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V. MOLNAR

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FINAL REPORT ON SILVERLEAF NIGHTSHADE (*SOLANUM ELAEAGNIFOLIUM* Cav.) : FIELD TRIALS IN THE VICTORIAN MALLEE 1974-1980.

FINAL REPORT ON SILVER-LEAF NIGHTSHADE (*SOLANUM ELAEAGNIFOLIUM* CAV.)

FIELD TRIALS IN THE VICTORIAN MALLEE 1974 - 1980

AN UNPUBLISHED REPORT PREPARED BY

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ABSTRACT

Six years of extensive field research in the Victorian Mallee failed to find any chemical able to eradicate silver-leaf nightshade (*Solanum elaeagnifolium* Cav.) on broadacre infestation.

For long-term control picloram (Tordon 50-D) and for short-term control 2,4-D ester were the best suited and most economical chemicals to use.

FINAL REPORT ON SILVER-LEAF NIGHTSHADE (*SOLANUM ELAEAGNIFOLIUM* Cav.). FIELD TRIALS IN THE VICTORIAN MALLEE 1974-1980.

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INTRODUCTION

Field trials on silver-leaf nightshade in the Victorian Mallee were laid out in the late sixties and early seventies by research officers Norman Welsh and David McKenzie. However, following farmers representation and a visit by the Minister of Lands in 1974 more detailed field work was initiated.

The results of this work, which involved thirty-two trials and several field studies, are presented.

The work, with little exception, was carried out on one 18 ha site, near Hopetoun, covering several years with different weather conditions.

The soil type is loamy sand over sand with limestone at depths varying from 1 to 4 metres. Farming practice is based on a three-year rotation: grain crop - pasture - fallow. The research cropping trials followed this pattern.

Average rainfall in the area is 300 mm.

Papers to be presented are listed on page 1 with the list of Tables on page iii.

TECHNIQUE

All trials but two were randomized block design with four replications with untreated plots for control incorporated in the design. There were two exceptions due to the size of the plots in these instances the plots were one hectare and 360 m^2 respectively. The size of nearly all the cropping trial plots was 60 m^2 and on the trials without cropping the size was 9 m^2. Any exception will be stated during the detailed description of the trials.

Counts were taken before spraying and then every month during the silver-leaf nightshade (SLN) growing season from October to the following April. All plants were counted on the 9 m^2 plots but on the 60 m^2 plots the middle - 10 m x 1 m = 10 m^2 was counted.

To facilitate comparison counts have been expressed as numbers 10 m^{-2}. Unfortunately most of the trials had to be terminated in April 1980 by which time severe drought and the ravages of plague mice reduced the SLN number from February onwards.

Application methods: A Mistifier spray unit*, operating at 240 kPa with an offset boom was used to spray the 9 m^2 plots at a volume rate of 1500 L/ha^{-1}. All other plots were sprayed with a tractor-driven spray unit using T-nozzles at a pressure of 240 kPa and driven in third gear at 800 revs. This gave a measured application rate of 200 l/ha^{-1} at 5-6 km/hr^{-1}.

Chemical rates: All chemicals are expressed as kg ha^{-1} active ingredient. The picloram used was mostly the Tordon 50-D formulation. The 2,4-D used was always the 80% ester formulation.

Harvesting: Harvesting was done with a Suzuki combine plot harvester. Yield results are expressed in kg ha^{-1}.

General: The term 'growing season' refers to October-April during which time the topgrowth is visible. Silver-leaf nightshade will be referred to in all papers as "SLN".

Rainfall as recorded at Hopetoun, 15 km distance from the trial site, for the experimental period 1974-1980 is given in Table 1.

SUMMARY

It became apparent that the results of spraying should not be assessed too early as chemically treated plants often did not recover until January-February of the following growing season, therefore earlier assessments result in a misleading picture. This probably reflects the ability of the plant to regenerate from depth. Trials have shown that the plant can recover from 125 cm, however it may take 13 months to do so.

To express SLN in percentage numbers reduction can be very misleading for practical purposes. Even one plant m^{-2} means thousands of plants ha^{-1} which have to be found and resprayed over a number of years. This, on a broadacre infestation just cannot be done.

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*Mistifier Knapsack Mistblower manufactured by Drake and Fletcher, England.

For short-term suppression 2,4-D ester at 1.20 kg a.i. ha^{-1} proved to be the most efficient, economic herbicide. At this rate it provides suppression for 4-5 weeks, preventing the weed from flowering, and seeding and thus this means of spreading. As some sort of control is imperative if crop losses are to be prevented on heavily infested land, chemical control is recommended as it is usually more economical than fallowing. Furthermore light mallee soils would not stand the necessary 4-5 weekly fallowing as the top soil would blow away.

