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INSTITUT ZA ZAŠTITU BILJA -- BEOGRAD  
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# **Z A Š T I T A B I L J A**

## **(PLANT PROTECTION)**

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INFLUENCE OF FOOD ON THE WEIGHT OF PUPAE AND IMAGOS,  
DURATION OF LIFE OF IMAGOS AND FERTILITY OF THE YELLOW  
MEALWORM *TENEBRIO MOLITOR* L. (COLEOPTERA:  
*TENEBRIONIDAE*)

by

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Summary

The object of the study was the influence of corn, wheat, cookies, finely ground pastes, soybean and lentil on the weight of pupae and imagos and on the fertility of the Yellow Mealworm (*T. molitor*). The results have shown that the weight of pupae and imagos, the duration of life of imagos and the fertility of *T. molitor* are in a direct ratio and in dependence on the food on which the larvae and imagos were grown. Corn, wheat and cookies have an exceptional influence on the fertility of the Yellow Mealworm.

The results have shown that the development of pupae, resp. the weight of pupae and imagos of the Yellow Mealworm are in direct dependence on the kind and quality of food on which the larvae were fed. Corn, wheat and cookies conditioned a greater weight of pupae and imagos, in relation to the soybean, finely ground pastes and lentil. The greatest weight of pupae and imagos was recorded on the corn. The male pupae had an average weight of 183 mg, and the female pupae 194 mg. Larvae reared on the wheat flour gave the average weight of the male pupae of 165 mg and of the female ones 172 mg. Feeding of larvae on

the soybean, finely ground pastes and lentiel is poorer, particularly on the lentil which conditioned the average weight of male pupae of 133 mg and of female ones of 131 mg only.

The metamorphosis of the pupae has as a consequence that the imagos weighed less in relation to the pupae. With the corn the males weighed less in relation to the females by 26 mg on an average and had from 94 to 198 mg, 163 on an average. The females had a less average weight in relation to the pupae by 26 mg on an average and weighed 167 mg on an average. The weight of a male on the wheat is 141 mg on an average and that of the female is 153 mg and in relation to the pupae are lighter by 24, resp. 19 mg.

The results obtained have shown that the food exerted a considerable influence on the fertility of *T. molitor*, because the weights of pupae and imagos, the duration of life of imagos and the number of laid eggs are in a direct ratio. In the first place this observation refers to the corn, because the pupae and imagos had a greater weight in relation to other tested kinds of food. The duration of life of imagos in relation to other plants is the greatest (males live 63 days on an average and the females 69 days) and so is the number of laid eggs (45.3 eggs). Further the females laid on the wheat 446.4 eggs on an average and on the cookies 436.4 eggs. On the lentil, finely ground pastes and soybean, the pupae and imagos have a less weight and the life of imagos is shorter and, consequently, the number of laid eggs is less. The fertility of females on the lentils is 289.7 eggs on an average, on the soybean 368.0 and on the finely ground pastes 393.3 eggs.

## OCCURRENCE OF *EPITRIMERUS PYRI* NAL. (ACARIDA: ERIOPHYIDAE) AND THE RESULTS OF CONTROL

by

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### Summary

The appearance of the Pear Bust Mite (*E. pyri*) has been followed in a considerable number of pear orchards in the areas of Subotica, Srem and Belgrade by examining each time 100 top leaves under binocular.

The control test has been carried out on 2 ha of pear orchard «Ljutovo» at Subotica. The treatments of the test are presented in Tab. 2. The sprayings were made by means of the atomizer »Betsler« with 500 l of water on 3300 m<sup>2</sup> per one treatment. The evaluation of the efficiency of the acaricides was affected on April 28, May 8 and June 4.

The emergence of deutogyne females of *E. pyri* in 1987 was observed in the beginning of the flowering of the pear trees in the interval from April 5 to April 10. The females settle on the basis of rosettes, on the spot where the wooden part passes into the green one, where they oviposit. After the hatching, the protogyne forms climb, settle on the fruits and follow the growth of annual sprouts. *E. pyri* reaches the highest numbers in May and June on the fruits (Tab. 1) on which it feeds below the calyx. Later on, *E. pyri* passes to the tops of annual sprouts. In young pear orchards there may come to an overpopulation of *E. pyri* which can lead to the partial defoliation. In the pear orchard »Poljana« at Sopot, 2—4 year aged, in August leaves fell off on 43 p.c. of annual sprouts.

