UDK 632.9

YU ISSN 0372 - 7866

INSTITUT ZA ZAŠTITU BILJA I ŽIVOTNU SREDINU - BEOGRAD
INSTITUTE FOR PLANT PROTECTION AND ENVIRONMENT - BELGRADE

ZAŠTITA BILJA
PLANT PROTECTION

VOL. 44 (4), No 206, 1993.

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(Primljeno 11.10.1993.)

SO FAR INVESTIGATIONS ON PHYTOPHAGOUS INSECTS FOR BIOCONTROL OF CARDUUS ACANTHOIDES L. (ASTERACEAE, ASTEROIDEAE)

by

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Summary

Carduus acanthoides L. is native to Europe and Asia. The species has been introduced into North America, Argentina and New Zealand where due to lack of natural enemies and competition with natural flora covers large areas in dense population.

On *C. acanthoides* in Yugoslavia an abundant entomofauna develops which in long terms plays significant role in regulating low population density of this weedy plant. Of special importance are insects which develop in flower heads damaging the reproductive plant organs. Among others, abundant are the insects of the *Tephritidae* (*Diptera*) (*Urophora aproximata* Hering, *U. stylata* Fabr., *U. quadrifasciata* Meigen, *U. solstitialis* L., *Terellia serratulae* L. and *Xyphosia miliaria* Schrank.) and the insects of *Curculionidae* (*Coleoptera*) (*Larinus jaceae* Fab., *L. turbinatus* Gyll., *L. beckeri* Petri, *L. strunus* Fab., *L. planus* Fab., *L. obtusus* Sturm, *L. latus* Herbst, *Rhinocyllus conicus* Froel. and *Ceutorrynchidius horridus* (Panz.).

In Europe, on *C. acanthoides* a large number of the insect species has been reported. After a detailed studies on biology, ecology, phitophagicity etc. for the biocontrol of *C. acanthoides* in North America, Argentina and New Zealand the 2 insect species were introduced.

Rhinocyllus conicus Froelich (*Coleoptera*: *Curculionidae*) was in 1968. introduced from France to Canada and a year after into the U.S.A. On some localities in Sachastewan (Canada) in 1974. it decreased the seed production of *C. acanthoides* for 63%. In 1979. *R. conicus* was introduced into New Zealand from France while in 1981. it was from France via New Zealand and Canada introduced into Argentina. It has been adopted on one locality in vicinity of Buenos Aieres. *R. conicus* was also introduced from Europe to North America, Argentina and New zealand for the purpose of biocontrol of *Carduus nutans* L., *Carduus thoermeri* Wein., *Carduus pycnocephalus* L., *Carduus tenuiflorus* Curtis, *Cirsium arvense* (L.) Scopoli, *Cirsium vulgare* L. and *Silybum marianum* (L.). On one locality in Virginia in the 6 year period it reduced the number of *C. nutans* for 95%.

Trichosirocalus horridus Panzer (= *Ceuthorhynchidius horridus* Panzer) (*Coleoptera*: *Curculionidae*) was introduced in North America and Argentina for biocontrol of *Carduus acanthoides* L., *Carduus nutans* L. and *Carduus thoermeri* Wein. In the U.S.A. in 1974. T. *horridus* was introduced from Italy for biocontrol of *Carduus acanthoides* and *Carduus thoermeri* Wein. On some localities in state of Virginia it decreased the population density of *C. acanthoides* for 87-100% (average: 95%). In Canada *T. horridus* was introduced in 1975. from Austria, Germany and Swiss. It has been adopted on *C. nutans* and redistribudet on *C. acanthoides* once again in states of Ontario and Quebec. However, in Canada on thiw weedy plant it did not adopt. In 1983. it was introduced into Argentina form Italy, but did not adopt.

- Nacionalni program (NWWSRN) kolekcionisanja, proučavanja i dopunjavanja genetskog jezgra otpornosti pšenice se uspešno nastavlja. Banka gena od oko 1500 genotipova predstavlja u kvantitativnom i kvalitativnom smislu veliku dragocenost.

- Efikasnu otpornost pokazali su sledeći genotipovi iz NWWSRN: Dimitrovska 5-12, F 5672, Niavt 31, K 45004, MV 8-83, IPPO 8, ID 1455, MVC 61482, OH 336, GA 83136-C-31 i domaća populacija 645-IV/3.

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(Primljeno 30.08.1993.)

TWENTYFIVE YEARS INVESTIGATION ON WINTER WHEAT RESISTANCE IN INTERNATIONAL (IWWSRN) AND THIRTI YEARS IN NATIONAL (NWWSRN) NURSERY OF STEM RUST

by

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Summary

From 1963 to 1987 in Yugoslavia was cultivated International winter wheat stem rust nursery (IWWSRN). Coordinators of this program were Kilpatrick and Moseman (ARS-USDA,

Beltsville). In that period there has been studied resistance of many of wheat genotypes of various origin and genetic composition, against *Puccinia graminis* Pers.f.sp. *tritici* Erikss. et Henn. Many of them have shownd a high degree of resistance in our agroecological conditions. The best onew were selected and included in our bank of resistance genes.

