates in Vojvodina.

In order to study inoculum potential of the fungus, 10—20 samples of soil (5 kg from 0—20 cm of soil depth) have been taken from 15 commercial fields (30—50 ha) planned to be sown with sunflower. By washing the soil with tap ater through a sieve (with the holes' diameter of 1 mm), sclerotia were separatd and its viability on artifical media was tested. The number of diseased plants was stated on the end of sunflower vegetation.

Sclerotia of the fungus have been found in the soil of all investigated fields (tab. 1). Most of them germinated on the PDA. The highest population of sclerotia and heaviest of the disease was stated on a field where soyabeen was proceed crop and on another field with two years crop rotation. There was no correlation between sclerotia population and intensity of disease attack. Sclerotia were present on the three fields where susceptible plants have not been grown for more than 10 years. The occurrence of the disease on such fields was of a moderate intensity. Similar results have been obtained in a microtrial with two and five years crop rotation (tab. 2).

The effect of sowing time on the disease development was studied in microtrials with 9 treatments in 1985. and in 12 treatments in 1986. The number of diseased plants was stated every 7 days. The obtained results show that the first symptoms of the disease (wilting of plants), appear in butonisation, more often in the begining of flowering of plants. The occurrence of the disease increased during the later period of vegetation. The intensity of the disease attack was much higher on crops sown during April and May in comparison to sunflower which was sown later. This could be explained by frequent rains and more precipitation during the first half of vegetation of earlier sown crops. (Tab. 3)

The effect of different quantities of nitrogen, phosphorus and potassium on the disease development was also studied in microtrials during the two years period (gr. 1,2). By inceasing of these nutrients, especially nitrogen, the occurrance of disease in the first year of investigation increased (1985.), but no significant diferences have been found in the next year's disease attack (1986). However, in another long term microtial (20 years), with two year-crop rotation, the occurence of the disease was much higher on fertilised (50 kg of nitrogen, phosphorus an potassium per ha) compared to nonfertilised plot (gr. 3).

There were no significant differences in the occurrence of the disease in the two years microtrials where different spacing of sunflower plants was studied (tab. 4) .

BACTERIAL SPOT ON THE EAR OF WHEAT

by

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Summary

During 1987. and 1988. from the diseased ear of wheat the bacterial strains of white coular were isolated. The isolates investigated caused the strong necrotic process of wheat tissues after artifical inoculation into the top leaf sheath by syringe, using bacterial suspension 10^7 cells/ml.

Their pathogenic properties were proved on peach shorts, green cherry, pear, lemon, paprika and tomato fruits, as well as on bean pods (tab. 1).

All isolates were Gram negative, non-sporulating, motile rods with polar flagella. On NA medium produced circular, entire, whitish glistening colonies. On NAS medium the colonies are white, large, domed, mucoid, circular and glistening.

The cultures metabolized glucose oxidatively, produced a green fluorescent pigment, levan and catalase; induce hypersensitive reaction in tabacco; oxidase, arginine dihydrolase and potato rot were negative (tabl. 1).

On the basis of the pathogenicity, cultural and biochemical characteristics the investigated bacterium is identified as a membr of the *Pseudomonas syringae* group, namely *P. s. pv. syringae* van Hall. Isolates Pš—4 and Pš—6 have been deposited in the International Collection of Micro-organisms from Plants, Plant Diseases Division, DSIR, Auckland, New Zeland.

SENSITIVITÄT DER ISOLATE VON *PHOMOPSIS VITICOLA* SACC., DEM ERREGER DER SCHWARZFLECKENKRANKHEIT DER WEINREBE GEGENÜBER EINIGEN FUNGIZIDEN

von

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Zusammenfassung

In Slowenien / Jugoslawien ist die Schwarzfleckenkrankheit der Weinrebe im südwestlichen Weinbaugebiet stark verbreitet. In der vorliegenden Arbeit wurde die Variabilität und die Empfindlichkeit des Erregers dieser Krankheit *Phomopsis viticala* Sacc. gegenüber einigen Fungiziden an 13 Isolaten von 6 Sorten und aus 8 Ortschaften der Vipavska dolina (Vipava-Tal) untersucht.