The fruit russetting occurs on such sorts as ripen in August and later, e.g. Williame, Conference, Bosk's Bottle, Pass Krassane.

*E. pyri* and *Psylla pyri* feed on the same places, but no intensive relations of competence manifest themselves in summer months, when the secondary growth of annual sprouts stops. *E. Pyri* can use the nymphs of *P. pyri* for the transportation.

The best control results of *E. pyri* and the protection of fruits were achieved by the treatment by DNC and dicofol (before and after the blossom). With this treatment, the fruits of the sorts Williame and Pass Krassane were clean and in the check 100 p.c. of them had a rust. The fruits of the sorts Bosk's Bottle and Conference had the rust both on the treated part and in the check.

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## THE EFFECT OF DIFFERENT FEEDING SUBSTRATES ON THE DEVELOPMENT OF *LYMANTRIA DISPAR* L.

by

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### Summary

In the oak forest, outbreaks of populations of the gypsy moth, (*Lymantria dispar*) show often a total defoliation, while in the locust-tree one, the total defoliation was never observed.

The eggs collected in both, the oak and / or the locust tree forest were maintained at constant temperature of 23°C for hatching. Newly-hatched larvae deriving from different populations (oak and / or locust-tree forest) were divided into experimental groups and reared on oak leaves (favourable food substrate) and / or locust-tree leaves (unfavourable food medium) at a constant temperature of 23°C and a photoperiod of 12<sup>h</sup>L : 12<sup>h</sup>D, (Table 1). The parameters followed were: survival, duration of larval development and sexual index.

Our results show (Fig. 1.), that the greatest mortality was observed in larvae from oak forest populations but fed on locust-tree leaves. An increase in mortality in later larval instars was also observed in other experimental groups, probably due to the effect of the constant temperature conditions and the infections of the populations with viruses and protozoans (Sidor i Jodal 1983).

It was found that larvae from the oak population fed on locust-tree leaves has prolonged their first and second instars in relation to the control (Fig. 2.) i. e. their initial instars were not adapted to the unfavourable feeding conditions.

The results show that in all the groups bred on locust tree leaves more females than males were developed which is probably a compensatory reaction at the level of the population under unfavourable conditions.

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## INSECTS FOUND IN STORE HOUSES AND IN SHIPS WITH SOYBEAN AND SOYBEAN MEAL IN YUGOSLAVIA

by

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### Summary

Storing period of soybean in Yugoslavia is not very long. This is due to the insufficient production and that is why there are almost not any problems with insect infestation yet.

According to the investigations of some authors, *Callosobruchus chinensis* and *C. maculatus* that are on our list of quarantine pests are the most dangerous pests of stored soybean. These two species will be important for our country as long as thousands of tons of soybean meal will be imported. The other species like *Ephestia cautella* and *Tribolium castaneum* are less dangerous because they develop very slowly and poor. However, soybean meal is a very good host for many insects. *T. castaneum*, *Lasioderma serriocorne*, *E. elutella* and *Plodia interpunctella* are the most important species for us that had been found in storages and ships.

While the production is growing the storing period of soybean and soybean meal will be longer and the insect infestation should be taken in a count.

\* This paper is a part of MS "Insects of stored soybean and soybean meal in Yugoslavia) that was made under the project "Insects of stored soybean" financed by Selfmanaged community for interest of science of SR Croatia and USDA, principal investigator Z. Korunić.

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## HARMFUL NEMATOFAUNA ON TOBACCO FIELDS IN SERBIA\*)

by

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### Summary

On the territory of Serbia there have been observed, in two last decades, several species resp. groups of phytoparasitic nematodes on tobacco fields, such as: *Meloidogyne* spp., *Ditylenchus dipsaci*, *Pratylenchus* spp, *Tylenchorhynchus* spp.

