

EFFECTIVENESS OF SUMMER APPLICATIONS OF TRIFLURALIN

J. R. Anderson and W. R. McGregor ^{a/}

INTRODUCTION

At the present time, TREFLAN 4EC (trifluralin) is registered as a preplant soil incorporated application for many oilseed crops and can be applied in the spring before planting or in the fall prior to the crop season. Fall application of TREFLAN may be done anytime between September 1 and soil freeze-up at a rate of 1.25 lb/A on most soils in Western Canada. Fall has become the preferred time of application in many areas since more time is available for herbicide application and the need to incorporate twice in the spring before planting is avoided, thereby maintaining a firm, moist seedbed.

Several years ago, Elanco began receiving questions from farmers concerning the possibility of applying TREFLAN earlier in the fall; in other words prior to September 1st. The advantages would involve application to summerfallow, which is usually free of trash, while incorporation would be done in the same operation as summerfallow tillage, thereby decreasing the need for extra cultivations in late fall normally used to incorporate fall applied herbicides. If a farmer were to till his summerfallow several times between June 1 and the fall, incorporation of the herbicide at the same time should be possible. The obvious concern would be whether the herbicide would last long enough to provide weed control in the crop growing the following year.

Elanco proceeded, in 1975, to set up several small-plot research trials and small acreage commercial applications to explore the utility of summerfallow application of TREFLAN.

METHODS AND MATERIALS

Research trials were established at 21 locations where TREFLAN was applied at rates ranging from 1 to 2 lb/A. Applications were made as early as June 12, and in many locations TREFLAN applications made side by side during June, July and August were compared. This was done to determine the relative effectiveness of early and late summer applications.

Application was made with research equipment and incorporation with a tandem disc followed immediately. The farmer-cooperator was asked to carry out subsequent tillage when it was necessary to control resistant weeds in the summerfallow. All trials were, therefore, incorporated at least twice during the fallow period. Shallow tillage just prior to seeding the following year was also done by the farmer-cooperator.

^{a/} Elanco Products Company, Winnipeg, Manitoba and Edmonton, Alberta, respectively.

Small scale commercial trials were also initiated at 11 locations. Several of the trials were initiated using research equipment and several involved application with the cooperator's equipment. Application and incorporation were as outlined above; the main difference being that research trials were replicated while commercial trials were generally single replications.

RESULTS AND DISCUSSION

Three observations were of primary interest: 1) weed control during the fallow year; 2) weed control during the following crop year; and 3) crop response. These will be discussed separately.

1) Weed control during the fallow year:

When weed control observations were made during the fallow year, control of susceptible weeds such as wild oats, wild buckwheat, green foxtail and lambsquarters was variable and not acceptable following only one incorporation. This was not surprising as a uniform treated layer after only one incorporation is not usually expected. When the trial area was cultivated a second time, control of the susceptible weeds improved to excellent with consistent results in all of the trials. The second incorporation established a uniform treated layer and weed control was excellent (Table 1)

TABLE 1. Weed Control During Fallow Year

TREATMENT	LB/A	PERCENT WILD OAT AVERAGE	CONTROL RANGE
TREFLAN 4EC	1.25	93	90-95
TREFLAN 4EC	1.5	94	94-95
CONTROL	0	0	0

After controlling susceptible weeds, only a few resistant weeds were present in the summerfallow. Mustards, volunteer rapeseed, and a few patches of Canada thistle were the only weeds which presented a problem. In all the trials, this growth of TREFLAN resistant weeds was controlled by subsequent fallow tillage, but it is possible that these species could also be sprayed with one of the phenoxyes. Weed species not controlled by TREFLAN are, for the most part, susceptible to a herbicide such as 2,4-D.

2) Weed control during the following crop year:

Observations during the following crop year in research trials (Table 2) indicated an average of 93% control of wild oats at 1.5 lb/A compared to an average of 88% in plots treated with 1.25 lb/A. All of the 1.5 lb/A plots showed acceptable

control with a range of 83% to 100% across all trials. Many of the 1.25 lb/A treatments also showed acceptable control, but what was more important was the range; from 65% to 99% across all plots. Three of the trials displayed unacceptable wild oat control at 1.25 lb/A, indicating that consistent acceptable results required the application of 1.5 lb/A during the previous fallow year.