The trials show that slashing, cultivations or a combination of these with chemicals provides no better control than any one treatment on its own. Control for only 2-5 weeks' duration can be expected. It was noticed that continuous slashing produced plants which tended to set lower flowers and seeds thus reducing the effectiveness of subsequent slashings.

Picloram - as Tordon 50-D - provided consistely good results for long-term control and hope for eradication. Ethidimuron (Ustalin) and terbacil (Sinbar) are two promising chemicals in non-crop situations but they have not been tested long enough for a recommendation.

The trials have shown that one application of picloram up to 2 kg a.i. ha^{-1} rate will not eradicate SLN. Higher rates provide longer term control but not eradication. For eradication to be achieved repeated applications are necessary over at least 3-4 successive growing seasons. The results show that rates of picloram less than 0.5 kg a.i. ha^{-1} do not provide adequate suppression. Picloram at 1.20 kg a.i. ha^{-1} will ensure in most cases, one year's control. However picloram at a total of 5 kg a.i. ha^{-1} rates with repeated applications failed to eradicate SLN during the test period. Picloram application before or after fallowing or slashing did not appear to affect the results.

Though split applications appear to give a better result the time between the commencement of the last time of spraying is shorter than for the one application. This difference gives the plant more time to recover after one application resulting in higher plant counts.

When picloram is used the time of application does not appear to influence the control achieved.

The results show that an early October-November spraying might require a second application in February-March, in the same growing season to control regrowth. Later spraying will prevent this happening if,

however spraying is delayed beyond the early flowering stage which is usually November-December, slashing or 2,4-D 1.a kg a.i. ha^{-1} should be used to prevent flowering. A picloram application in the autumn should follow if aiming at eradication.

TABLE 1. Rainfall figures at Hopetoun 1974-1980 in mm

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1974	88.2	18.0	66.2	59.4	34.6	16.2	27.0	42.4	43.4	66.0	5.0	3.6	470.0
1974	1.4	2.4	13.8	9.6	45.6	2.6	35.8	29.6	46.6	119.0	9.2	23.2	338.8
1976	19.4	13.4	4.2	16.0	7.6	18.6	15.0	13.6	27.2	51.0	38.0	16.0	240.0
1977	9.4	26.2	5.8	18.4	52.6	20.6	13.4	11.4	16.4	19.0	21.6	8.0	222.8
1978	4.0	4.6	17.4	20.4	48.4	33.2	54.8	44.6	40.0	21.0	61.0	7.6	357.0
1979	74.4	48.0	8.6	17.4	52.2	15.0	11.2	34.6	71.2	41.0	57.0	1.4	432.0
1980	0	0.4	12.6	86.4	29.4	36.2	25.6	42.8	14.7	50.8	22.2	10.0	331.1

1-0-0-0 Root recovery and root depths studies

1-1-0-0

1-2-0-0

INTRODUCTION

To help to explain why chemical treatments are not always effective the growth pattern of the root system was determined. The depth from which the root can regrow and the time it takes them to reappear were investigated.

1-1-0-0

TECHNIQUE

In October 1974, on a heavily infested site 2.5 m^{-2}, unreplicated plots were dug out after original counts were taken. Plots were dug to a depth of 25, 50, 75, 100, 125 and 150 cm and then the sides were lined with black plastic sheets to prevent SLN plants growing into the plots.
N.B. As there were no root pieces at the bottom of the 150 cm deep plot, the experiment did not continue beyond that depth. The SLN root pieces together with the soil were removed from these plots which were then refilled with SLN-free soil. SLN emergence from each depth was recorded (see Table II).

RESULTS

TABLE II. Root recovery

Plot depth (cm) / Original count	Number of SLN/10 m^2					
	25	50	75	100	125	150
Nov. 1974	31	36	52	64	72	48
7 weeks later	1	0	0	0	0	0
10 " "	2	0	0	0	0	0
15 " "	9	12	0	0	0	0
18 " "	12	28	0	0	0	0
25 " "	4	40	0	0	0	0
12 months later	70	32	12	0	0	0
13 " "	113	88	64	4	20	0

It will be noted that at the site selected, roots were only excavated to a depth of 125 cm.

SUMMARY

To help explain why chemical treatments are not always effective the growth pattern of the root system was determined. The depth from which the roots can regrow and the time it takes them to reappear were investigated. The results showed that SLN can regrow from a depth of at least 125 cm and that recovery may take up to one year.

1-2-0-0 TECHNIQUE

In 1975 and 1976 the root system of unsprayed and picloram sprayed plants was traced to establish the average root depth and the depth of root which picloram will kill. Trenches were dug at eight sites in 1975 and at three sites in 1976. The individual plants roots were followed and measured on 29 plants in 1975 and 30 plants in 1976. At three such sites the lateral root parameters were also measured on 30 plants.

