UDK 632.9

YU ISSN 0372-7866

INSTITUT ZA ZAŠTITU BILJA — BEOGRAD
INSTITUTE FOR PLANT PROTECTION — BEOGRAD

ZAŠTITA BILJA
(PLANT PROTECTION)

VOL. 39 (3), BROJ 185, 1988. GOD.

CONTENTS

Original Scientific papers

Profesional papers

Kouyeas, H. (1979): The »rhizomania« of sugar beet. — Annales de l'Institut Phytopathologique Benaki (1979) 12 (1), 151—153. (Abstr.: RPP 60 (1981), 1682).

Krexner, R. (1981): Rizomania (Wurzelbärtigkeit), eine neue Rübenkrankheit. — Pflanzenarzt (1961) 34 (1), 3—7. (Abstr.: RPP 60 (1981), 5590).

Putz., C., Vuittenez, A. (1974): Observation de particules virales chez des betteraves présentant, en Alsace, des symptômes de »rhizomanie«. — Ann. Phytopath. 1974) 6, 129—238. (Abstr.: RPP 54 (1975), 4216).

Šutić, D., Milovanović, M. (1978): Pojava i značaj kržljavosti korena šećerne repe. — Agrohemija (1978), 9—10, 363—368.

Tošić, M., Ivanović, M., Đurđević Mirjana (1978): Neki načini prenošenja virusa izolovanog iz kržljavih korenova šećerne repe. — Agrohemija (1978), 9—10, 377—382.

Tošić, M., Šutić, D., Ivanović, M, (1978a): Prouzrokovač infektivne kržljavosti korena šećerne repe. — Agrohemija (1978) 9—10, 369—375.

Weiler, N. (1976): Gefar durch Rizomania für Süddeutschen Rübenanbau. — Deutsche Zuckerrübenzeitung, Febr. 76, 9.

(Primljeno 2. 02. 1988)

CONTRIBUTION TO THE STUDY OF SUGAR BEET RHIZOMANIA EPIDEMIOLOGY

by

M. Tošić, Branka Krstić, Svetlana Bajić and **Gordana Stojanović**
Faculty of Agriculture, Beograd—Zemun
Persida Vilovski and **R. Rožić**
»Agrozavod«, Kikinda

Summary

Done investigations and obtained results have shown that water from channels for irrigation contains and spread inoculum of sugar beet rhizomania. This was proved by means of sugar beet seedlings watered with the water from four different channels (»Galad«, »Topola«, »29. novembar« and »Banaćanka«) in North Banat region. In the root of watered sugar beet seedlings the presence of beet necrotic yellow vein virus and its vector *Polymyxa betae* was found. The presence of the virus was detected by »bio-assay« on test plants of *Beta vulgaris* var. *saccharifera* cv. KW Maja. *Chenopodium amaranticolor* and *C. quinoa*. Presence of *P. betae* was observed by light microscopy. Infection of watered sugar beet plants with rhizomania was discovered as early as one month after watering was started.

A STUDY OF THE BIOLOGY AND ECOLOGY OF POLYMYXA *BETAE* KESKIN IN SUGAR BEET IN YUGOSLAVIA

by

M. Ivanović

Faculty of Agriculture, University of Belgrade, Beograd

Summary

Polymyxae betae is sugar beet parasite and the vector of Beet Necrotic Yellow Vein Virus, which cause rizomania of sugar beet.

In its life cicle the fungus has the following forms: cystospores, cystosors, primary, zoospores, zoosporangia and zoospors (secundari zoospores).

Cystospores are globular in form, 4,56 × 4,56 micrometers in size. On the surface of the cyst there are 6 horny protrudings. On an ultrathin section of the cyst envelope, a nucleus and a nonstructured leyer on outer side of the cyst can be seen. Cysts are conected among themselves and formed cystosors.

