

UDK 632.9

YU ISSN 0372-7866

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

ZAŠTITA BILJA

(PLANT PROTECTION)

VOL. 37 (3) BROJ 177, 1986. GOD.

Zaštita bilja Vol. 37 (3) Br. 177 (str. 197—292) Beograd, 1986.

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WHEAT (*TRITICUM AESTIVUM* SSP. *VULGARE* /VILL. HOST/
MC KEY) AS THE TEST OF PATHOGENICITY OF *PSEUDOMONAS*
SYRINGAE PV. *SYRINGAE* VAN HALL

by

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Summary

As a widely spread and very polyphagous pathogen the bacteria *Ps. syringae* pv. *syringae* parasitizes a large number of plants in nature. On account of this the isolates of this bacterium may often be obtained in the laboratory on the occasion of bacteriological analyses of the diseased samples both of herbaceous and ligneous plants.

Different tests, among which also the pathogenicity test, can be of use in differentiating this from other similar bacteria. Starting from this, we were interested in the behaviour of wheat, which is otherwise host of the bacterium *Ps. s. pv. syringae*, as the test of pathogenicity of its isolates of different origin.

For this purpose as used the San Pastore sort, raised in field. The artificial inoculation was carried out in the field at the end of April and in the beginning of May, by injecting the suspension into the yet unopened sheath of the apical leaf (tube) of wheat, by means of medical syringe. There were used 3—4 ml of suspension, concentration between 10^7 — 10^8 cells/ml of each isolate (Tab. 1 and 2).

Besides the isolates of *Ps. s. pv. syringae*, originating from herbaceous and ligneous plants, there were used also the isolates of *Ps. s. pv. glycinea*, *Ps. s. pv. lachrymans*, *Ps. s. pv. phaseolicola*, *Ps. s. pv. tabaci*, *E. carotovora* pv. *carotovora* and saprophytic isolates of the bacterium *Ps. fluorescens*.

The first changes in form of necrosis of the inoculated tissue, which is gradually spreading and increasing, appear on the fourth day following the inoculation. Necrosis of the tissue is caused by the isolates of *Ps. s. pv. syringae* only, regardless of the origin (Fig. 1—3).

The isolates of other bacteria of the genus *Pseudomonas* (*Ps. s. pv. glycinea*, *Ps. s. pv. lachrymans*, *Ps. s. pv. phaseolicola*, *Ps. s. pv. tabaci*), the saprophytic isolates of the bacterium *Ps. fluorescens* and the isolates of *E. c. pv. carotovora* do not cause the necrosis of the inoculated wheat (Tab. 1 and 2).

Consequently, wheat can be used as the test of pathogenicity of the bacterium *Ps. s. pv. syringae*, regardless of its origin, from herbaceous or from ligneous plants.

PATHOGENIC AND SEROLOGIC CHARACTERISTICS OF
PSEUDOMONAS SYRINGAE PV. *SYRINGAE* VAN HALL
ORIGINATING FROM WHEAT

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S u m m a r y

Artificial inoculation effected by the puncture with a needle with the use of bacterial suspension, concentration about 10^7 cells/ml, shows that the isolates of *Ps. s. pv. syringae* originating from wheat, can parasitize the herbaceous and woody plants. Brown necrotic spots which appear on the Sudan grass (*Sorghum sudanense*), vigne (*Vigna sinensia*), horse-bean (*Vicia faba*) and alfalfa (*Medicago sativa*) spread and increase, occupying larger areas on the plant tissue, on account of which the inoculated plants wither and afterwards dry and die (Arsenijević, 1973); horse-bean (*V. faba*) gets also characteristic black colour (Fig. 3). The spots on the string bean pods are round and brown.

A strong necrosis occurs both on inoculated leaves of the peach tree (*Prunus persicae*), and on herbaceous annual shoots of the apricot tree (*Armeniaca vulgaris*), of the plum tree (*P. domestica*), of the peach-tree (*P. persicae*), of the pear-tree (*Pyrus communis*), of the lilac (*Syringa vulgaris*) and of the poplar-tree (*Populus sp.*). Spreading lengthwise, as well as along the circumference of inoculated annual shoots, the formed necrosis, encompassing them in form of a ring, causes the withering and then also their dying (Fig. 7).

On green fruits of fruit-trees (cherries, sour cherries, apricot, pear and citron) there appear large, brown spots which also increase and spread. Their characteristics aspect, or their absence, when it is a question also of other bacteria of parasitized plants can serve as a diagnostic sign, because they do not cause such spots (Arsenijević, 1982, 1986).