Der Pilz wuchs von 5 untersuchen Nährmedien an besten auf dem Substrat von Das Gupta und auf der Mischung des Kartoffelextrakts mit dem letzt erwähnten Nährmedium.

Eingehend wurde die Variabilität der Isolate untersucht und variationsstatisch bearbeitet. Anhand dieser Bearbeitung wurden die Isolate in zwei Gruppen eingestuft: in schnell und langsam wachsende. Von den 5 Variabilitätsquellen (1. Isolate, 2. Wachstumszeit, 3. Isolate x Wachstumszeit, 4. Petrischalen innerhalb der Isolate und 5. (Petrischalen x Zeit) innerhalb der Isolate) war die grösste Variabilitätskomponente Wachstumszeit, danach folgen Isolate, Isolate x Wachstumszeit, die geringste Variabilität zeigten (Petrischalen x Wachstumszeit) innerhalb der Isolate und Petrischalen innerhalb der Isolate. Das bezeugt, dass der Experimentalfehler in den Befunden gering ist.

Anhand der Senstivitätsuntersuchungen wurden Isolate in 2 Gruppen eingestuft: wenig und mehr empfindliche. Es scheint, dass die Sensitivität der Isolate nicht von der Wirtssorte abhängt. Zwischen den langsamwachsenden und mehr empfindlichen Isolaten besteht eine Beziehung. Von 8 langsamwachsenden Isolaten sind 6 mehr sensitiv.

Von den 6 untersuchten Fungiziden (in praxisüblicher Formulierung) in Konz. von 0,1 bis 1000 ppm, wirkte am besten Benomyl, danach folgten Mancozeb, Thiophanet-Methyl und Captan. Relativ schlecht wirkte Netzschwefel. In der Konz. 1000 ppm wirkte Kupfersulfat kaum.

THE MECHANISM OF SOME FUNGAL INFECTIONS OF THE NEEDLES OF *AUSTRIAN PINE* AND *SCOTH PINE*

by

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Summary

The paper presents the results of the research of figural infection mechanisms of *Dothistroma septospora*, *Cyclaneusma minus*, *Lophodermium seditiosum* and *Sphaeropsis sapinea*. These fungi have shown different modes of needle penetration.

The greatest number of *D. septospora* conidia germinates after 48 hours (individual conidia start germinating already after 8 hous), by forming 1—3 germ tubes. Most frequently, 3 germ tubes are formed, two at the ends and one in the centre. Most of the germ tubes develop in the direction of stomata. Appressoria-like structures are then formed in the stomata. The infection hypha starts from the centre of these appressoria-like structures and penetrates the guard cells, then occupies the mesophyll. Eight days after the inoculation, numerous secondary conidia are also formed on the surface of the needles. Within the mesophyll, the mycelium penetrates both inter and intra cells, occupying even the endoderm and resin canals. Germ tubes have never been observed only in the vascular tissue of the needles. The first symptoms on the inoculated needles, in the controlled conditions, occur after 6—8 months, while the first fructifications occur after 3,5—4,5 month.

Ascospores of *Cyclaneusma minus* germinate and form 2—4 germ tubes. The germ tubes penetrate the stomata, without the previous formation of appressoria-like structures.

Ascospores of *Lophodermium seditiosum* germinate into a short germ tube at the end of which an appressorium-like structure is formed. The germ tubes start from the centre of the appressorium and penetrate directly through the cuticle and the walls of epidermal cells.

The conidia of *Sphaeropsis sapinea* start germinating already after one hour, and process of germination is almost fully terminated after 6 hours. The germ tubes penetrate either through the bark of young shoots or through the needles. Before needle penetration, the aggregations of hyphae are formed on the surface and then the germ tubes penetrate into the stomata. Within the stomata, the hyphae are first stored and then they penetrate through he guard cells ino the mesophyll. From there they are further distributed both inter and intra cells.