Cystosors are found in the epidermal cells of the tap root and root hairs. They have various shapes: globular, irregular, elongated and sometimes composed of a linear series of cysts. In some instance the shape of the cystosors depends on the cell in which the cystosors are found. The size of the cystosors is 8,8—146 μm in lenght and 4,6—45,8 μm in width. The number of cysts in a cystosor varies from 4 to 353. Cystosor make possible the survival of the species in unfawourable conditions in nature.

Primary zoospores are formed by the germination of cystospores. There are no morphological differences between them and secondary zoospores, which are formed in zoosporangia. The zoospores are mice-like in shape. The size of fixed zoospores is 4.5 × 5.2 μm. They have two flagella of different size, the shorter 6.8, and longer 18.0 μm.

On an ultrathin section of zoospores can bee seen a membrane, a nucleus, a golgi complex, mitohondria, oil drops, ribosomes and a vacuole.

Zoosporangia are formed from the plasmod after the zoospora empeties its content int the host cell. They are of elongated or iregular shiape with a small exit papille for the discharge of zoospores out of zoosporangia. In one zoosporangia there may be hundreds or even thousands of zoospores.

P. betae is able to grow and infect sugar beet in a wide range of pH, from 5—8. It can grow and cause infection to sugar beet in temperature intervals from 10—30°C. Zoosporangia and zoospores are formed in 55 hours on 30°C, and 6—7 days at 10°C. Cystosors and cystospores are formed in 6 days at 30°C, and 35 days at 10°C.

XANTHOMONAS CAMPESTRIS PV. PELARGONII (BROWN 1923) DYE 1978 A PARASITE OF PELARGONIUM (*PELARGONIUM HORTORUM BAILEY*)

by

M. Arsenijević
Faculty of Agriculture, Novi Sad

S u m m a r y

Bacterial rot of the stem and wilting of plants is a frequent disease of the pelargonium in Yugoslavia. From the diseased plants have been isolated several isolates of bacteria, whose pathogenic and bacteriological characteristics are fet forth in the present paper.

The isolates, which were the object of investigation liva as parasites on the pelargonium only, vhile on the inoculated slices of potato, carrot and parship they do not cause any changes whatsoever. On the tobacco plant develops a typical hypersensitive reaction (HR), after eight hours already, which is a characteristic of the genus *Pseudomonas.*

Bacteria are aerobic, rod-shapes, asporogenous and gramnegative with one polar cilia. Their development on the nutrient medium (NA) is characterized by the occurrence of tiny, roundish colonies, of cream to light yellow colour. On the medium with the yeast extract and $CaCO_3$ (YDC) the colonies are roundish, bulging, coarse and mucous, of brilliant and lemon--yellow colour. Slimy, bulging and coarse colonies develop also on the medium enriched with the saccharose (NAS), indicating the creation of levan. On the King's B medium there is no creation of the fluorescent pigment.

The bacteria, object of our investigations, do not produce the oxydase or argininedihydrolase, but creates levan and catalase. Metabolism of glucose is oxydative, but not fermentative, too. Bacteria dissolve the gelatin slowly, do not hydrolyze starch; create H_2S, NH_3 and effect proteolysis of milk (in the proteolitic test); do not create nitrites from nitrates nor indole, as well as the reducing substances from the saccharose; they develop in the solution with 2% or 3% of NaCl and at the temperature of 36°C, whereas at 41°C and in the solution with 4% or 5% NaCl there is no developing.

On the basis of the results obtained it follows that the investigated parasite of the pelargonium belongs to the bacterium *X. c. pv. pelargonii.*

Keeling, B. L. (1974): Soybean seed rot and relation of seed exudate to host susceptibility. Phytopathology 64: 1445—1447.

Lehman S. G., Wolf, F. A. (1926): *Pythium root rot of soybean. J. Agr.* Res., 33: 375—380.

Mathews, D. W. (1931): Studies of genus *Pythium*, Baltimore, SAD.

Plaats-Witernk van der A. J. (1981): Monograph of the genus *Pythium*. Mycology 21. Centraalbureau voor schimmelcultures, Baarn.

