

Susceptibility of rape to fungi causing root rot

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Roots of rape and other Cruciferae plants are infected by *Fusarium* sp., *Rhizoctonia solani*, *Sclerotinia sclerotiorum* and other fungi (Armstrong and Armstrong, 1952; Berkenkamp, Vaartnou, 1972; Frenzel et al, 1984).

The aim of the field work (1985/86) was to estimate the effect of rape seed dressing with Oftanol T on the occurrence of root rot and the kinds of factors causing the rot. In the greenhouse was observed the susceptibility of four rape cultivars to the fungi (*Fusarium Wollenweberii* Raikko, *Rhizoctonia solani* K.) most frequently causing root rot in the field.

Material and methods

In the field experiment two cultivars (Beryl - „0”, Jantar - „00”), and in the greenhouse four cultivars (Górczański and Skrzyszowicki - high erucic, Beryl - „0”, Jantar „00”) were used.

The field experiment was carried out in Zlotniki near Poznań. Plots were in a randomized complete block design with four replications. The forecrop was potato. The seeds undressed and dressed with Oftanol T were sown in rows of spaces 45; 22,5 and 15 cm. The amounts of seeds sown were

6, 12 and 18 kg ha, respectively. The roots of 20 plants from each plot were estimated at about one month's intervals (Table 1). Ripcord 10 EC against pests was used on April 10th. Isolations of microorganisms from rotting roots were made on potato dextrose agar (PDA) or on potato agar (PA). Ethanol 96 % and sublimate 0,1 % were used for disinfection of roots. The pathogenicity of the isolated microorganisms was checked. Five millimeter discs of PDA overgrown with 14 day old fungi or 2 day old bacteria were placed in steamed soil under each of the five seeds of Beryl as well as of Jantar rape cultivars. At the stage of the first leaves the health state of rape plants was estimated. The species of the rape root pathogens were identified (Cowan, 1974; Kochman, 1973; Parmeter, 1970; Raikko, 1950).

The susceptibility of four rape cultivars to *F. Wollenweberii* and *R. solani* was estimated in the greenhouse. A mixture of corn meal (5 %) and soil (95 %) overgrown with 3 week old fungi was an inoculum. The inoculum in the amount of 2 mg was put close to each of the 20 rape seeds placed in steamed soil. At the stage of the first leaves the health state of the plants was estimated :

- 1 - healthy plants,
 - 2 - slightly
 - 3 - moderately
 - 4 - heavily
- } infected plants.
- 5 - no plants (sprouts destroyed in the soil).

For statistical analysis the numbers were transformed into degrees of Freeman-Tukey. The means were compared by the Duncan test.

Results and discussion

In the field experiment at temperature and humidity conditions favourable to winter rape, the seed dressing with Oftanol T decreased root rot (Table 1). The numbers of rotting roots were similar in both the rape cultivars. The health state of rape roots was not dependent on quantity of the seeds sown.

Table 1

Occurrence of rape root rot in the successive terms
(Złotniki, 1985 86)

Terms of estimation	Percentage of plants with rotting roots, in case of seeds			
	dressed		undressed	
	Beryl	Jantar	Beryl	Jantar
I - 17.09.	0,0	0,0	0,0	0,0
II - 14.10.	0,4	0,4	0,8	2,5
III - 19.11.	0,0	0,0	14,1	4,1
IV - 16.12.	0,0	0,4	16,2	8,3
V - 21.01.	0,4	2,5	15,0	14,1
VI - 17.03.	2,5	2,5	14,2	15,0
VII - 14.04.	0,4	1,2	18,3	14,6
VIII - 19.05.	2,1	4,6	15,0	18,3
IX - 23.06.	11,7	7,9	24,1	27,5
Mean ^x	1,9 ^a	2,2 ^a	13,1 ^b	11,9 ^b

x - means followed by the same letter are not significantly different at 5 % level;

The most frequently isolated and pathogenic to rape roots was *Fusarium Wollenweberii* (Table 2). The next frequent was *Rhizoctonia solani*. Rotting degree of roots was higher in the case of *R.solani* (4,5) than in that of *F.Wollenweberii* (3,0).

Table 2

Pathogenic species of fungi and bacteria isolated from rotting rape roots (mean for Beryl and Jantar cultivars, seeds undressed and dressed with Oftanol T)

Species	Percentage of the whole number of pathogenic isolates	Mean degree of infection
<i>Fusarium Wollenweberii</i> Raijko	72,0	3,0
<i>Rhizoctonia solani</i> K.	21,4	4,5
<i>Alternaria brassicicola</i> (Schw.) Wiltsch.	3,6	3,9
<i>Erwinia</i> sp.	3,0	1,1

In the greenhouse, all the four rape cultivars were susceptible to both species of fungi. The smallest number of diseased plants and a low degree of root infection by *F.Wollenweberii* and *R.solani* were observed in Beryl cultivar (Table 3).

Table 3

Susceptibility of rape to root rot fungi (Poznań, 1986)

Rape cultivars	Percentage of infected plants ^x		Mean degree of infection	
	<i>F.Wollenweberii</i>	<i>R.solani</i>	<i>F.Wollenweberii</i>	<i>R.solani</i>
Górczański	100 ^b	95 ^{cd}	2,4	3,4
Skrzeszowicki	90 ^b	100 ^c	1,9	2,6
Beryl	70 ^a	90 ^d	1,9	3,2
Jantar	90 ^b	100 ^c	2,2	3,9

x - means followed by the same letter are not significantly different at 5 % level;

In the field, where affected by other microorganisms and

pests, the numbers of plants with rotting roots mean for nine terms of observations were similar in Beryl and Jantar cultivars. In the greenhouse, where steamed soil with inoculum of one of the two fungi was used, Beryl ("O") proved to be less susceptible to *F. Wollenweberii* and *R. solani* than Jantar ("OO"), Górczański and Skrzyszowicki (high erucic).

Different levels of erucic and glucosinolate compounds in plants of rape did not correlate with susceptibility degree of the four cultivars to root rot pathogens.

References

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