

EFFECT OF DEPOSITES OF HERBICIDE USED FOR WINTER RAPE ON SPRING PLANTS GROWN AFTER PLOUGHING THE FORECROP IN

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I. Purpose of investigations.

In Polish climatic conditions winter rape is often ploughed in spring, mostly due to its wrong after winter condition. The necessity of resowing of rape plantation is troublesome if it was sprinkled with herbicides in autumn. Despite the fact that the time elapsing between herbicide application and resowing is rather long, the chemicals decomposition processes are very slow in fall and early spring while during the winter they practically stop. Therefore appropriate selection of follow crops which would be insensitive to herbicide residues in soil is of great importance.

II. Material and methods.

The experiment was carried out in Agricultural Experimental Station Przybroda near Poznań, Poland, on brown and black soils of 1.5-3.0 per cent of humus in cultivated layer during the years 1974-1980. The experiment was made with the method of randomized blocks in 4 repetitions. The list of herbicides and their doses as well as the years of evaluating follow crops sensitivity to the residues are given in Table 1.

Table 1

Herbicides applied in winter rape and years of examination their effect on follow crops

Active substance / product /	Dose of active substance / product / kg or l/ha	Time of application	Potatoes Maize Barley	Wheat	Sunflower
trifluraline /Treflan EC2/	1.04 /4.0/	I	1974-80	1975-80	1974-76
napropamide /Devrinol 50WP/	1.5-2.0 /3.0-4.0/	I	1975-80	1975-80	1975-76
propyzamide /Kerb 50W/	0.75-1.0 /1.5-2.0/	III	1975-80	1975-80	1975-76
aziprotetryne /Mesoramil 50WP/	1.0 /2.0/	II	1974-76	1975-76	1974-76
prodiamine /Rydex/	0.75 /1.5/	I	1978-80	1978-80	-

x/

I - presowing with incorporation

II - postsowing

III - postemergence in 4-6 leaves stadium

The rape was ploughed down in spring to the depth of about 20 cm. The evaluation measure were yields and yield structure of the follow crops. The evaluation was carried out in comparison with the controls without herbicides using the tests F and t at the significance level 0.05.

III. Results.

Basic experimental results, yields of the follow crops, are given in Table 2.

Table 2

Yields of the follow crops in relative numbers

Herbicide	Potatoe	Maize	Barley	Wheat	Sunflower
without herbicide	355dt/ha =100	451dt/ha =100	37 dt/ha =100	40 dt/ha =100	23 dt/ha =100
trifluraline	97 ^x	96 ^{xx}	101	94 ^x	103
napropamide	98	97	74 ^{xx}	76 ^{xx}	105
propyzamide	102	99	94 ^x	80 ^{xx}	112 ^{xx}
aziprotryne	99	101	101	92 ^x	106
prodiamine	103	95	98 ^x	91 ^{xx}	-

x - yield significantly different then that from the control in some years

xx - yield significantly different then that from the control independently from environmental conditions

1. Potatoe reacted with lowered yield only to trifluraline residues. In seven year long experimental cycle negative reaction of the plant was observed twice. It occurred during the years with meteorological conditions during the time between the herbicide application and potatoe planting unfavourable for its decomposition in soil. There were low temperatures and draught in one year and very high moisture content in soil in the other. The fall in yield in these years amounted to 16 and 18 per cent.

2. Silage maize appeared to be sensitive only to trifluraline residues decreasing the yield of fresh and dry mass and plant height independently from environmental condi-

tions.

3. Barley reacted negatively to napropamide residues independently from environmental conditions, and in some years also to the propyzamide and prodiamide residues. After propyzamide only in two years of six of experimenting, barley did not produce lower yield of grain than that from the control. The lack of negative reaction of barley to propyzamide in these years can be accounted for by relatively long period of time which elapsed between the herbicide application and resowing at simultaneously very warm autumn or spring. The napropamide and propyzamide residues weakened productive tillering of barley, increased protein content in grain, while the napropamide residues inhibited moreover the plant growth. Barley reacted to prodiamine residues with decreased yield in one year following cold and very wet period between herbicide application and resowing, lowering the number of ears per 1 m^2 and the number of grains per ear.

4. Wheat has proven to be sensitive to the residues of all examined herbicides. To the napropamide, propyzamide and prodiamine residues it reacted by lowering grain yield due to weakening of productive tillering independently from environmental conditions. The napropamide residues also inhibited the plant growth, and prodiamine decreased the number of grains per ear. The residues of trifluraline and aziprotryne brought about lowering of wheat yield during the years without the meteorological conditions unfavourable for the herbicide decomposition in soil. However in time of wheat tillering there was draught during these years which could increase the plant sensitivity to even low level of herbicide residues in soil.

5. Sunflower did not react negatively to the residues of any examined herbicide. After propyzamide the yield even increased in both years.

IV. Conclusions.

In case of spring resowing of winter rape plantation on which in autumn trifluraline, napropamide, propyzamide, aziprotryne or prodiamine were used cultivation of the

following plants involved a risk of crop lowering :

1. potatoe and silage maize - due to trifluraline residues.
2. barley - due to napropamide, propyzamide and prodiamine residues,
3. wheat - due to napropamide, prodiamine, trifluraline and aziprotryne residues.