From 1964 to 1993 we have continually woeked with National wheat stem rust nursery (NWWSRN). This nursery was established by K o s t i ć, B. in 1964, and from 1974 its coordinator became S t o j a n o v i ć, S. The NWWSRN has been sown every year in 10-15 localities in Serbia. The genotypes proved to be the most resistant in a long period of time, have been used in our domestic breeding program.

IWWSRN and NWWSRN have remarkably contributed to the success of developing of new wheat cultivars in Yugoslavia. Some of new cultivars, in addition to many positive characters distinguish with high resistance against stem rust too (Jugoslavia, Balkan, Mačvanka 2, Pomoravka, Zvezda, Iskra, Kozara, Nera, Studenica, Lepenica, Srbijanka, Panoramka, Zemunka).

ERWINIA CAROTOVORA SUBSP. *CAROTOVORA* THE POTATO PATHOGEN

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Summary

12 strains of bacteria, of which 9 isolated from the rotten tubers, and 3 from the diseased potato stalk (Tab.1) manifest a large number of common characteristics in respect to pathogenicity, morphological, cultural and biochemical-physiological characteristics.

In the test of pathogenicity it was manifested that the typical rot is caused on the inoculated slices of the potato and carrot, such as on the immature fruits of the tomato and pepper, while the reaction of onion bulbs is much more poor or negative. Hypersensitive reaction is not caused on the tobacco leaf (Tab.2).

The bacteria of all 12 investigated strains are rod-shaped, gram negative, asprogenous and have peritrichous flagellation; they produce katalse and acid from glucose in O/F test; they do not produce oxidase, lecitinase not acid from α - metaglucoside and dulcite, they do not produce indol nor phosphatase except the strain Kr-262; they grow on the medium with 5% NaCl and at the temperature of 37°C (Tab.3).

According to this, based on the obtained results, it can be concluded that disregarding the origin (potato tuber or stalk) all investigated strains belong to the bacterium *Erwinia carotovora* ssp. *carotovora* (Jones 1901) Bergey et al. 1923, an important potato parasite.

PSEUDOMONAS SYRINGAE PV. *SYRINGAE*, THE APPLE PATHOGEN

by

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Summary

More strains of bacteria were isolated from the diseased apple shoots and five of them were examinated more detailed (J-50 to J-54). All five strains manifest high degree of virulency on the inoculated apple, pear, peach and lilac shoots causing wilting and their total death due to the outstanding necrosis of bark tissue and xylem. Similarly occurs with the strain Du-39 (*E. amylovora*) originated from the diseased quince-tree. On the inoculated fruits of fruit tree (pear, cherry, sour cherry and lemon) the isolates originating from the apple-tree (J-50 to J-54) cause necrotic changes and the isolate Du-39 on the pear, cherry and plum fruits (variety stanley), causes necrosis and bacterial exudate (Tab.1).

The isolates from apple-tree cause poor necrosis, of unequal intensity, on the fruits of inoculated lemon-tree, while the strain Du-39 do not cause it at all. Inoculated pepper and tomato fruits manifest strong necrotic changes typical for the bacterium *P.s.* pv. *syringae*, and lack of necrosis by the strain Du-39 (*E. amylovora*). Among these two bacteria there are differences also on the inoculated string beans pods, where the strains J-50 to J-54 cause brown spots, sunken into the tissue, and the strain Du-39 light brown IIR like (Tab.1).

On King's medium B the strains from apple-tree (J-50 to J-54) produce the green fluorescent pigment, while the strain Du-39 does not produce it. The strains from apple-tree and the strain from quince-tree differ also sereologically, such as in respect to glucose metabolism (Tab.1).

According to this, based on the pathogenic and bacteriological characteristics, such as on the characteristics of LOPAT tests, it can be concluded that the investigated strains (J-50 to J-54) fall into the group of Ia fluorescent bacteria of the genus *Pseudomonas*, and into the pathogenic variety *P.s.* pv. *syringae*, respectively, non-investigated bacterium as apple-tree parasite in our parts so far. The strain Du-39, originating from quince-tree, is the typical representative of the bacterium *E. amylovora*.

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(Primljeno 27.07.1993.)

DISTRIBUTION OF MICOFLORA ON BARLEY SEED

by

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Summary

In this paper the results of the investigation of micoflora occurence of the seed of eight barley varieties originating from 1986 and 1987 were presented. The following methods of investigation were used: method of filter paper, freezing on the filter paper, nutritive medium PGA and method of glass bell. The occurence of 14 fungi were proved: *Pyrenophora graminea*, *P. teres*, *P. tetramera*, *Cochliobolus sativus*, *Alternaria* spp., *Fusarium* spp., *Aspergillus* spp., *Botrytis* spp., *Penicillium* spp., *Mucor* spp., *Trichotecium* spp., *Ceratocistis* spp., *Chaetomium* spp. and *Rhizopus* spp.

