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U svibnju 1992. god. glavni urednik dr. Josip Balabanić u uvodnoj riječi ukazuje na neobičnu činjenicu da prirodoslovni muzeji u Hrvatskoj, u više od 150 godina svoga organiziranog djelovanja (muzeji u Zagrebu, Dubrovniku, Splitu, Zadru, Rijeci i dr.) nisu imali svojih glasila, što je imalo loših posljedica, kako za muzejsku djelatnost, tako i za razvoj prirodoslovlja. U nadahnutom osvrtu na povijest muzeja i čuvane hrvatske prirodoslovce i muzealce, urednik iznosi namjere izdavača da objavljuje znanstvene i stručne sadržaje prirodoslovnih grana zastupljenih u odjelima Muzeja (Botanički, Geološko-paleontološki, Mineraloško-petrografski i Zoološki) kao i radove koji spadaju u širi sklop proučavanja tla, flore i faune Hrvatske, te stručne i znanstvene prinose iz područja muzeologije. Poziv na suradnju upućen je starijim, prokušanim istraživačima, a još se više daje poticaj mlađim istraživačima da predstavljaju plodove svog rada. Najavljuju se i dodaci časopisa o fauni Hrvatske. Namjera za boljim povezivanjem sa znanosti u svijetu izražena je u tiskanju članaka na engleskom, njemačkom i francuskom jeziku. Svi članci imaju apstrakt na jeziku članka, kao i na engleskom i hrvatskom, te ključne riječi i UDK. Časopis će izlaziti dvaput godišnje (lipanj, prosinac). Tiska se na kvalitetnom papiru uz financijsku potporu Ministarstva znanosti i tehnologije Republike Hrvatske i tvrtke Exportdrvo d.d., Zagreb. Godišnja pretplata US \$ 35.00 posredstvom BTS - Book Trade and Services, Knjiga trgovina d.o.o., Kaptol 25, 41000 Zagreb, Hrvatska. - U prvom su svesku, odnosno prvom volumenu, objavljena četiri članka iz zoologije, dva iz botanike, tri iz paleontologije i po jedan iz mineralogije i muzeologije, vijesti i prikazi knjiga. Ovdje navodimo samo entomološke priloge:

Kučinić, M., The Noctuidae (Insecta, Lepidoptera) of Lička Plješevica Mountain (Croatia), (Abstr. engl., hrv.; saž. hrv.), str. 71 - 80.

Perović, F., Die ersten Untersuchungen der Sägewespen (Hymenoptera, Symphyta) im Biokovo-Gebirge (Dalmatien, Kroatien, (abstr. njem., engl., hrv.), str. 93 - 104.

Natura Croatica, Vol. 2. No. 1. : 1 - 107, Zagreb, 1993. Donosi dva entomološka članka, a drugi svezak nema članaka iz entomologije.

Lorković, Z., *Leptidea reali* REISINGER 1989 (=lorkovicii REAL 1988), a new European species (Lepid., Pieridae), (Abstr. engl., hrv.; saž. hrv.), str. 1 - 25.

Merdić, E., Mosquitoes (Diptera, Culicidae) of the Special Zoological Reserve Kopački rit (NE Croatia), (Abstr. engl., hrv.; saž. hrv.), str. 47 - 54.

Vol. 3. No. 1.: 1 - 118, June 29, 1994. donosi članke:

Rucner, Z., Beitrag zur Entomofauna einiger Waldassoziationen Kroatiens, (Abstr. njem., engl., hrv.; saž. hrv.), str. 1 - 22.

Kučinić, M., Igalffy, K., Šašić, M., Balen, S., A contribution on the Heterocera fauna (Insecta, Lepidoptera) of the Central-mountain part (Risnjak & Lička Plješevica) of the Republic of Croatia, (Abstr. engl., hrv.; saž. hrv.), str. 23 - 40.

Fauna Croatica. U časopisu *Natura Croatica*, Vol. 3. No. 1., Zagreb, June 29, 1994. na str. 109 - 118. objavljene su Upute autorima za rad na hrvatskoj fauni (Fauna of Croatia - Guide for contributors). Rezultati rada na Fauni Hrvatske (popisi faune, katalozi faune s atlasom, te Fauna u obliku monografskih prikaza) izlazit će kao dodaci (Supplementa) časopisa *Natura Croatica*. Iz prvog dodatka: A. Požar - Domac, Index of the Adriatic Sea Polychaetes (Annelida, Polychaeta) Fauna Croatica, VIII/1, str. 1 - 23., saznajemo da ovu značajnu publikaciju uređuje Mladen Kerovec, a u uredničkom su odboru: M. Meštrov, J. Balabanić, N. Tvrković, M. Kerovec, S. Leiner i V. Štamol.