TABLE 2. Weed Control in Crop Year - Research Trials

TREATMENT	LB/A	PERCENT WILD OAT CONTROL	
		AVERAGE	RANGE
TREFLAN 4EC	1.25	88	65-99
TREFLAN 4EC	1.5	93	83-100
CONTROL	0	0	0

Similar results were obtained in commercial scale applications (Table 3). An average of 87% control of wild oats was observed at 1.25 lb/A with a range of 75 to 100% control. Three of the locations showed unacceptable control at 1.25 lb/A. In contrast, 95% control was the average over all trials at 1.5 lb/A with a range from 90% to 100%. Obviously, acceptable control of wild oats was obtained in all trials at 1.5 lb/A.

TABLE 3. Weed Control in Crop Year - Commercial Trials

TREATMENT	LB/A	PERCENT WILD OAT CONTROL	
		AVERAGE	RANGE
TREFLAN 4EC	1.25	87	75-100
TREFLAN 4EC	1.5	95	90-100
CONTROL	0	0	0

In both commercial applications and research trials the control of several other susceptible species was acceptable at both 1.25 and 1.5 lb/A. Control of redroot pigweed, green foxtail, lambsquarters and wild buckwheat was rated as excellent with a very small range in control ratings.

Therefore, it appears that the X rate for application of TREFLAN prior to September 1 for weed control during the following crop year is 1.5 lb/A. This rate will consistently provide acceptable control of wild oats and several other susceptible weeds not listed on the TREFLAN label through the crop year.

3) Crop response:

It is felt that rapeseed will be the primary crop grown on a

summer application of TREFLAN. Consequently, most of the trials described previously were planted to rapeseed the year following application. No crop injury symptoms were observed during the growing season and since rapeseed has shown a high margin of safety to TREFLAN, no attempt was made to carry trials to yield. The primary concern with respect to crop safety was to determine the effect of the 1.5 lb/A application rate on the yield of flax. Flax has displayed a relatively low margin of tolerance to spring applications of TREFLAN with the result that it is recommended that flax be seeded only into a fall application of TREFLAN. With fall application and proper seeding techniques in the spring, the tolerance of flax to TREFLAN is approximately as good as its tolerance to other flax herbicides.

Flax displayed excellent tolerance to TREFLAN at rates up to 2 lb/A summer applied between June 12 and August 13. Increased yield (Table 4) reflected the absence of crop injury coupled with good weed control. Flax tolerance has appeared to be dependent upon the method of seedbed preparation and seeding rather than the rate of TREFLAN applied and these data support that observation.

TABLE 4. Flax Yield

TREATMENT	LB/A	6/12	YIELD ^{a/} DATE APPLIED		
			7/8	7/8	8/13
TREFLAN 4EC	1	143	141	138	106
TREFLAN 4EC	1.25	150	150	141	120
TREFLAN 4EC	1.5	147	140	130	103
TREFLAN 4EC	2	143	142	147	130
CONTROL	0	100	100	100	100

^{a/} Yield = Percent of control

CONCLUSIONS

At the present time it appears feasible for TREFLAN to be applied and incorporated during routine summerfallow operations between June 1 and September 1. Weed control will be maintained through the following crop year if 1.5 lb/A is used. Crop safety is excellent for rapeseed and also appears to be acceptable for flax. There appear to be several advantages to be gained from the flexibility of fall application timing:

- a) The time allowed for fall application of Treflan extends throughout the late summer and fall months, allowing the grower an opportunity to plan the timing of application and incorporation according to his own farm management requirements.

- b) Normal fallow tillage is utilized to incorporate Treflan, thereby minimizing the need for very late fall tillage normally required for incorporation of herbicides which must be applied close to freeze-up.
- c) Control of Treflan susceptible weeds in fallow or late fall may provide an opportunity to control resistant weeds with commonly used herbicides such as 2,4-D, thereby minimizing the need for additional tillage for weed control late in the fall.

We recognize the potential dangers of soil erosion in certain areas and under certain conditions. It has been very obvious that acceptance of fall application by farmers in areas susceptible to soil erosion overwinter has been low--those farmers recognize the dangers and are prepared to use the herbicide in the spring or not use it at all. On the other hand, fall application is preferred in other areas where erosion is not a constant problem.

Our desire is to make the application and incorporation of our product flexible enough so that it may find a place in the management scheme of farms in many areas depending, of course, upon the rainfall, topography, soil type and cropping practices of those areas.