Schlub, R. L., Lockwood, J. L. (1981): Etiology and epidemiology of seedling rot of soybean by *Pythium ultimum* Phytopathology 71: 134—138.

Sinclair, J. B. (1982): *Pythium rot*. Compendium of soybean diseases: 45—47.

Thomson, T. B., Athow, K. L., Laviolette, F. A. (1971): The effect of temperature on the pathogenicity of *Pythium aphanidermatum, P. debaryanum* and *P. ultimum* on soybean. Phythopathology 61: 933—935.

Waterhouse, G. (1968): The genus *Pythium* Pringsheim. Mycological Papers 110: 68—69.

(Primljeno 10. 09. 1987)

PYTHIUM ULTIMUM TROW. AS THE PARASITE OF SOYBEAN

by

S. Jasnić
Facylty of Agriculture,
Institute for Plant Protection, Novi Sad

B. Cvjetković
Faculty of Agricultural Sciences,
Institute for Plan Protection, Zagreb

M. Vidić
Faculty of Agriculture,
Institute for Field Crop and Vegetable,
Novi Sad

Summary

Pythium ultimum Trow. causes hlorosis, wilting and drying of soybean plants in Yugoslavia. Typical symptoms appear on stem base as ellongated brown watersoaked lesions. Later the lesions became reddish-brown, widespread and a watery soft rot is produced.

On potato dextrose agar fungus formswell developed grayish-white aerial mycelium. Hyphe branched, nonseptate in young and usually septate in old cultures. The sporangia formed only rarely.

Sporangia usually terminal and spherical or eliptical. The dimensions of the sporangia are width 13,7—14,2 and length 23,6—25,8 micrometars. Zoospores were not formed. Oogonia smooth, usually terminal 18,06—21,5 micrometars in diameter. Antheridia mostly monoclinous, sackshaped and generally one to each oogonim, arising from the stalk of the oogonium. Oospores not filling the oogonium, spherical, with a heavy wall 13,76—17,2 micrometers in diameter.

The symptoms obtained by artificial inoculation resemble those of natural infection of soybean.

Kulik, M. M. (1983): The current scenario of the pod and stem blight stem canker-seed decay complex of soybean I. Tropical Plant Diseases 1 :1—11.

Vidić, M., Jasnić, S.: Osetljivost soje prema *Diaporthe phaseolorum* var. *caulivora* u različitim fenofazama razvoja, Zaštita bilja (u štampi).

Vidić, M., Jasnić, S.: Uticaj *Diaporthe phaseolorum* var. *caulivora* na prinos i kvalitet soje. Zaštita bilja (u štampi).

(Primljeno 5. 05. 1988)

CONTRIBUTION TO INVESTIGATION OF *DIAPORTHE PHASEOLORUM* VAR. *CAULIVORA* EPIDEMIOLOGY ON SOYBEAN

by

M. Vidić and S. Jasnić
Faculty of Agriculture, Novi Sad

Summary

The infected plant debris of soybean stems have the very important role in the epidemiology of *D. phaseolorum* var, *caulivora*. The fungus forms in mass perithecia with asci and ascospores on infected plant debris of soybean stems. The ascospores can infected the soybean.

For the formation of perithecia, germination of ascospores and occurence of iniection the moisture is necessary. The distribution and quantity of rainfalls during the vegetation determines the time of perithecia occuring and he dynamics of ascospores discharge. The formation of perithecia and the liberation of ascospores occure in temperatural interval from 10°C. to 27°C. with optimum between 20°C. and 25°C. The ascospores germinate on temperature from 10°C. to 32°C. with optimum at 22,5°C.

The formation of perithecia were not observed on overground parts of the soybean during the vegetation. The perithecia can form on the root of soybean at the end of vegetation season when long rainy period occures.

The fungus overwinters in soybean debris on soil surface and forms perithecia in these plant debris in spring, most frequently at the end of May or in the first half of June. The begining of ascospores discharge occure 5—10 days after appearance of perithecial necks on the stems of soybean. The ascospores are discharged successively during all vegetation period usually after abudant rainfalls.