Optimalna temperatura za razvoj gljive je 25°C.

Najveći broj ispitivanih sorata boranije i pasulja ispoljile su osetljivu, odnosno srednje osetljivu reakciju, prema *F. oxysporum f. sp. phaeseoli.*

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FUSARIUM OXYSPORUM F.SP.PHASEOLI AS CAUSE OF FUSARIUM WILT OF SNAP BEANS AND BEANS IN YUGOSLAVIA

by

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Summary

The results of our investigation showed that the fungus isolated from the stems of typically withered samles of snap beans and beans is a species of *Fusarium oxysporum f.sp.phaseoli* Kendrik and Snyder.

The symptoms observed in field have been reproduced in the conditions of inoculation. The symptoms of the disease are a retarded growth, chlorosis, the necrosis of vascular tissue, leaf druying and shedding and the necrosis of roots and stems. The infected plants invariably perish.

The fungus forms an aboundent colony with pale pink aerial micelia. The dimensions of the micro and macroconidia are 7,5 x 2,8 nm and 33,5 x 4,0 nm, respectively, and of the chlamidospores 6,2 x 8,5 nm.

The fungus develops best on the synthetic acid medium. The development is poorest on the onion medium. The optimum temperature for the development of the fungus is 25°C.

The largest number of the investigated snap beans and beans varieties demonstrated sensitive to medium sensitive reaction to *F. oxysporum f.sp..phaseoli.*

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(Primljeno 5. 01. 1989.)

CONTRIBUTION TO THE INVESTIGATION OF INFECTION OF THE LARVAE OF EUROPEAN PINE SAWFLY (*NEODIPRION SERTIFER*) IN DIFFERENT INSTARS REGARDING TO THEIR INSECT PARASITES

by

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Summary

Using specific nuclear polyhedrosis virus (Baculovirus) against younger larvae of *Neodiprion sertifer* a high mortality even over 90% is achived, depending of the intensity of the feeding of the larvae and doses of the virus consumed. But with infection the older larvae the total mortalities are less because a part of the larvae stop to feed and does not consume lethal doses of the virus and they spinned cocoons.

In laboratory conditions when larvae of *N. sertifer* of the fourth and older instars were fed with the virus concentration about 10^6 pol/ml 49,09 to 56,38% of the mortality were obtained.

The data presented in table 1 and 2 shows that the most survived larvae which spinned cocoons were among earlier in forest collected and with virus infected larvae. More than 71% male were eclosed from these cocoons. Later infection when the larvae were older percents of the dying were bigger and spinning cocoons relatively smaller and from these cocoons eclosed more female what shows taht at the time of infection the male larvae finished with feeding and avoid infection.

From a part of the spinned cocoons in the same year does not eclosed the imagoes. From such, closed, cocoons in the next spring eclosed the parasites *Lamachus eques* and *Lophyroplectus luteator*. The second parasite was were more frequent. The data also shows that percents of the eclosed insect parasites were bigger in the cases when the time of the collecting. *N. sertifer* larvae in forest were later. It was statement that the same number (500) dead larvae and spinned cocoons were most lighter in case of the most earlier collected larvae in forest. All the gained data shows that we were dealing with the larvae of different sexes depending of the time of their collecting in forest at Deliblato Sand.