Dugogodišnja zamisao, prioritarna potreba i nezaobilazna sastavnica hrvatske znanosti - Fauna - našla je konačno svojega pravog izdavača, nadamo se, iako je to mogla biti i Hrvatska akademija znanosti i umjetnosti. Obećava upornost koju je izdavač pokazao u kratko vrijeme izdavanjem časopisa *Natura Croatica*. Treba se još nadati da će popisi, katalozi, monografije i bibliografije, kao jedan oblik sinteze istraživanja, već u pripremljenoj fazi (privremeni popis ... i sl.) biti dostupni na Hrvatskoj akademskoj i istraživačkoj mreži (CARNET). Primjena suvremene informacijske tehnologije omogućila bi bržu znanstvenu provjeru i suradnju, primjerenu današnjim potrebama.

Bogomir Milošević, Zagreb

PLANT - PARASITIC NEMATODES IN THE RHIZOSPHERE OF RAPE (*Brassica napus* var. *oleifera*)¹

† Anđelka JELIĆ

Faculty of Agriculture University "J. J. Strossmayer",
Šetalište kardinala F. Šepera 6, 54000 Osijek, Croatia

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Results of a two-year field investigation on the presence and seasonal variation of the plant-parasitic nematodes in the rhizosphere of rape in 4 commercial fields in the region of eastern Slavonija (Croatia) are shown in this paper. A total of 11 genera were identified, with in which 12 plant-parasitic species of the nematodes. Some differences in a structure and relating population density of nematodes have been recorded during the rape growing season in all investigated fields. More individuals, as well as greater number of the nematodes genera, have been found in the beginning of the rape growing season (autumn) than later (spring). Nematodes of *Aphelenchus* and *Tylenchus* genera have been found in 96 % of all the examined soil samples. The above mentioned genera have been the most frequent and dominant ones as of the total number of found nematodes, having partaken of 62 %.

Plant-parasitic nematodes, rhizosphere of rape, seasonal dynamics, population density, Croatia

JELIĆ, A., Poljoprivredni fakultet Sveučilišta "J. J. Strossmayer", 54000 Osijek, Hrvatska. - Fitoparazitarne nematode u rizosferi uljane repice (*Brassica napus* var. *oleifera*). - Entomol. Croat., 1995. Vol. 1.: 35-39. - Prikazani su rezultati dvogodišnjih istraživanja prisutnosti i sezonskih kolebanja brojnosti fitoparazitskih nematoda u rizosferi uljane repice na četiri polja u području istočne Slavonije u Hrvatskoj. Ukupno je identificirano 11 rodova sa 12 vrsta fitoparazitskih nematoda. Na istraživanim poljima zabilježene su razlike u strukturi i gustoći populacije nematoda za vrijeme vegetacije. Veći broj primjeraka kao i više rodova nematoda nađeni su u početku sezone uzgoja u jesen, nego kasnije u proljeće. U 96 % pregledanih uzoraka tla nađene su nematode iz rodova *Aphelenchus* i *Tylenchus*. Navedeni su rodovi najfrekvenciji i dominiraju sa 62 % u ukupnom broju nađenih nematoda.

Fitoparaziti, nematode, rizosfera, uljane repice, sezonska dinamika, gustoća populacije, Hrvatska

Introduction

In Europe, among the oil yielding plants, rape is one of the oldest agricultural plant. In Croatia, two types of oil rape are grown *Brassica napus* var. *oleifera* (rape) and *Brassica campestris* var. *oleifera* (rape seed). On the territory of Slavonija and Baranja *Brassica napus* var. *oleifera* usually gives higher yields. Preference for

† Umrlo 9. 7. 1994. - Dead on 9. 7. 1994.

¹ Results of this paper were presented on the Second International Nematology Congress, Veldhoven, The Netherlands, 11 - 17. 8. 1990. - Prema referatu održanom na Drugom međunar. nematološkom Kongresu, Veldhoven, Nizozemska, 11-17. 8. 1990.

growing of winter rape is due to favourable agroecological conditions. There are no enough information on the presence of nematodes in the fields of rape in Croatia. There are few information on their qualitation and quantitative structure. In the region of Slavonija, on locality of Osijek (I v e z i ć et al. 1980) nematodes of 6 plant-parasitic genera have been found. The aim of this field investigation was to extract and to determine free-living nematodes, to observe the variation and dynamics of community during the growing season of winter rape in the localities of the investigated area.