The ascospores were oozed through opening of the neck, where they form mucous drop. The ascospores are disseminated on plants by raindrops and wind.

The infection of soybean plants take place directly through leaf blades, petioles or stem wounds.

ETIOLOGIC STUDY OF BACTERIAL NECROSIS OF THE FRUITS AND LEAVES OF SOUR CHERRY AND POSSIBILITY OF PARASITE CONTROL

by

Jelica Balaž, M. Arsenijević and **Đ. Vojvodić**
Institut for Plant Protection, Novi Sad

Summary

Bacterial necrosis of fruits represents a new, economically important disease of sour cherry in our country. The most susceptible varieties are as folows: *Heimans Rubinweichsel, Heimans Konzevrenweichsel* i *Rexelle.*

The infection of fruits occur immediately after their fruit set. Symptoms spread very quickly at the stage of their intensive increase (growth), when they are most visible. On leaves, the symptoms appear even earlier at the beginning of leaf formation.

The pathogenicity of isolates and reisolates is proved on the fruits and leaves of sour cherry.

Bacteria are of sticky shape, gramnegative and asporogenous. The results of LOPAT test show that these isolates on NSA base form levan, the reaction to the oxidase presence is being negative, they do not produce potato rot, the reaction of arginin dehidrolasis is also negative and on tabacco plants they cause hypersensitive reactions. On the King B base there is formed fluorescent pigment, they are aerobi since they separate (segregate) glucose only oxidatively. They produce acid from different carbon compounds (arabinose, glucose, manita, manozeand, sacchlarose), but they do not conduct the hydrolysis of starch and do not produce indol and H_2S. They do not reduce nitrates into nitrites.

According to the abovementioned results it can be concluded that the isolates investigated belong to the I group of fluorescent phytopathogenic bacteria form the genus *Pseudomonas,* i. e. they represent a pathogenic variety of bacteria *Pseudomonas syringae* van Hall, showing greatest similarity with bacteria *P. s. pv. syringae* and *P. s. pv. morsprunorum.* Further determination of isolates to the pathogenic varieta is in course.

The results of trial of this bacteriose control by chemicals show a certain efficiency of control measure, but it do not exceed 77,8%.

One sprayng in autumn and two or three spraynгs in spring with Bordeaux mixture at phenostage early flower, petal fall and fruit formation secured an efficient control of more than 70%. Similar results were obtained by the application of the chemical Kasumin (Kasumicin + copper hydroxide).

Zadoks, J. C. (1967): International dispersal of Fungi. Neth. J. Plant Path. 73 : Suppl. 1 : 61—80.

Yarwood C. E., Sidky, S., Colen, M., Stantili, V. (1954): Temperature relations of Powdery Mildews, Hilgardia, Vol. 22. № 17, Berkley, California.

(Primljeno 1. 02. 1988)

THE INVESTIGATION OF EPIDEMIOLOGY AND ECOLOGY OF FOUR SPRING WHEAT PATHOGENES IN HILLY-MOUNTAIN REGIONS OF BOSNIA AND HERCEGOVINA

by

Jelena Bošković

Faculty of Agriculture,
Institute for Plant Protection, Novi Sad

Summary

In the paper are presented results of the investigation in epidemiology and ecology of four pathogens (*Puccinia recondita tritici, Puccinia graminis tritici, Puccinia striiformis* and *Erysiphe graminis tritici* on spring wheat genotypes in the trials of Nevesinje, Gacko, Duvno and Kupres in 1979 and 1980.

On spring wheat varieties and lines the first appearence of four pathogens were registered, as well as further severities according to Coob's Modified scale up to the end of vegetation period. The results are presented on the graphs (progressiv pathogen curves) with the temperatures and rain falls (graf. 1, 2, 3, 4, 5 and 6).

The results showed that in the regions of Nevesinje, Gacko, Duvno and Kupres are possible favourable conditions for very intensive development of four investigated pathogenes whithin one season. During the vegetation period the temperatures were 12—16°C and rainfalls 40—120 mm. According to the available literature exception was intesive development of *P. graminis tritici* at temperature of 16°C and development of *E. graminis tritici* on lower temperature.

