DOES 2,4-D ADVERSELY AFFECT THE VALUE OF THE FLAX CROP?

by
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The control of weeds through the use of selective herbicides has become a widespread and accepted practice. During the past crop season this method of weed control was extended to include fields of flax. In general where directions were carefully followed, no apparent damage to the crop resulted. In those cases where annual weed infestation was extremely heavy before spraying, the net result must have been reflected in increased yields. This is especially true where there was competition between weeds and crop for a limited supply of available moisture.

If spraying affects the flax plant by greatly stimulating growth, this condition should be reflected by a study of the yield, oil content, iodine number of the oil and protein content of the seed. In general conditions which stimulate growth produce a high yield of large, plump seeds with high oil content and an oil with a high iodine number. The iodine number is a measure of the drying quality of the oil. An oil with a high iodine number dries faster in paints than an oil with a low iodine number Under unfavorable conditions one may expect a lower yield of "thin" seeds with a low oil content and an oil with a low iodine number. If the yield, oil content and iodine number are not affected, one must conclude that spraying flax for weed control does not affect the flax plant seriously enough to diminish the economic value of the flax crop. Dunham (1) and Tandon (2) reported some preliminary experiments on sprayed flax which indicated distinct varietal tolerance. The quantity of 2,4-D used in their experiments was several times the amount which is generally recommended for the control of weeds in flax: This study was undertaken to determine the effect of 2,4-D amine spray on the value of the flax crop, when used at the recommended level. Yield, seed size, oil content, iodine number and protein content were taken as a measure of the value of the flax crop.

Experimental: Multiple square yard samples of the flax crop were taken from sprayed and adjacent unsprayed check strips in the various fields in 1948. Care was taken to select samples from those strips which contained a minimum infestation of weeds. This was done to eliminate the effect of presence of weeds in the check samples as compared with the corresponding sprayed samples.

The spray was applied at the rate of 1/3 pint of 66% alkanolamine salt of 2,4-D (40% acid equivalent) per acre. The volume of water used varied from four to five gallons per acre. In terms of acid used this is equivalent to .175 lbs. of 2,4-D (dichlorophenoxy

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acetic acid) per acre. The flax was at the 4-6 inch stage in fields (1) and (2); at the 10-12 inch stage in field (3) when the spray was applied.

The following tables list the results of the several determinations made on the flaxseed samples collected. Where there is more than one sample the value listed is an average of the individual values for that treatment.

Table 1.—Comparison of Yield, Oil Content, and Iodine Number of the Linseed Oil from 2,4-D sprayed and unsprayed flax fields.

Field Number	Variety	Treatment	Number of Samples	Yield Bushels Per Acre	% Oil, 8% Moisture	Iodine Number
1	Dakota	Sprayed	4	22.6	37.11	181.2*
	Dakota	Check	4	21.9	36.60	177.7
2	Sheyenne	Sprayed	7	17.3	37.38	187.3
	Sheyenne	Check	7	16.9	37.69	188.6
3	Minerva	Sprayed	6	16.1	40.07	190.1**
	Minerva	Check	6	19.5	40.44	191.8
4	Dakota	Sprayed	1	.....	37.27	192.2
	Dakota	Check	1	.....	37.08	192.2

*Significant at 5%
**Significant at 1%.

Table 2.—Comparison of Seed Wt. and Crude Protein Content of flaxseed from 2,4-D sprayed and unsprayed flax fields.

Field Number	Variety	Treatment	Weight per 1000 Seeds	% Crude Protein 8% Moisture	% Crude Protein-Moisture and Oil free basis
1	Dakota	Sprayed	5.524 grams	24.2	40.6
	Dakota	Check	5.531 grams	25.6	42.4
2	Sheyenne	Sprayed	4.806 grams	28.0	47.2
	Sheyenne	Check	4.764 grams	27.0	45.8
3	Minerva	Sprayed	5.983 grams	27.3	48.4
	Minerva	Check	5.570 grams	27.1	50.0
4	Dakota	Sprayed		28.9	48.6
	Dakota	Check		29.2	48.9

Discussion: The differences observed were very small. In the case of field (1), the check samples showed a lower per cent oil and iodine number than the sprayed samples. This was probably due to factors other than spraying. The crop was retarded slightly by the spray. In actual ripening date it was about two days later than the check. It is likely that this time difference permitted the sprayed portion to make better use of rains which fell during the filling stage.

The yield of Minerva was significantly reduced. This is in agreement with the Minnesota report, that Minerva is more sensitive to 2,4-D sprays than most other varieties. However this may also have been due to the relative maturity of the flax at the time

of application. If the grower anticipates the control of weeds with 2,4-D sprays he should plant varieties other than Minerva. Those weeds which are susceptible to 2,4-D spray such as mustard and marsh elder were almost completely removed by the treatment used in these fields. The alkanolamine salt of 2,4-D when applied at the rate of 1/3 pt. per acre is not detrimental to the value of the flax crop. If weeds are present which can be eliminated by spraying, one may well benefit by increased yields due to weed removal.

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CHOKECHERRY DISEASE IN NORTH DAKOTA

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The chokecherry bushes that were planted on the Horticultural plots at the Station at Fargo 15 and more years ago as windbreaks and for observations on inheritance of yellow fruit color have reached the end of their usefulness. Some of these chokecherry bushes have been drying out for at least the past five years. The cause of death was not recognized until mid-summer of 1948.

Inspections made during the 1948 season have revealed that practically 100 per cent of the chokecherry bushes on the Horticultural plots and some bushes on the NDAC campus are seriously infected with one or more virus diseases. The principal disease is that referred to as "red-leaf chokecherry virus" or as "X-Disease of Stone Fruits". This is apparently the first report of the occurrence of this disease in North Dakota. Observations made this summer indicate that the disease is also present in wild native chokecherries in Richland and several other counties. It has also been observed on chokecherries in several shelterbelt plantings in various parts of the state.

This virus disease complex is not new. It is recognized as a major problem in Eastern and Western peach-growing sections and control measures have been developed in those areas. It is a serious hazard in North Dakota in two respects: first, the disease causes death of chokecherry bushes in about five years after a bush becomes infected; and, second, the disease seems to be transmissable from chokecherries to many of the plum and cherry varieties grown in North Dakota orchards (and vice versa). The disease apparently has moved faster and more destructively in chokecherries than in other stone fruits grown on the Horticultural plots. Under our conditions the chokecherries may be serving as a medium for spreading the disease in our cultivated stone fruits.

As nearly as can be determined, infection of chokecherries in the Horticultural plots first occurred about ten years ago. It appears likely that the disease was brought here in a group of plum varieties planted adjacent

(1) R. S. Dunham, Paper No. 614 Misc. Jour. Series Minn. Agr. Exp. Sta.; Proc. Fourth Annual Meeting of the North Central Weed Control Conference, p. 35.
(2) T. K. Tandon. Paper No. 615 Misc. Jour. Series, Minn. Agr. Exp. Sta.; Proc. ibid p. 36.