Herbaceous plants used for the inoculation were produced from the seeds in the glasshouse. For the inoculation of the peach-tree leaves were used young shoots, brought from the orchard and put into the Erlenmayer's pistons filled with water (Arsenijević, 1970a.) Herbaceous annual shoots of fruit-trees are produced in the glasshouse in rather large plastic vessels from the seedlings and the poplar trees from its cut off twigs. After the inoculation, all the plants (herbaceous and woody) as well as the fruits of fruit-trees, were sprinkled with water and held for 24—48^h in the humid chamber or under the nylon sacks, in order to secure humidity.

Serologic investigations show that only homologous serum *Ps. s. pv. syringae* causes the agglutination of the suspension of bacteria, originating from wheat (103, 106). For, the serum produced by means of the isolate of this bacteria (524), originating from the lilac, does not agglutinate

the bacterial suspension, isolated from wheat (Tab. 1 and 2), reacting only in the bacterial suspension of its own isolate (524).

Our results are in conformity with the results which were obtained by Lovrekovich et al. (1963) and Otta and English (1971) emphasizing the existence of several serological groups with this polyphagous bacterium.

SOME WEED SPECIES AS A TEST OF THE PATHOGENICITY OF PHYTOPATHOGENIC PSEUDOMONAS

II Reaction of Simson weed (*Datura stramonium* L.) and Lamb's quarters (*Chenopodium album* L.)

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Summary

Simson weed (*D. stramonium* L.) and Lamb's quarters (*Ch. album* L.) were reared in the glasshouse from seeds and having reached the stage of adult plants, used as a test of pathogenicity of the phytopathogenic bacteria of the genus *Pseudomonas*.

The inoculation of their leaves was effected by the infiltration of the bacterial suspension in the concentration of 10^7 cells/ml. For this purpose were used the isolates of the following bacteria: *Pseudomonas syringae* pv. *syringae*, *Ps. s.* pv. *morsprunorum*, *Ps. s.* pv. *glycinea*, *Ps. s.* pv. *lachrymans*, *Ps. s.* pv. *mori*, *Ps. s.* pv. *phaseolicola*, *Ps. s.* pv. *pisi*, *Ps. s.* pv. *savastanoi*, *Ps. s.* pv. *sesami*, *Ps. s.* pv. *tabaci*, *Ps. s.* pv. *tomato*, *Ps. s.* pv. *ulmi*, *Ps. caryophylli*, *Ps. colanacearum*, *Ps. viridiflava* and others.

All the isolates which were used caused the necrosis of inoculated leaves of *D. stramonium* within the 24 hours from the infiltration of the suspension of the above bacteria. The saprophytic isolates (*Ps. fluorescens*) and water do not cause any changes. Consequently, the Simson weed can be used as test plant for the verifying of pathogenicity of bacteria belonging to the genus *Pseudomonas*.

Lamb's quarters (*Ch. album*) could not be recommended for the time being, for on its leaves inoculated with the suspension of bacteria does not appear typical necrosis, but rather mostly chlorosis of the tissues.

OCCURRENCE OF *PHYTOPHTHORA CACTORUM* (LEB. ET COHN)
SCHROET. IN APPLE ORCHARDS, CAUSAL AGENT OF
COLLAR ROT

by

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Summary

In the apple orchard Kmetijski kombinat Jeruzalem, not far from Ormož damage was observed on the cultivar Golden Delicious growing on MM-104 rootstock. The disease mainly occurs on the stem of the tree from the surface of the soil upwards. The junction of the rootstock and stem may also suffer damage.

The first phase consists of wetness of the stem, the moisture is exuded by the damaged cells and makes its way to the surface of the bark. The Disease progresses rapidly: The entire stem may be encircled by the dead bark tissue. The bark becomes raddish brown, and watery, and begin to give off ferment smell.

The foliage turns raddish and falls earlier. The fruit remains small and ripen early. By the time of next spring, such trees are in most cases dead.

From the damaged trees we succeeded in isolating the fungus wich belongs to the genus *Phytophthora* with this characteristics: the sporangia have distinctly formed papillae, the shape of sporangium is oval, egg-shaped or ellipsoidal and the dimensions are 33,3—49,9 × 23—33,3 μm. The oogonia are oval, smooth walled and size 31,8 — 25,6 μm. The anteridia a paragyny. Chlamidospore are always present, but their size is variable from 19 — 53,3 μm. The optimal temperature for growth is +25°C but with extreme values of +2°C and +35°C. On the basis of these characteristics, we concluded that the isolate from the apple belongs to the species *Phytophthora cactorum* (Leb. et Cohn) Schroet.