It proved to be a great flexible development on a spring wheat of *E. graminis tritici,* but medium of *P. graminis tritici* and *P. striiformis,* and very low flexibility of *P. recondita tritici.*

CONTRIBUTION TO THE STUDY OF THE CHRYSANTHEMUM WHITE RUST

by

Liljana Đorđević
Vrtno cvećarski kombinat »Rasadnici«, Beograd

Summary

Chrysanthemum white rust was found to be present in the localities of Beograd and Vranjska Banja, as well as on cutted flowers originating from localities of Pančevo, Split and Vršac. This is first record of chrysanthemum white rust in localities of Vranjska Banja and Split.

Symptoms of white rust were recognized on leaf, leaf petiole, stem, petal and sepal leaflets, as well as on bracts. The most characteristic and the most often symptoms can be seen on the leaf blade. First sign of infection on the upper side of the leaf blade is a convex surphace, getting light green, then yellow and brown at the end. These dots could be up to several mm in diameter. On the lower side of the leaf there is a concave dot in which sori are formed. At the beginning sori are whitish, getting later yellowish and at the end brownish. Sori are usually formed in concentric arrangement arround initial one. Very rarely sori are not formed and dots remain sterile. Sterile dots could be found in the fall. In some cases sori were found on the upper side of leaf blade. These sori at the end of big veins and they are narrow and longer. Very few sori have been seen among veins on the upper side of leaf blade, and they were corresponding to the sori formed on the lower side of leaf blade.

Infection on leaf petiole, stem, petals, sepals and bracts is usually associated with sori formation.

Mass infection leads to the complete leaf necrosis and premature death of infected plants which do not flower.

Teleutospore of *Puccinia horiana* are twocelled, hialine to yellowish, with average size of 44,02 × 15,29 μm by one isolate and 48,30 × 14,60 μm by another isolate and with interval of variation of 19,32—61,18 × × 9,66 — 22,54, or 22,54 — 57,96 × 8,05 — 28,98 μm respectively.

Stalk of teleutospores is a little bit curved and long 6,44 — 61,18, and average size with two isolates of 27,60 and 33,55 μm, respectively.

Teleutospores germinate without resting period. They germinate in a drop of water or in high relative humidity, as well as on temperatures from 5 — 32 — 36°C and the optimum is 21 — 23°C. At optimal temperature and humidity teleutospores germinate after 15 minutes, then in next three hrs bazids and bazidiospores are formed, which will be liberated in next three-four hrs.

Bazid is with three or four cells, hyaline, elongated 43,7 — 197,5 μm. Bazid grows normally in the opposite direction teleutospore stalk, but

with teleutospores of weak viability bazids grow towards teleutospores stalk. In that case bazids are deformed, shorter and do not bear bazidiospores.

Bazidiospores are onecelled, oval to eliptic, size of 16 × 6 µm. After detachment from bazid bazidiospores germinate. In the case of leaf infection tekes place on the lower side of leaf blade.

In laboratory or greenhouse conditions incubation period lasts 9 days during spring and summer and 16 days during winter. The sori are formed 15—20 days after incubation.

Teleutospores are not durable. Short time after formation they become of weak ability, deformed and bear bazidia without bazidiospores. The same phenomenon was recognized after freezing. Because of that the most likely teleutospores serve only for propagation during summer.

THE INFLUENCE OF FUNGICIDES AND VARIOUS SUBSTRATUM ON CONTROLING DAMPING-OFF OF CONIFERS IN NURSERY

by

M. Usčuplić, V. Lazarev, S. Nikolić, F. Glavočevlć and B. Antić
Faculty of forestry, Sarajevo

Summary

Further investigation on the control of damping-off using some fungicides and various types of supstrata are represented here. Satisfactory production of seedlings in seedbeds depends not only quality of seeds and the fungicides used, but mainly on the ecosystem of supstrata. The results obtained through many years experiments showed high significant changes among years and types of supstrata.