*Meloidogyne* spp. whose harmful effect on tobacco plant has been followed in two localities of the Pomoravlje (river valley of Morava), was represented by two species, to wit: *M. incognita* and *M. hapla*, the former being dominant.

*Ditylenchus dipsaci* has been observed in several localities with different and unequal intensity of attack. Particularly great damages have been recorded at Preševo and Kamenare.

*Pratylenchus* spp. is the most widespread group of phytoparasitic nematodes on tobacco in Serbia.

*Tylenchorhynchus* spp. is frequently occurring on tobacco fields of Serbia in increased populatiois. In community with pathogenous fungi (*Fusarium* spp. and others) this group of pests increases its harmful effect on tobacco.

In addition to these, most widespread and most important nematode species and groups, on tobacco fields of Serbia have been recorded some less numerous groups, to wit: *Helicotylenchus* spp., *Paratylenchus* spp., *Hoplolaimus* spp., *Tylenchus* spp. and others.

\*) The paper was presented at the 10th Yugoslav simposium on the fauna of the soil, held in Skopje from 1st to 3rd October 1987.



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## DYNAMICS OF NEMATOFAUNA AND MICROFLORA IN VINEYARDS, AS POSSIBILITIES OF BIOLOGICAL CONTROL OF PLANT PARASITIC NEMATODES

by

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Comparative investigations of seasons nematofauna dynamics and microflora per profiles of soil in vineyards (to 150 cm), at analyses of their vertical distribution, it was found the next relationship: antagonism (*Bacillus* sp.), toxicity (*Aspergillus niger*, *Rhizopus* sp.) and parasitism on (in) nematodes (*Dactylaria* sp., *Nematoconus* sp., *Catenaria* sp., *Myzocytiium* sp. and *Bacillus* sp.).

At laboratory testing determined microorganisms and nematodes on agar medium were shown certain selectivity of pathogen microorganisms, as different susceptible (resistants) of genus and species of nematodes. Reduction of nematodes by microorganisms was higher in laboratory condition (to 100%) according to nature condition (to 10%).

The results of investigations point out possibilities of biological control of plant parasitic nematodes by microorganisms, a their role in integrated control for rationalization of pesticides.

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(Primljeno 15. 10. 1987.

## EFFICACY AND PERSISTENCE OF SOME NEW INSECTICIDES IN CONTROL OF THE COLORADO POTATO BEETLE (LEPTINOTARSA DECEMLINEATA SAY)

by

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### Summary

The potato beetle has in our country only a few natural enemies and on the other hand conditions for its development are quite favourable. That is why this pest regularly appears more intensively so far. In a more suitable weather larvae of the beetle's first generation could completely destroy the potato plant in 5 to 7 days.

Since the natural enemies have showed themselves as insufficiently effective and the control methods of biological fight have not satisfied at all, the usage of chemical methods to control this pest is required.

Where classic insecticides were used, both organophosphoric and carbamates, there were even four treatments that were necessary to prevent higher damages in certain areas of the country. When more treatments were applied the phenomenon of the pest's resistency appeared, what is the main reason for constant finding out possibilities for new insecticides application.

In that respect Nomolt with the active substance tefluoron was tested chosen out of the IGR group. Concerning new insecticides there were also tested Bancol 50 wp (bensultap) and Evisekt S (thyocyclam-hydrogenoxalate). These were compared with Posse 20 EC (carbosulphane), Ekalux 25 EC (kvinalphos) and Elokron 50 (dioxacarb). The tests were done in field condition where both efficiency and persistence in combating the beetle were monitored.

The variants were placed randomly in a block system, with three repetitions. The testing was done in the course of 1985 and 1986, both years having similar results.

The initial toxicity of Bancol 50 WP and Evisekt S has on the same level as in the control group used as a standard one. Persistence of these preparations varied depending on the dosage applied, but always being on the standard level if not higher.

