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## CANADIAN EXPERIENCE WITH THE PRE-HARVEST DESICCATION OF SUNFLOWER WITH REGLONE

### Introduction

A paper (J. Hill, B. Knight, J. Ogilvy, 1974) given at the Sixth International Sunflower Conference discussed the beneficial effects of pre-harvest desiccation with Reglone in trials in Poland, Hungary, France and Canada between 1967 and 1972.

Reglone at 1.2 - 3 l/ha lowered seed moisture by 4-15%, advanced the harvest by 9-16 days which lessened crop damage by birds and improved the speed of harvesting by 2-3 ha/combine/day. The fields were cleared for the following crop more quickly than with conventional harvesting and labour and machinery was released for other purposes, especially that of maize harvesting.

Diquat residues were low in the whole seed (non-detectable to 0.18 ppm), and cake (non-detectable to 0.12 ppm) and, as diquat is insoluble in oil, were absent from the oil. Cows in milk fed a diet containing cake artificially fortified with up to 50 ppm diquat (several hundred times greater than the above levels) remained healthy and no residues were detected in the milk or, in toxicologically significant quantities, in the body tissues (E. Sipos, 1973).

The results of further work in western Canada are reported in this paper.

Two trials were laid down in Manitoba, September 1973 in which the direct combining of unreplicated 2 ha plots was compared after pre-harvest treatment with Reglone at 1.4 and 2.8 l/ha in one trial and 1.4 l/ha in the second

with untreated plots in both trials. Reglone was applied in water (plus 0.1% Agral 90 as surfactant) at 45 l/ha by fixed wing aircraft when the seed moisture was approximately 25%, at which stage the sunflower bracts were brown and the back of the head completely yellow. Details of the trials are given in Table 1. Yield was determined from six combine cuts of 30 m length per plot.

The effect of pre-harvest desiccation with Reglone on seed moisture, germination and yield are given in Table 2. No differences were observed between 1.4 and 2.8 l/ha. Browning of the leaves occurred within 2-3 days and of the stem within 7-12 days; the back of the head dried out in 13-21 days. Pre-harvest desiccation advanced the time of harvesting by 10-11 days and the operating speed of the combines from 6.4 to 9.6 kph. The moisture content of the seed at harvest was 11.1-11.2% compared with 14.5-14.7% of the untreated. Germination capacity of the seed assessed a month after harvest was 62% for the untreated and 82-84% for the treated. Yield was increased marginally. Low diquat residues of 1.2 ppm were found on the seed husk in one trial only; no residues were present inside the seed (Table 3).

The major problem of the Canadian sunflower grower is harvesting. The crop usually matures about 30-40 days before the leaves, stem, head and seed are dry enough through natural senescence and the agency of frost, sun and wind for the crop to be combined. It is not uncommon for combining to take place when snow is on the ground. During this period of natural drying the losses caused in certain years by bird damage (up to 80% loss has been recorded) and weather can be considerable. Further, cultivation after the crop has been cleared in the autumn is either difficult or impossible and the range of crops which can follow is restricted to those which can withstand poor seed beds.

Table 1

Trial Details		
	Trial 1	Trial 2
Crop variety	Commander	Commander
Plot size, ha	2	2
Spray treatments		
Date	6.9.73	12.9.73
Time	11.00	12.00
Spray volume, l/ha	45	45
Wind speed, kph	9	8
Temperature, °C	12	17
Relative humidity, %	80	50
Cloud cover	nil	nil
Aircraft speed, kph	145	145
Harvest of sprayed plots	19.9.73	3.10.73
Harvest of unsprayed plots	29.9.73	14.10.73

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**DOCUMENTATION**

Table 2  
 Effect of Reglone on Seed Moisture, Germination  
 and Yield

Trial	Reglone l/ha	Seed moisture at spraying, %	Seed moisture at harvest, %	Germination, %	Yield, t/ha
1	0	25	14.5	62	1.05
	1.4	25	11.1	82	1.11
	2.8	25	11.1	84	1.06
2	0	24	14.7	64	1.05
	1.4	24	11.2	84	1.07

Table 3

## Diquat Residues. PPM

Trial	Reglone, l/ha	Whole seed	Husk	Inner seed	Oil
1	1.4	0.2	1.2	ND	ND
	2.8	ND	ND	ND	ND
2	1.4	ND	ND	ND	ND

ND - not detectable; level of detection 0.05 ppm.

Pre-harvest desiccation made earlier and speedier harvesting possible. Yields were not noticeably increased as little damage was caused by birds in 1973. Seed of the desiccated crop was dry enough to store without costly artificial drying.

Improved quality of the seed following pre-harvest desiccation, as judged by enhanced germination, is explained by the improved condition of the seed at harvest. This observation is supported by the results of similar trials in 1972 when germination was increased from 67% to 91-96% (J. Palmer, E. Reiner, 1973).

The potential value of pre-harvest desiccation of the sunflower crop in the USSR is immense. It is estimated that at least a third of the crop would benefit especially in regions of high moisture in autumn and of short growing season as in the north. Polish work (F. Dembinski, A. Horodyski, M. Jablonski, 1971) on USSR varieties, e.g. Czernyanka 66, Kubaniec, Jenisej and others showed that pre-harvest desiccation with Reglone at 3 l/ha was an essential factor in attaining high yields of up to 2.53 t/ha. Russian authorities (L.D. Stenov, 1973) have estimated yield increases of 75-100 kg/ha from the use of desiccants on sunflowers: if one third of the USSR crop of approximately 4.5 million ha was treated the saving would be of the order of 150,000 tons of seed. To this saving must be added the advantages which the technique brings to large scale, highly mechanised farming - greater independence of the weather and savings in labour, machinery, fuel and time.

### References

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