Materials and method

This field investigation was carried out on four localities in Croatia, sited in the region of the eastern Slavonija: PIK Đakovo, IPK Osijek, PPK "Đuro Salaj" Valpovo and VUPIK Vukovar. The previous crop in all fields was winter wheat. The average soil sample, from one hectar at each plots, was taken in autumn (October), in early spring (April) and at the end of spring (June) during two growing seasons of rape, in the course of 1984, 1985 and 1986, respectively. The soil samples were taken around the roots with special nematological sampling device to a depth of 20 cm.

Extraction of nematodes from 100 ml of soil was made in Laboratory for Nematology at Agricultural Faculty in Osijek by the bottle technique (S e i n h o r s t 1956). The plant tissue of roots and stems of 10 accidentally chosen plants of rape on presence of free-living and sedentary nematodes was also controlled. Assesments were done after holding cut pieces of rape in water for 5 hours (S o u t h e y 1970). To check the obtained results this assesment was repeated after 24 hours.

Results

By examination of the epigon and underground parts of rape plants, the presence of plant-parasitic nematodes was not identified either on the roots or inside the plant tissue. A list of determined nematodes from the rhizosphere of rape are summarized in Table 1.

Table 1 Nematodes in the rhizosphere of rape
 Tablica 1. Nematode u rizosferi uljane repice

Species of nematodes - Vrste nematoda
Aphelenchoides parietinus (B a s t i a n, 1865) S t e i n e r, 1932
Aphelenchus avenae B a s t i a n, 1865
Diphtherophora spp. D e M a n, 1880
Ditylenchus dipsaci (K ü h n, 1857) F i l i p j e v, 1936
Dorylaimus spp. D u j a r d i n, 1845
Helicotylenchus vulgaris Y u e n, 1964
Mononchus spp. R a h m, 1938
Paratylenchus spp. M i c o l e t z k y, 1922
Pratylenchus crenatus L o o f, 1960
P. neglectus (R e n s c h, 1924), F i l. & S c h. - S t., 1941
P. pratensis (D e M a n, 1880) F i l i p j e v, 1936

P. thornei S h e r & A l l e n, 1953
P. vulnus A l l e n & J e n s e n, 1951
Tylenchorhynchus clarus A l l e n, 1955
Tylenchus filiformis (B u t s c h l i, 1873) L o o f, 1961
T. haganeri E l m i l i g y, 1971

The results of quantitative characteristics of nematodes indicate that free-living nematodes from 11 genera were present in soil of the investigated winter rape fields. They belong to orders Tylenchida (81,82 %) and Dorylaimida (18,18 %). There were determined 12 species of nematodes with unequal degree of parasitism. Some of found species are known as obligatory and polyphageous pests (T h o r n e 1961) of grown plants (*Ditylenchus dipsaci*, *Helicotylenchus vulgaris*, *Paratylenchus* spp., *Pratylenchus* spp., *Tylenchorhynchus clarus*), whereas some of facultative plant-parasitic nematodes (*Aphelenchoides parietinus*, *Aphelenchus avenae*, *Tylenchus filiformis*, *T. haganeri*).

Presence of plant-parasitic nematodes during growing season of rape at localities of Osijek, Đakovo, Valpovo and Vukovar is given in Table 2.

Table 2 Presence of nematodes during growing season of rape (1984/85, 1985/86)
 Tablica 2. Zastupljenost nematoda tokom vegetacije uljane repice (1984/85., 1985/86.)

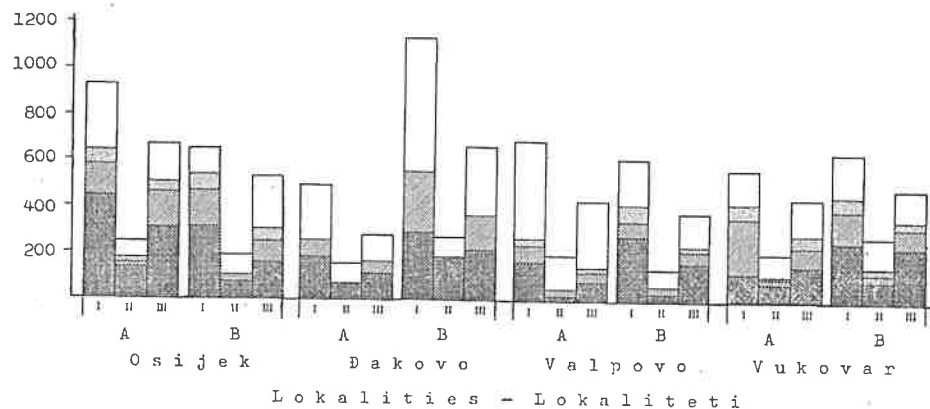
Nematodes (genus) Rodovi nematoda	Time of sampling - Vrijeme uzorkovanja											
	Autumn Jesen				Early spring Rano proljeće				Spring Proljeće			
	Localities - Lokaliteti											
	1	2	3	4	1	2	3	4	1	2	3	4
<i>Aphelenchoides</i>	+			+	+			+				+
<i>Aphelenchus</i>	+	+	+	+	+		+	+	+	+	+	
<i>Ditylenchus</i>	+		+						+			+
<i>Diphtherophora</i>	+		+									
<i>Helicotylenchus</i>	+	+		+			+	+	+		+	
<i>Paratylenchus</i>	+		+	+					+		+	+
<i>Pratylenchus</i>	+	+	+	+	+		+		+	+	+	+
<i>Tylenchorhynchus</i>	+	+		+				+	+	+		+
<i>Tylenchus</i>	+	+	+	+	+	+	+	+	+	+	+	+
Saprophageous	+	+	+	+	+	+	+	+	+	+	+	+
Predaceous	+			+				+				+