A DISEASE OF POPLAR LEAVE BEETLE (*MELASOMA POPULI* L.,
CHRYSOMELIDAE, *COLEOPTERA*) PROVOKED BY
NOSEMA MELASOMAE

by

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S u m m a r y

In a nursery and young plantations of the poplar in the vicinity of Novi Sad, the poplar leave beetle (*Melasoma populi* L.) occurs in population of different density. It was found that the larvae and imagoes of the *M. populi* suffer and die in natural conditions from a disease provoked by *Nosema melasomae*. Microscopic examinations conducted in the period 1970—1974 showed that 53,5 to 82% of the examined larvae of the pest suffered from nosematosis.

N. melasomae spores are similar in size to those of *N. leptinotarsae* and *N. polyhrammae*.

The larvae of the potato beetle (*Leptinotarsa decemlineata*) fed on potato leaves contaminated with *N. melasomae* spores died with symptoms of nosematosis. These data indicate that it would be worthwhile to create foci of the disease in the pest populations living in natural conditions.

A CONTRIBUTION TO THE STUDY OF THE DEVELOPMENT
OF THE SMALLER ELM BARK BEETLE *SCOLYTUS*
MULTISTRIATUS MARSH. (COLEOPTERA, SCOLYTIDAE)

by

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S u m m a r y

The object of the study was the development of the smaller elm bark beetle *Scolytus multistriatus* Marsh. under the conditions prevailing in our country. A particular attention has been paid to the diapause, egg-laying capacity and complementary nutrition.

The smaller elm bark beetle is the most important vector of the fungus *Ceratocystis ulmi* Moreau (Buis), causer of the so-called »Dutch disease« on the elm-tree. In the central parts of Yugoslavia it chiefly hibernates in the larval stage, most frequently from the second generation that did not succeed in concluding the development in autumn or remained in the diapause from the first generation. In our conditions they can hibernate as pupae and imagos, which depends from the period of time, in which stage the elm bark beetle population found itself when the low autumn temperatures began, interrupting the development of bark beetles.

The swarming period of imagos of *S. multistriatus* takes place in our country in the course of May and in the first half of June, as well as at the end of July and in the first half of August in the second generation. The flying out of insects after the development of the first generation had been concluded, lasted 43 days in 1971 and 48 days in 1972. After the complementary feeding of imagos, which is performed in the furcate twigs of the elm-tree from 1 to 5 years old, there begins the piercing in and the deposition of eggs.

Imagos of *S. multistriatus* bore into the bark of the elm tree, where the turgor had slackened. The most appropriate parts of the trunk for the boring in are those whose diameter is about 12 cm and the thickness of the bark about 7 cm, although it develops also in the trunks where the thickness of the bark is over 12 mm as well as on the branches where the bark is only 3 mm thick.

The results point out that under the conditions of the laboratory, the total laying-egg capacity of the females varied, in 1971, from 19 to 57 eggs (35 eggs on an average), and in 1972 from 24 to 65 eggs (40 eggs on an average), whereas the number of larval galleries under natural conditions amounted to an average of 51.9 in 1971, resp. 49.8 in 1972.

At the constant temperature of 27°C and at 75 p. c. of relative humidity, the embryonal development of eggs lasts from 4 to 16 days, 6 days on an average; the larval stage lasts from 21 to 36 days (27 to 29

days on an average, and in the pupal stage from 21 to 36 days (7 days on an average).

We established that a considerable part of the population of *S. multistriatus*, both from the first and the second generation remains in the diapause and concludes the development in the following year. Thus in forests in the inundation territory of the river Save, there remain in the diapause and conclude the development in the following year about 20 p. c. of the first generation population and over 85 p. c. of the second generation.

The sexual index of *S. multistriatus* is positive, the relation is in favour of females. The maximum values of the sexual index were recorded in the forest of Senajske Bare in the second generation 1972 (0.55) and in 1971 (0.54).

By measuring the humidity of the elm-tree at the end of the concluded development of bark beetles, the latter points out that *S. multistriatus* can develop even when the percentage of bark humidity is very low. The almost dry bark (minimum 8.4 p. c. in 1972 and 9.7 p. c. in 1973) and the superficial layer of the tree (11.3 p. c. and 13.1 p. c. according to the years) were no hindrance to the development and the flying out of bark beetles. Nor in the bark, at a very low humidity, there occurred mass perishing of bark beetles.