The initial toxicity of Nomolt, when measured by death rate of larve and imagoes, was pretty lower than the standard one, but if the level of damage on a variant was taken as a criterion then the preparation's initial toxicity was also satisfactory. It is, of course, understood that Nomolt should be applied in the first stage of the larve development.

As for the persistence of this preparation it was extremely higher comparing it to the standard.

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## ECOLOGICAL SELECTIVITY OF SOME ACARICIDES ON THE PREDATORS *PANONYCHUS ULMI* KOCH.

by

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### Summary

The population dynamics of the development of *Panonychus ulmi* Koch. and of its predators was followed from April to October. There has been established the presence of several predatory species, such as: representatives of the family Coccinellidae (*Stethorum punctillum* Weise), Anthorcoridae (*Orius vicinus* Rib.) Phytoseiidae (*Amblyseius andersoni* Chant), development and further reproduction of which are closely connected with the development of the population of *P. ulmi* as well as of Chrysopidae (*Chrysopa carnea* Steph) which is polyphagous.

On the basis of the number of mobile forms of *P. ulmi* were determined their critical number (threshold of noxiousness) on a leaf and the term of application of acaricides.

The obtained results indicate that

ACAREX 60 manifested partial toxicity to *S. punctillum*, *O. vicinus*, and a complete selectivity to *Ch. carnea*. It is not ecologically selective to the predator *A. andersoni*.

NEORON 500 is ecologically selective to *S. punctillum* and *Ch. carnea*, and completely selective to *O. vicinus*. It is not selective to *A. andersoni*, where it causes total mortality as early as after 72 hours.

OMITE 57E shows a complete ecological selectivity to *S. punctillum*, *O. vicinus* and *Ch. carnea*. This preparation manifested a partial selectivity to the predator *A. andersoni* where there survive 20 p.c., which is an important factor in the use of these methods in the protection of apple trees against this pest.

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(Primijeno 21. 03. 1988.)

## INVESTIGATION OF POLYMYXA BETAE KESKIN HOSTS IN YUGOSLAVIA

by

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### Summary

The host range of *Polymyxa betae*, the vector of beet necrotic yellow vein virus (BNYVV), was investigated. From 60 species investigated, 14 plant species were found to be hosts *CHENOPODIACEAE*: *Beta vulgaris* var. *saccharifera*, *B. vulgaris* var. *cicla*, *B. vulgaris* var. *esculenta*, *B. vulgaris* var. *crassa*, *B. macrocarpa*, *Spinacia oleracea*, *Chenopodium foliosum*, *C. hibrydum*, *C. murale*, *C. quinoa*, *C. album*; *AMARANTACEAE*: *Amaranthus retroflexus*; *PORTULACACEAE*: *Claitonia perfoliata* and *Carophyllaceae*: *Stellaria media*.

*S. media* and *C. perfoliata* are new hosts. *P. betae* produce only zoosporangia and zoospores without resting spore clusters, in *S. media*. Isolates *P. betae* from sugar beet were infective to *A. retroflexus* and those from *A. retroflexus* were infective to sugar beet. The incidence of »rhizomania« of sugar beet caused by BNYVV in Yugoslavia is associated only with the isolates which carry BNYVV.

## IDENTIFICATION OF SOME BACTERIAL ISOLATES ORIGINATING FROM BEAN PLANTS

by

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### Summary

Six investigated bacterial isolates, originating from the diseased bean leaves and pods manifest a series of common characteristics of pathogenic, rearing and biochemical nature.

Beside on leaves and pods of bean, all of the six isolates causes changes also on the leaves of inoculated broad bean, lupine, soybean, on the nerves and stalk of sudan grass as well as on the lemon fruit.

On the tobacco plant they cause hypersensitive reaction, and on the King's B medium fluorescence what ranges them into the genus *Pseudomonas*.

The colonies are rounded, of white colour and bacteria are rod-shaped, asporogeneous and gram-negative.

The acids are created in the course of the first week of the development from the galactose, glucose, xylose, mannose, saccharose, raffinose, glycerin and mannite. The acid is not created from the arabinose, maltose, dextrin, starch, esculin and dulcitol.

In the milk peptonization is more pronounced than the coagulation.