A CONTRIBUTION TO THE STUDY OF LADYBUGS PREDATORS OF PLANT LICE *(COCCINELLIDAE, COLEOPTERA)*

by

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Summary

In the period from 1984 to 1986, there were observed in different localities of Serbia, as predators of plant lice, the following species of ladybugs: *Coccinella septempunctata* L., *Propylaea quatuordecimpunctata* (L.), *Syncharmonia conglobata* (L.), *Adalia bipunctata* (L), *Adonia variegata* (Goeze), *Hipodamia tredecimpunctata* (L) and *Micraspis sedecimpunctata* (L). The most frequently reared species were *C. septempunctata*, *A. bipunctata* and *Syncharmonia conglobata*. Other species were obtained in individual samples. There were studied the biology and the intensity of feeding under laboratory conditions of *S. conglobata*. The initial population was obtained from the colony of *Eucallipterus tilliae*, which developed on lima tree leaves of the alleys of New Belgrade. On a leaf of lime tree were found up to ten imagos of *S. conglobata*. Two treatments were practised in rearing the larvae: mixed regime of feeding and feeding on a single species of prey. In the experiment were utilized following species of prey: *Eucallipterus tilliae*, *Hyalpoterus pruni*, *Brachycaudus helichrysi*, *Betulaphis quadrimaculata* and *Macrosiphum rosae*. With the mixed feeding regime, a larva eats, in the course of its life which lasts 10.5 days on an average, 161 lice of $L_3/_4$ degree, and with the diferentiated alimentation 261 lice. Differentiated feeding did not exert an essential influence on the length of the larval development and of the pupal stage.

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POSSIBILITY OF CHEMICAL CONTROL OF GALL MIDGES *DAKTULOSPHAIRA VITIFOLIAE* FITCH *(HOMOPTERA: PHYLLOXERIDAE)* ON AMERCAN GRAPEVINE

by

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Summary

The results of two-year investigations relating to the intensity of infestation and population density of gall midges *Daktulosphaira vitifoliae* Fitch during the vegetation period are reviewed in this paper along with the data on the efficiency of several insecticides used in order to control them on American grapevine.

The investigations were carried out within the scope of microtrials set up in the nurseries of the American grupe clone Kober 5BB in 1987 and 1988. Each of the nine insecticides were used to treat areas covering 150 m^2. Spraying was applied to the soil, vines, shoots and leaves formed up to that moment. The area of the same size remained untreated and served as control. The intensity of phylloxera attack and the efficiency of the insecticides were assessed 21, 42, 63, 84 and 105 days after treatment by counting the galls on the apical leaves.

The results have shown that the intensity of infection and the population density of gall midges of phylloxera on the American grape clone Kober 5BB were uneven in different generations and in different experimental years. Generally speaking, the attack by phylloxera was considerably more severe in 1987 than in 1988. In both years, the population grew during June and July and reduced by the end of August. The most intensive infection by *D. vitifoliae* under Yugoslav conditions

was recorded in the first decade of August. Thus, on August 4, 1987, there were 96% of leaves attacked with 116.14 galls per leaf on the average, whereas on August 9, 1988, the number of infected leaves amounted to 83% with 29.77 galls per leaf on the average. By inspecting the apical leavs on the American grapevine at the end of August it was concluded that the rate of phylloxera infestation was reduced so that on August 25, 1987, there were 91% of infected leaves with 79.41 galls per leaf on the average, and on August 30, 1988, the figure amounted to 75% wth a considerably smaller number of galls per leaf (17.30 on the average).

Of all the insecticides tested, Lindan 20—EC revealed a satisfactory efficiency in both years in the reduction of population density of gall midges *D. vitifoliae* on the American grape. This insecticide completely protects the American grape against phylloxera during the period lasting up to 6 weeks. Its efficiency is also high 63 days after the application (86.88% in 1987, and 92.18% in 1988). After this period the efficiency of Lindan is reduced, as was the case in 1987 when the infection by phylloxera was rather high. Lorzban 20—EC, of which the active substance involves lindan (158 g/l) in addition to chlorpyrifos, is also a suitable insecticide against leaf gals *D. vitifoliae,* since it protects safely the American grapevine in the course of three weeks. The efficiency of this insecticide is also high 42 days after application (97.21%). Afterwards the efficiency of Lorzban is reduced and 84 days after application it amounts to 34.03%, and 105 days after application to 20.17% only.