THE OLIVE RUST MITE, *DITRYMACHUS ATHIASSELLA* K.
(ACARIDA: ERIOPHYOIDEA) A NEW SPECIES
FOR YUGOSLAV FAUNA

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S u m m a r y

Olive rust mite, *Ditrymacus athiasella* K. was unknown for the Yugoslav fauna until now.

This paper gives the description of protogyne female, I and II nymph and proportions of male. Locality, host plant, relation to the host and geographical distribution are also recorded.

Individuals of one local population from Yugoslavia were shorter and wuder than individuals from the type locality.

Nymphs I and II are described for the first time.

ASETADIPTACHUS EMILIAE CARMONA AND RHYNCAPHYTOPTUS
FICIFOLIAE K. (DIPTILOMIOPIDAE: ERIOPHYOIDEA)
TWO NEW SPECIES FOR YUGOSLAV FAUNA

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S u m m a r y

Two fig rust and vagrant mites *A. emiliae* Carmona and *Rh. ficifoliae* K. was unknown for the Yugoslav fauna until now.

This paper gives the description of the protogyne female from our local populations. Localities, host plants, relation to the host and geographical distribution are also recorded.

A. emiliae Carmona individuals of our local population in comparison with the original description differ in number of tergites, shape of dorsal shield and in punctuation of genital coverflap.

Rh. ficifoliae K. was for the first time found on *Medicago sativa* L. All individuals of our local populations differ from the original description in the number of rays in featherclaws which were 5-rayed.

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UDK: 632.7 : 581.2
AGRIS: H10 F05
Stručni prilog

BIOLOŠKE OSNOVE ŠTETNOSTI ERIOFIDNIH GRINJA

U radu su izneta dosadašnja znanja o anatomskim i fiziološkim osnovama štetnosti eriofidnih grinja, spektru biljaka domaćina, osetljivosti sorti, objašnjenju interakcije eriofida i biljaka domaćina, tipovima oštećenja i vektorskoj ulozi kao i načinima prenošenja biljnih patogena.

Uvod

Eriofidne grinje (*Acarida: Eriophyoidea*) su isključivo fitogeni organizmi. Otuda potiče i nužnost pretpostavke o njihovoj štetnosti.

Prilazeći problemu štetnosti eriofidnih grinja smatramo da treba imati u vidu nejednoznačnost ovog pojma. Još kompleksniji od pojma štetnost je ekonomski značaj, koji ne podrazumeva samo biološke osnove štetnosti. Naime, čovek određene epohe je taj subjektivni činilac koji izvesnim biljnim ili životinjskim vrstama pridaje manji ili veći značaj u smislu pozitivnih ili negativnih efekata koje one imaju ili mogu imati po njega.

Sledeći ovakav pristup treba imati u vidu da je njegov krajnji rezultat procena štete, odnosno koristi koju u konkretnom slučaju interakcija biljke domaćina i eriofidne grinje može imati. Na tom polju je po rečima Hernea i sar. (1979) do sada izgleda malo urađeno.

Osnovna pretpostavka praktičnih efekata koji se u krajnjoj liniji očekuju su fundamentalna istraživanja interakcije biljaka i eriofida.

Reakcija biljke na prisustvo ovih grinja kreće se u širokim granicama od potpune tolerancije, preko različitih tipova modifikacije tkiva i sterilnosti do težih oštećenja i letalnosti. S tim u vezi parafrazirajući Jurilja (1948) treba reći da se još uvek ne zna da li su uzročnici gala paraziti na biljci domaćinu ili je to simbioza »*sui generis*« od koje i domaćin ima neku korist.

Proučavanje biološke osnove štetnosti eriofida u širem smislu bi podrazumevalo i problem razmnožavanja, razvića, životnog ciklusa i ekologije. Zbog obimnosti literature i problema u celini ti aspekti će biti obrađeni i štampani kao posebne celine.

Anatomske i fiziološke osnove trofičke specijalizacije eriofida

Eriofide se hrane samo sukulentnim tkivom i to koliko je do danas poznato isključivo tečnim sadržajem vakuola epidermalnih ćelija (Silvere, Stein-Margolina, 1976). Eriofide pripadaju grupi fitofaga sa izrazito specijalizovanom trofičkom vezom i režimom ishrane. Imaju kratko crevo čija je apsorpciona površina