To improve quality of supstrata and to achieve optimal pH of supstrata (considering it as an important factor of ecosystem), we introduced saw-dust of beech and mixed conifer (spruce and fir) as a part of basic supstrata and saw-dust of beech, pine, fir and mixed conifer (spruce and fir) as cover or subcover of seed. Investigation has been carried on following species: Scots pine, Austrian pine, spruce, European larch and Douglas fir. Captan and Folpet are used for chemical control.

Results are not constant because of failure in homogenizing the supstrata and the influence of other non controled factors. However, some conclusions could be made:

— use of fungicides could not be replaced by improving the supstrata,

— Captan and Folpet gave satisfactory effects,

— use of saw-dust only as the seed cover gave the best results,

— use of saw-dust as adition to basic supstrata should be limited,

— use of saw-dust as seed subcover should not be recommended.

BIOLOGICAL VALUE OF SOME SPECIFIC ACARICIDES IN THE CONTROL OF *PANONYCHUS ULMI* KOCH.

by

M. Marković
Chemical Industry »Zorka«, Šabac

Summary

Numerous population as well as a large number of generations in the course of the vegetation period required permanent following of *Panonychus ulmi* Koch. and its control. The occurrence of resistant forms imposes the need of choice a considerable number of specific acaricides (the establishing of their biological value) which can be taken into consideration for its control. There were investigated specific acaricides based on propargyte (Omite 57E), cihexatine (Acarex 60) and brompropylate (Neoron 500) and determined the initial toxicity and persistence. On the basis of the obtained results was established that the preparations behave in different manners under different conditions, that they have not the same initial toxicity and persistence, lhich is very imporant in choosing and applying these preparations.

Acarex 60 manifested throughout the three years a high degree of initial efficacy as well as the persistence for 28 days after the treatment.

In all the investigations Neoron 500 achieved a high degree of initial action in controlling te movable forms of *Panonychus ulmi* Koch. However, the persistence decreases after 21 days from the treatment and after 28 days the effect is considerably reduced.

Omite 57 manifested in all the investigations a high degree of initial action, but its persistence is at the level of Neoron 500.

This investigation and the results achieved make possible the objective evaluation of the acaricides — objects of this study, for the control of *Panonychus ulmi* in this area and even in a wider region.

Schrodter, H. (1966): Das Problem der Vorhersage des Auftretens der Kartoffelkrautfäule (*Phytophthora infestans*) und die Möglichkeit seiner Lösung duch eine »Negativprognose«. Nachr. Bl. des Deutschen Pflanzenschutzdinestes, 18, 8, 33—39.

Van der Plank, J. E. (1963): Plant diseases: Epidemics and Control. Academic Press, New York, San Francisko and London, 7—55.

(Primljeno 21. 03. 1988)

NEGATIVPROGNOSE FÜR KARTOFFELFÄULE (*PHYTOPHTHORA INFESTANS*) NACH ULLRICH UND SCHRODTER IN BEDINGUNGEN DES SAVINJA — UND DRAVATALS

Marta Dolinar

Inštitut za hmeljarstvo in pivovarstvo, Žalec

Zusammenfasung

In den Jahren 1986 und 1987 wurde die Anwendbarkeit der Negativprognose zur integrierten Bekämpfung der Kartoffelfäule (*Phytophthora infestans*) in Savinja und Dravatal demonstriert. Im allen Fällen trat der Erstbefall nach dem prognostizierten Ende der epidemiefrein Zeit auf (GBZ 150). In Savinjatal trat der Erstbefall gegenüber der Erreichen der GBZ 150 stark verzögert auf, in Dravatal aber bald nach dem Erreichen. In Dravatal wachsen Kartoffeln im grösseren Komplex, damit ist der primäre Infektionsdruck stärker gegenüber Savinjatal, wo der Kartoffelbau extensiv, an kleinen Feldern (ca 0,3 ha) angebaut wird.