Legend - Legenda: 1 = Osijek; 2 = Đakovo; 3 = Valpovo; 4 = Vukovar.

During the investigated period differences in structure and population density of nematodes depending on times of sampling were observed. In the samples taken in autumn





plenty of plant-parasitic nematodes from most of the identified genera as *Aphelenchoides*, *Helicotylenchus*, *Pratylenchus*, *Pratylenchus*, *Tylenchorhynchus* and *Tylenchus* were regularly found. Only a few genera of nematodes were recorded in samples taken in early spring. In all the investigated fields mainly saprophageous and facultative plant-parasitic nematodes from genera as *Aphelenchoides*, *Aphelenchus* and *Tylenchus* were found, as well as from endoparasitic genus *Pratylenchus* ones. The commonest plant-parasitic nematodes were individuals from genera *Aphelenchus* and *Tylenchus* in all the investigated plots. Their presence was registered in 96 % of the total samples of soil. These two genera of nematodes may be taken as dominant in all localities because they made up as much as 62 % (*Aphelenchus*- 28 %, *Tylenchus* - 34 %) of the total number of nematodes found.

Figure 1 Representation of nematodes in the fields of rape in 1984/1985. and 1985/1986 year
 Grafikon 1 Zastupljenost nematoda u usjevu uljane repice u 1984/1985. i 1985/1986. godini



Legend - Legenda

I autumn - jesen II early spring - rano proljeće III spring - proljeće

-  nematodes from genera - nematode iz rodova *Aphelenchus* and *Tylenchus*
-  nematodes from genera - nematode iz rodova *Helicotylenchus*, *Pratylenchus* and *Tylenchorhynchus*
-  nematodes from genera - nematode iz rodova *Aphelenchoides*, *Diphtherophora*, *Ditylenchus* and *Paratylenchus*
-  saprophageous - saprofagi

A = first year of investigation - prva godina istraživanja, B = second year of investigation - druga godina istraživanja

The number of root-lesion (*Pratylenchus* spp.), spiral (*Helicotylenchus* spp.) and stunt nematodes (*Tylenchorhynchus* spp.) showed a trend of slow increase from the spring to autumn. Nematodes from these genera take part of 29 % of all the determined plant-parasitic individuals. Occurrence of other genera of nematodes was much rarer. A relatively low percentage of nematodes presence belonging to genera *Ditylenchus*, *Diphtherophora*, *Aphelenchoides* and *Paratylenchus* (9 %) was established.

Results of the population density and seasonal variation of nematodes in the fields of rape at 4 localities are given in Fig. 1 summarized for a two-year investigation.

The highest population of plant-parasitic nematodes was recorded in the samples taken in autumn. The number of nematodes declined during the winter, hence early in the spring the lowest population density was evident. During the spring their abundance increased in relation to early spring. Generally, it is evident that greater number of genera, as well as greater number of nematodes specimens, were found in the beginning of the rape growing season (autumn) than in the second part (spring).

Conclusion

On the basis of the attained results of the two-years field investigation on plant-parasitic nematodes in the rhizosphere of rape it could be concluded:

- From the extracted soil samples, taken around the roots of rape, nematodes of 11 genera were found, among which 12 species were determined. Some of them are known as agents of damage of economic importance on major oil yielding plants (*Ditylenchus dipsaci*, *Pratylenchus* spp.). Facultative plant-parasitic nematodes from genera *Aphelenchus* and *Tylenchus* were found as the commonest (96 %) and dominant (62 %) ones. As subdominant nematodes from genera *Pratylenchus*, *Helicotylenchus* and *Tylenchorhynchus* (29 %) were identified.

- On all localities differences were noticed regarding the time of occurrence and population density of nematodes during the rape growing season. The highest number of specimens and genera of plant-parasitic nematodes was found in the beginning of growing season (autumn), whereas the lowest one in early spring (April).

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