The most frequent were *Alternaria* spp., *C. sativus*, *P. graminea* and *Fusarium* spp.

Higher degree of occurence of the fungi was proved on the seed of 1987 then of 1986, except *P. graminea* and the fungus of the genus *Alternaria* spp.

Some barley varieties have specific predisposition of susceptibility to some fungi. In relation to *P. graminea*, the most susceptible are multy-row varieties NS-315, NS-313 and NS-27, and the most resistant is NS-311. In relation to the parasite *C. sativus*, the most resistant is NS-27.

The distribution of fungi on barley seed acoording to the methods of invcstigation, ranged in the following relations:

-*Alternaria* spp. from 56,0-91,0% (freezing method), from 37,5-77,6% (filter paper method) and from 48,4-75,0% (PGA method);

- *Cochliobolus sativus* from 31,6-70,0% (filter paper method), 33,6-70,0% (freezing method) and from 24,7/69,0% (PGA method);

- *Fusarium* spp. from 13,5-38,0% (freezing method), from 12,0-40,0% (PGA method) and from 0,5-12,3% (filter paper method);

- *Aspergillus* spp.; to 11,1% (filter paper method), to 8,5% (freezing method) and to 1,0% (PGA method);

- *Penicillium* spp. to 4,5% (freezing method), to 3,5% (filter paper method) and to 4,2% (PGA method);

- *Pyrenophora graminea*; to 48,9% (glass bell method) and to 36,22% (freezing method).

Some methods proved to be more suitable for the detecting of fungi compared with some other. Due to this, freezing method is more suitable for *Alternaria* spp., *Fusarium* spp., *C. sativus* and *Penicillium* spp.), glass bell method for *P. graminea*, filter paper method for *Aspergillus* spp., *Trichotecium* spp., *Mucor* spp. and *Ceratocists* spp., and nutritive medium PGA for *Botrytis* spp.

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(Primljeno 8.10.1993.)

ACTIVITY OF *BACILLUS THURINGIENSIS* SUBSP. *TENEBRIONIS* ON, *LEPTINOTARSA DECEMLINEATA* SAY (*COLEOPTERA: CHRYSOMELIDAE*)

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Summary

Since the time when Colorado Potato Beetle (CPB) was introduced it has been permanent and serious pest on potatoes in Yugoslavgia. Mass occurrence of the pest in two generations was controlled by several treatments with chemical insecticides on potatoes.

Discovery of *Bacillus thuringiensis* subsp. *tenebrionis* offered the possibillity for chemical control of CPB with a biological insecticide which has specific mechanism of action. Therefore, the goal of this paper was to determine the effectiveness of the biological insecticide Novodor FC, based on *Bacillus thuringiensis* subsp. *tenebrionis*, in field conditions.

On the field plots with the infested potatoe and egg plants, in the vicinity of Zemun, insecticidial efficiacy of B.t.t. was followed. Doses of 100 ml a.i./ha and 40 ml a.i./ha were applied. Results showed that B.t.t. when applied under the conditions of high B.t.t. in doses of 40 ml a.i./ha was also effective when infestation was low. The applications in the period of mass hatching and 11 days latter controlled effectively the CPB larvae. However, at the lower doses more older larvae survived.

On the basis of the egg masses number it was concluded that B.t.t. can not prevent egg laying on potatoes and egg plants.

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(Primljeno 23.02.1993).

THE STRAWBERRY APHID *CHAETOSIPHON FRAGAEFOLII* COCKERELL IN PLANTINGS IN SERBIA

by

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Summary

The composition of aphidophauna was monitored in strawberry planting in Serbia over 1989-1992. The species Aphis forbesii Weed. and *Chaetosiphon fragaefolii* Cockerell were found to be most important in terms of distribution and population numbers. The sporadical occurrence of *Macrosiphum euphorbiae* (Thomas), *Myzus persicae* Sulz and *Aphis gossypii* Glover in lower numbers was also recorded.

The strawberry aphid Chaetosiphon fragaefolii occurred in all localities. Population numbers of this species varied, being affected by climatic factors and predators. Two peak numbers were recorded, the first in late May and the second in late September.

Morphometric characteristics of apterous virginoparae were tested on slide-mounted preparations. Body length was 0.96-1.6 mm (averaging 1.29 mm); the last segment of the rostrum 0.1-0.12 mm; siphunculi length 0.23-0.48 mm (averaging 0.392 mm); and antenall segment III 0.18-0.41 mm (averaging 0.327 mm).

The length of body and of the last segment of the rostrum in females were lower compared to those of the populations studied so far.