On the basis of the obtained results one can conclude that the investigated isolates belong to the polyphagous bacterium *Ps. s. pv. syringae* van Hall.

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ARTIFICIAL INOCULATION OF WHEAT (*TRITICUM AESTIVUM* L.) WITH *DILOPHOSPORA ALOPECURI* FR. AND THE SENSITIVITY RESP. RESISTENCE OF SOME WHEAT CULTIVARS

by

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Summary

In 1984 *Dilophospora alopecuri* Fr. occurred on wheat in Koprsko (Slovenia, Yugoslavia). With isolates from this region the investigations were carried out.

Pathogenic properties were studied in vitro on seedlings of two cultivars ('Jugoslavija' and 'BF 17/83') with suspensions of three individual isolates and simultaneously with mixture of three isolates. The plants displayed no symptoms of infection, reisolation from wheat tissue proved negative.

Pathogenic properties were also studied by inoculation of wounded nodia of 8 wheat cv ('Jugoslavija', 'Lonja', 'Mačvanka', 'Super zlatna', 'NS rana', 'Zlatna dolina', in 'Marinka'). The most resistant were 'Jugoslavija' and 'Mačvanka', the most susceptible 'Lonja' and 'NS rana'.

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## INFLUENCE *DIAPORTHE PHASEOLORUM* VAR. *CAULIVORA* ON YIELD AND QUALITY OF SOYBEAN

by

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### Summary

Stem canker of soybean (*D. phaseolorum* var. *caulivora*) could influence the yield significantly. The influence is bigger if the infection occurred early, as a result of premature wilting and draying of plants. In that case, the yield was lower for 50—62%. At the same time the plants with lower degree of infection, with spots on the stalk, suffered the yield reduction from 9—20%, dependent of the variety.

Late varieties were more sensitive than early varieties, what was obvious from greater number of plants with symptoms of siver infection and greater yield losses.

The highly significant negative corelation ( $R = -0,697$ ) was found between yield and severity of infection and between 000 kernels weight and degree of infection ( $R = -0,565$ ).

The protein and oil synthesis in beans were not effected by stem canker.



WEEDS CONTROL IN SEED CROP OF *DACTYLIS GLOMERATA*

by

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## Summary

On the bas of our investigations carried out 1982—1984. about possibility broadleaf weeds control an seed crop of *Dactylis glomerata*, we can conclude next:

— For the successful control most of broadleaf weeds can one use herbicides on the bas 2,4—D, MCP and dicamba, but for enlarging efficiency this activity ingredient can combine between them (Tab 1 and 2.).

— The best selectivity showed 2,4—D in all termin of treatment. MCPP and especially dicamba showed strong phytotoxyc effect in some development stage of *Dactylis glomerata* (Tab. 3.).

— Havin in mind efficiency and selectivity, the best time application of this herbicides is: for 2,4—D and MCPP is in shooting but with dicamba herbicides this is end of tillering and in start of shooting.

— Application of dicamba herbicides after stage start of shooting can cause drastical decrease of yield.

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## HEALTH FITNESS AND NUTRITIVE VALUES OF BABY FOOD- -INFANT MUSHES

by

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### S u m m a r y

The study deals with the results of 5-year determination (1983—1987) of health fitness of 228 samples of baby food, prepared of vegetables, fruits and meat. The highest average quantities of lindane residues are found in fruit mushes and the highest DDT quantities in vegetable mushes with meat.

The other organochlorine insecticides were present in the traces, whereas organophosphoric ones were under a detection level (less than 0,01 mg/kg). Concerning the insecticide residues, all tested samples go by the rules of the MAC values.

The highest average quantities of copper and zinc were found in vegetable mushes with meat, and of arsenic and manganese in fruit. In most cases, the quantities of cadmium and mercury were at a detection level. The highest contents of fats and proteins were present in vegetable mushes with meat, having the highest energetic value.

The content of nitrates and nitrites in all mushes varied to a high extent, the average values being gone by the regulations, but the maximum nitrite values in vegetable mushes with meat rose above the prescribed values.