A NEW PLANT MATURITY REGULATOR FOR WINTER RAPE WITH A WIDE SPECTRUM OF ACTION

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I. Introduction

Winter rape is the major oilssed plant grown in Poland on the area of about 500 th.ha. It is harvested mostly in one-step /about 80% of the plantations/ or rarely in two-step /about 20% of the plantations/ method. Such a wide spread of a one-step rape harvesting is explained by the modern tendencies towards simplification of the plant harvest technology. In one-step harvest the rapeseed is ready to cut later - at the beginning of cereal harvesting. The introduction of double-low rape varieties with a longer vegetation period makes this situation still worse, causing a further delay in rape harvesting even till the full harvest of cereals. For that reason Polish farmers are interested in a possibility to unload harvesting by accelerating rapeseed harvest. This is certainly solved by a two-step harvest, which is, however, more laborous and complicated than a one-step harvest.

Acceleration of a one-step harvest by treating plants with the recently applied in Poland dessicant Reglona is related to a risk of lowering the yield and its quality in the case, when the chemical is applied too early, and to a threat of the environment contemination during agro-aircraft procedures. In view of that Polish farmers set their hopes on the new chemical Harvade 25 F, especially in cultivation of double-low rape varieties on large plantations constituting about 60% of the total area under that crop. This chemical was the subject of interest of many scientists abroad, such as Amos et al. /1974,1982/,

Bailey /1982/, Bell et al. /1974/, Bowerman /1984, 1985/, Hegman /1982/, Neidermyer et al. /1974/, Peddie et al. /1986/, who displayed marked reduction of the water content in plants ender its influence. In Poland pilot studies on that chemical in the culture of winter rape, white mustard, oilseed sunflower and legumes were conducted by Ciesielski et al. /1985/ and Witkowski et al. /1985/. The reperted results constitute a concise summary of Polish studies concerning rape crops.

II. Methods

Field trials under this subject were carried out by the Institute of Plant Protection, Poznań, and by the University of Agriculture, Poznań, in cooperation with the Institute of Plant Breeding and Acclimatization, Poznań. In the reported trials Harvade 25 F was applied at the beginning of plant ripening at the rate of 2 l/ha, whereas the control chemical Reglone was applied at full maturity at the rate of 3 l/ha. The characteristics of the chemicals and their application are given in Table 1. The both chemicals were used in water solution at 300-500 l/ha. Besides that, the trials included a control combination ripening in a natural way. The trials were carried out on the arucic acid-free rape varieties Jet Neuf, Beryl, or on double-low Jantar or BOH 283.

III. Discussion of Results

The water content in the harvested rapessed is presented in Table 2. Data contained in this table indicate that the seed moisture on the day of the control rape harvest was averagely 15,8% and ranged depending on the weather from 11.8 to 23,9%. When Harvade 25 F and Reglone were applied, the rapeseed always contained below 13% water, which in Poland is considered normal for purchased oilseeds. Under the influence of Harvade 25 F harvested rapeseed frequently attained even the parameters of storage moisture /below 7% water content/.

Under the influence of Harvade 25 F the rapeseed attained their normal moisture 6-7 days earlier than in the

control combination /Table 3/, with a large levelling off independently of the weather conditions in different years.

In addition to that, plants treated with Harvade 25 F matured more evenly than unterated ones, which was particularly evident on double-low varieties, more injured by frosts or bitten by game. On the other hand, plants treated with Reglone, rapidly dying and drying, looked unnaturally ripe.

The curves of the dynamics of water loss from the seeds during their ripening in the years 1985 and 1986 /Fig. 1/ also point out to a quicker decrease of water from Harvade 25 F-treated plants.

Harvade 25 F had no negative influence to a significant degree, on the 1000-grain weight /Table 4/, and thereby could not significantly affect the plant yielding. It had no significant effect upon the seed germinating ability and oil content of seeds, either. The contents of chlorophyll and free fatty acids were so low, that it is difficult to consider that differences favourable to Harvade 25 F were of practical importance. The contents of chlorophyll and free fatty acids are good indices of the degree of seed maturity /Niewiadomski 1985/. For "00 " - varieties, as a result of their less even ripening, these indices are worse than for erucic-acid-free varieties /Table 5/. Harvade 25 F somewhat lowered both the chlorophyll content and free fatty acid content in oil of the harvested seeds, thus improving their technological quality.

IV. Conclusions

1. Harvade 25 F, speeding up drying of only ripening plants, appeared to be not worse than Reglone, and due to its less aggressive action is recommended in Poland, particularly in cultivation of double-low, late and less evenly ripening rape varieties.
2. Contrary to dessicants and defoliants, Harvade 25 F as a plant maturity regulator, in the case of tolerance to the chemical, should not constitute a large threat to the neighbouring crops, being at full vegetation.
3. Harvade 25 F may be also used for acceleration harvest

of erucic acid-free rapes, since it considerably reduces the moisture of harvested seeds, causing no losses in their quantity and quality.

