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PHYSIOLOGICAL ASPECTS OF SMALL GRAINS IMMUNITY TO DISEASES

by

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Summary

The paper deals with generalization of the data available in literature on mechanism and physiological function of the plants during pathogenesis and on many aspects of host-parasite relations. Comparative studies on the physiological process of resistant and susceptible varieties might give an insight into the nature of immunity of plants to diseases. Also, considerable attention was given to the changes in the physiological processes of the diseased plants as water regime, photosynthesis, respiration, carbohydrate and nitrogen metabolism, enzymatic reactions etc. On the basis of these data it was proposed the modes of increasing the resistance of the plants to infections and the decreasing of the great damages caused by parasites.

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EFFICIENCY OF THE BARLEY RESISTANCE GENES TO POWDERY MILDEW

by

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Summary

The barley powdery mildew is very spread in Serbia. Good results in the control of this disease could be realized by growing of resistant cultivars.

Investigation was carried out during 1991-1992 in five localities (Kragujevac, Zaječar, Kruševac, Vršac and Peć). Artificial inoculation was made only in Kragujevac.

The results show that the genes ml-05, Ml-a16, Ml-a17, Ml-a18 and Ml-a19 were the most effective. There are no virulence alleles to this genes in our population. The genes Ml-a, Ml-a3, Ml-a9, Ml-a13, Ml-p i Ml-at had the middle efficiency (coefficient of infection 2,2-9,8). The other genes (Ml-a6, Ml-a8, Ml-a12, Ml-g, Ml-c, Ml-k, Ml-nn, Ml-41/145, Ml-h and Ml-La) were not effective.

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BACTERIAL SOFT ROT OF CABBAGE SEED PLANTS

by

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Summary

In the spring of 1993, a soft rot of individual seed cabbage plants was noticed in a field near Novi Sad. Several bacterial strains were isolated from the diseased cabbage tissue. Three of them (Ku-60, Ku-61, Ku-62) were studied in detail. The investigated strains expressed the following common characteristics:

- High level of pathogenicity, causing hypersensitive reaction of tobacco leaves, wilting and stem rot of cabbage transplants and soft rot of potato slices, tomato and pepper fruits.
- **Colonies on nutrient medium are round, convex, shiny and white-cream.**
- **Bacterial cells are Gram-negative, asporogenous, rodshaped, with peritrichous flagellation.**
- Investigated strains do not produce green fluorescent pigment on King's medium B; grow at 37°C and also in presence of 5% NaCl; oxidase, lecithinase and phosphatase are negative but catalase positive; acid production from lactose and trehalose is positive, but not from dulcitol and α-methyl glucoside; indole production and reducing substances from sucrose are negative.

According to these results, it could be concluded that all strains investigated belong to the bacterium *Erwinia carotovora subsp. carotovora* (Jones) Bergey et al. 1923.

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THE PATHOGENICETY OF *PHOMOPSIS SOJAE* AND *PHOMOPSIS LONGICOLA* ISOLATES ON SOYBEAN

by

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Summary

On the basis of soybean seeds and plant artificial inoculations, the pathogenicety degree of four *Phomopsis longicola* Hobbs. isolates (P1, P2, P3 and P5) and two *Phomopsis sojae* Lehman isolates (P4 and P6) were investigated.

Significant differences in virulence were determined between isolates of the same species as well as between isolates of different fungus species. The differences in virulence between *P. sojae* isolates were very strongly expressed, while the differences in virulence between *P. longicola* isolates were weaker.

However, comparing the mean values of pathological index it can be concluded, that *P. longicola* was more virulent than *P. sojae*. The first one was more severe on inoculated soybean seeds, than the second one, although the both fungi infected soybean seeds.

Between symptoms caused by two studied fungi from the genus *Phomopsis* on soybean seeds, seedlings and plants no differences were noticed.

CONTRIBUTION TO THE STUDY OF *PHYTOPHTHORA NICOTIANAE* VAR. *NICOTIANAE* PARASITE OF TOBACCO

by

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Summary

Performed research and obtained results showed that investigated tobacco disease is caused by plant pathogenic fungus *Phytophthora nicotianae* (Breda de Haan) Tucker var. *nicotianae* Waterhouse.

The symptoms were typical for "black shank" of tobacco. On the basal part of the stem black necrosis appeared, followed by yellowing, wilting, necrosis and curling of lower leaves. necrosis was also present on the roots of infected tobacco plants. Infected plants dwarfed and died prematurely.

P. nicotianae var. *nicotianae* was isolated from diseased tobacco plants. The most properties of the studied isolates correspond to those of *P. nicotianae* var. *nicotianae*. The mycelium is coenocytic, 5.3-8.7 micrometers in diameter, rarely forming swellings. Older parts of mycelium are often granular. Conidia are pearshaped, oval or eliptic, with papiła and in size of 25.3-68.4 x 19.6-45.9 micrometers. Chlamidospores were also typical for *P. nicotianae* var. *nicotianae*, with diameter 20.6 to 42.1 micrometers, and forming in groups. Investigated isolates did not form oogonia und antheridia, neither oospores.

Inoculation of the top of wounded plants was more successful than inoculation of wounded lower part of stem. Inoculation was also rather efficient by immersion of root of seedlings into inoculum before transplantation, or transplants in the soil in which inoculum has been added. Some infections were also achieved by spraying tobacco plants with inoculum. Adding inoculum over soil surface further than 1 cm from plants was the least successful.

Younger tobacco plants showed to be more susceptible than older ones. In a comparative studies tobacco cv. Virdžinija was more susceptible than cvs. Džebel, Jaka, Otlja and Prilep.

Isolate "NS", which was isolated from diseased tobacco plants sampled at Novo Selo near Strumica, was more aggresive than isolate "P", which was isolated from diseased tobacco plants sampled in the vicinity of Prilep.

BACTERIAL SPOT OF PEPPER TRANSPLANTS

by

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Summary

Several bacterial strains were isolated from the diseased pepper transplants showing necrotic leaf spot and blight symptoms. Among them, three strains (Pap-6, Pap-7, Pap-10) were investigated more detailed.

Investigated strains showed high level of pathogenicity to artificially inoculated test plants and fruits. Inoculated pepper transplants expressed the necrotic spot symptoms similar to those in natural infection. They were very aggressive to the pepper, tomato, lemon and cherry fruits, causing severe necrosis.

Bacterial cells of our pepper strains are gram-negative and rod-shaped. On NA they form round, shiny, creamy white colonies. They produce green fluorescent pigment on King's medium B. According to LOPAT tests they form levan-type colonies on media containing 5% of sucrose (NAS), and induce hypersensitive response (HR) in tobacco. They do not produce oxidase, protopectinase and arginine-dihydrolase.

The bacteriological characteristics indicate that investigated strains belong to the same bacterium identified as *Pseudomonas syringae* pv. *syringae* van Hall.

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MYCOFLORA OF WHEAT, BARLEY AND CORN SEEDS

by

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Summary

Approximately 1000 samples of wheat, 100 samples of barely and 600 samples of corn seeds were tested for fungi presence. Filter paper method was used for development of genera to which fungi belonged, and nutritive PDA medium for growth and identification of their species.

According to the obtained results 21 fungal species from wheat and barley seeds, and 34 from corn seeds were isolated. Fungi belonging to *Fusarium* genus dominated on wheat and corn seed, and those belonging to *Helminthosporium* genus dominated on barley seed (Tab. 1-3; Fig. 1-2). So-called "storage fungi" belonging to *Penicillium, Aspergillus, Rhizopus* and *Mucor* genera were also present on seeds of all three plant species.