Other insecticides tested in 1987 (Fenitrotion 50—EC, Reldan 2—E, Chromorel—d and Cymbosh—10) have shown an insufficient efficiency in the reduction of population density of leaf phylloxera galls on the American grape. On the plants treated with the above insecticides, 21 days after application the galls were present on the apical leaves. Especially insufficient efficiency was revealed by Cymbush—10, since 21 days after application its efficiency amounted to 62.43% and after 42 days to 11.20% only. Of these insecticides, Chromorel—d showed somewhat higher efficiency in the reduction of the number of leaf phylloxera gals (91.01% after 21 days, and 53.84% after 42 days).

The experimental results have shown that in 1988 a satisfactory degree of efficiency in reduction of the number of gall midges *D. vitifoliae* on the American grapevine three weeks after the application was characteristic of Fastac 10% EC and Ultracid 40—EC. Forty-two days after application, the former still had a high efficiency (81.01%) though the efficiency of the latter was considerably lower (62.03%). After this period, the efficiency of the two insecticides was reduced abruptly. On the other hand, Sumicidin EC—20 and Zolone liquide have revealed an insufficient efficiency, since on the American grape treated by these insecticides, the galls were observed already three weeks after the application.

Single application of any of the insecticides tested is not sufficient as to provide an optimum protection of the American grapevine against the gall midges *D. vitifoliae* and therefore it should be suggested that the treatment is to be repeated as soon as initial galls are noticed on the leaves after the first application.

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THE RESULTS OBTAINED UNTIL NOW IN THE INVESTIGATIONS OF *PHOMOPSIS/DIAPORTHE HELIANTHI* ON SUNFLOWERS.

II. ESTIMATE OF DISEASE INTENSITY AND INOCULATION METHODS

by

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Summary

The outbreak of a new sunflower disease in 1980, caused by the holomorph *Diaporthe helianthi* Munt.—Cvet. et al., confronted many researchers with the choice of the most suitable method of assessment of disease intensity and the most suitable inoculation methods. This paper reviews eight-year results of the studies carried out on the host-parasite relationship. Attention was paid on the role of temperature and humidity on this relationship. Applicability of a number of inoculation methods has been analyzed in detail.

The assessment of disease intensity on a numerical scale from 0 to 4, for the leaf and the stem separately, allows an efficient screening of susceptible genotypes in breeding programs. The assessment based on the rate of formation of spots and their size, conducted in greenhouse or in the field, provides more accurate data on disease intensity, i. e., degree of resistance in tested material.

Inoculation methods which include the wounding of plant tissues, regardless of the kind of inoculum used, are too radical and nonselective. Their results are not in agreement with those obtained in natural infection conditions. Such methods do not permit distinctions between the effects of the parasite and saprobe organisms, resistant and susceptible genotypes, as well as between parasites specialized on one plant species or genus and polyphages. When these methods are used, all known resistance sources appear susceptible.

For agronomic trials of resistant genotypes, studies of pathogenesis in different species of *Helianthus* and interspecific hybrids, inheritance studies, and specially pathohistological and patophysiological studies, the method of inoculation with suspensions of *D. helianthi* ascospores used as inoculum on intact leaf tissue is the most correct choice with respect to the course of natural infection in the field.

A decissive role on the outcome of the host/parasite relationship in field conditions, from the occurrence of the first symptoms on the leaf margin to the end of the vegetative season, is played by temperature and rainfall. After the occurrence of macroscopically visible symptoms, the pathogenesis may be stopped by high temperatures (over 30°C) accompained by a protracted dry spell. The destruction of a portion of the foliage does not bring/direct losses in seed yield and oil content since contemporary varieties and hybrids have the leaf area much above the minimum necessary for normal photosynthesis and accumulation of assimilates.

At later stages of the pathogenesis, when necrotic processes spread to the vascular system of the stem, the climatic conditions described above have the contrary effect. High temperature increases transpiration to the point when damaged vascular system of infected plants cannot compensate the water losses. This rapidly leads to an abrupt maturation of the plants. Separate assessments of disease intensity on the leaf and on the stem of susceptible genotypes have revealed that correlation coefficients for the assessments vary from 0.18 to 0.93, in dependence of the above mentioned climatic factors.