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Table 1. Characteristics of chemicals and their application

Chemical	Active ingredient	Producer	Toxicity class	Rate /dcm3/ per ha/	Date of application
Reglone	diquat	ICI	III	3	beginning of full maturity
Harvade 25 F	dimethipin	Uniroyal	IV	2	beginning of technical maturity

Table 2. Moisture of harvested seeds of winter rape /%/

Chemical	1983	1984	1985	1986	Means
Control	14,8	23,9	11,8	12,5	15,8
Reglone	5,3	6,8	10,5	11,6	8,6
Harvade 25 F	5,3	5,6	10,4	7,0	7,1

Table 3. Speeding up of the winter rape seed drying to 13% of water content in relation to the control /days/

Chemical	1983	1984	1986	1986	Means
Reglone	6	6	4	3	5
Harvade 25 F	6	7	6	6	6

Table 4. The influence of Harvade 25 F on the quality of the winter rape seeds harvested in 1985 /n=5/

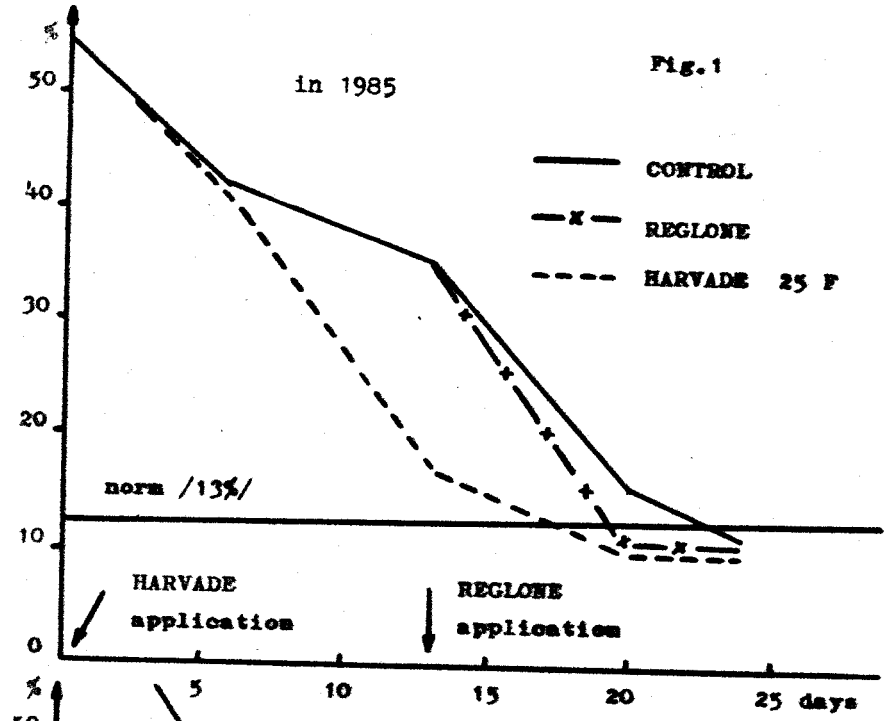
Quality indices	Control / =100/	Harvade 25 F	
		units	relatively
100-grain weight /g/	4,77	4,68	98
Germinating ability /%/	95	96	101
Oil content /%/	47	46,6	99
Chlorophyll content in oil /ppm/	17	15	
Content of free fatty acids in oil /%/	0,91	0,86	

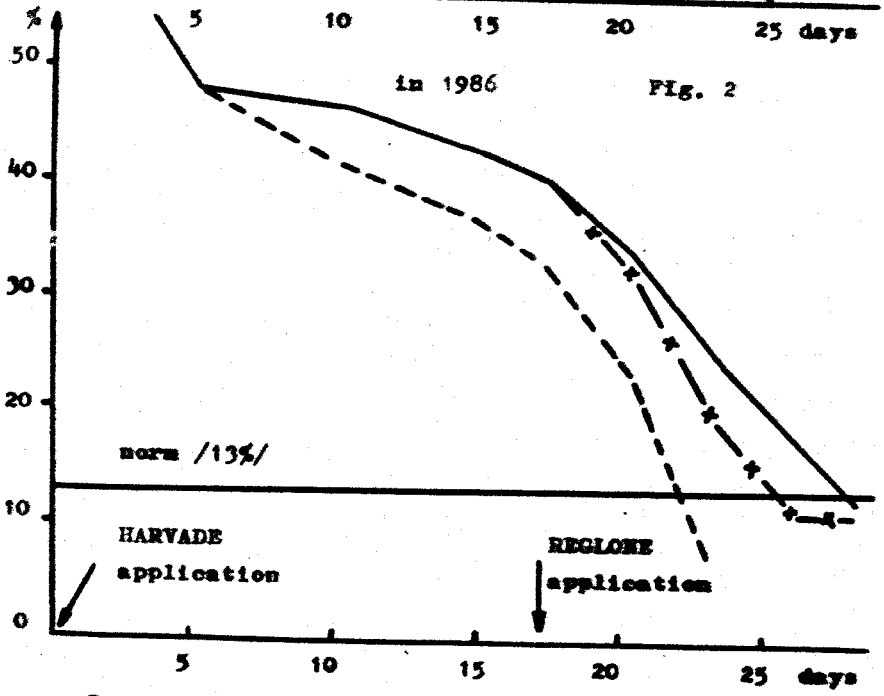
n=number of trials

Table 5. Indices of the degree of seed maturity of two winter rape types harvested in 1985 / n = 4/

Quality type	Content in oil	Control	Harvade 25 F
"0"	Chlorophyll /ppm/	14	13
	Free fatty acids /%/	0,93	0,81
"00"	Chlorophyll /ppm/	20	18
	Free fatty acids /%/	1,12	1,02

n = number of trials





Dynamics of water loss from the rapeseed