RESULTS

Soil type in the test areas:

Sandy loam	20-30 cm
Clay or loamy clay	30-100 cm
Limestone at	100 cm or beyond.

Limestone sometimes occurred at 50-60 cm to be followed again by clay or loamy clay.

Results given in Table III and IV are the total from 14 sites where altogether 115 plants have been followed.

TABLE III. Root tracing of SLN plants (unsprayed)

Total No. of sites	11
Total No. of plants	59
Average depth of vertical roots	127 cm
Longest vertical root	280 cm
Shortest vertical root	30 cm
Average No. of lateral roots/plants	5.8
Deepest lateral root	143 cm
Shallowest lateral root	1 cm

TABLE IV. Root tracing of picloram sprayed SLN

Date of spraying with 1% picloram	March 1974
Date of root tracing	August 1975
No. of sites	3
No. of plants	56
Average depth of root kill	51 cm
Deepest root kill	165 cm
Shortest root kill	8 cm

SUMMARY

The average depth of vertical roots of SLN was 127 cm on the soil type tested. Lateral roots started from just under the surface to a depth of 143 cm. While picloram penetrated the roots, the depth of kill varied. The reason for this is not understood. With this product the deepest root kill was often identical to the maximum length of the root. These measurements also show that mechanical control will be unlikely.

2-0-0-0 Picloram - as Tordon 50-D - Tracing - Bioassay test results

INTRODUCTION

The depth to which picloram can penetrate in the soil and in the root, is important when assessing results of applications of this chemical on SLN.

TECHNIQUE

360 m^2 was sprayed with 1.2 kg a.i. ha^{-1} picloram in November 1978 and another 360 m^2 in March 1979. Soil sampling followed 1, 2, 4, 6, 8 and 10 weeks later at both sites. At the same time the depth of the dead roots was recorded. These figures provide information on picloram movement in the plant (see Table VI).

At each sampling three 2 m deep holes were dug on the treated site and one on the control. Using a 15 cm auger the soil from each 15 cm was separately potted and three soya beans were planted in each pot as indicator plants.

TABLE V. Detailed rain recording during the bioassay test period

Date	mm	Date	mm
3.11 - 10.11	18.6	2.3 - 9.3	6.6
11.11 - 17.11	14.0	10.3 - 16.3	2.0
18.11 - 24.11	27.4	17.3 - 23.3	0
25.11 - 1.12	1.0	24.3 - 30.3	0
2.12 - 8.12	7.6	31.3 - 5.4	2.0
9.12 - 22.12	0	6.4 - 19.4	0

TABLE VI. Picloram movement in soil and SLN plant

Weeks after spraying	After October spraying		After March spraying	
	depth (cm)		depth (cm)	
	In soil	In plant	In soil	In plant
1	15	15	45	30
2	30	45	45	45
4	45	45	60	60
6	75	60	60	60
8	100	90	60	75
10	100	90	60	75

SUMMARY

The results indicate that picloram - as Tordon 50-D - moved equally well in the soil and in the plant. However the depth reached in 10 weeks in both soil and roots is not enough to kill the SLN if the plant grows according to the data from the depth studies.

3-0-0-0 Yield studies

INTRODUCTION

It was assumed that SLN will reduce yields of grain crops. To assess the effect, wheat yield studies were conducted in 1977/78/79.

TECHNIQUE

From wheat crops heavily infested with SLN fifty one-m^2 quadrats were harvested. Each figure in Table VII is the average of its fifty samples. The sampling was not truly randomized as SLN-free and various SLN infestations had to be included.

RESULTS

TABLE VII. Wheat yield reduction due to SLN infestation

Year	Site No.	No. of SLN/ 10 m^{-2}	Wheat yield kg ha	SLN-free wheat yield kg ha	Yield reduction %
1977	1	59	725	817	11
1977	2	15	711	1254	43
1978	1	85	1920	3290	41
1978	2	171	1760	3110	43
1978	3	102	1900	3250	41
1979	1	66	1880	2900	35
1979	2	57	1850	2840	34
1979	3	86	1720	2970	42

SUMMARY

Yields, especially in 1977 were generally poor due to drought conditions, take-all and eelworm infestations. However the above figures indicate that wheat yields will be severely reduced by heavy infestations of SLN.

4-0-0-0 Toxicity in sheep - due to SLN poisoning

INTRODUCTION

On one farm in the Hopetoun district, where every single paddock is heavily infested with SLN, periodical sheep losses occurred which the farmer could not explain. After a postmortem examination a veterinary officer concluded that death was due to SLN poisoning. This diagnosis was based on the fact that SLN berries were found in dead sheep's stomach.

In 1976 three separate episodes of mortality occurred. Altogether 35 sheep died during February, March and April from a mob of 500. A number of sheep were very sick but recovered and abortion was not uncommon. The circumstances were different, involving 2,4-D ester sprayed and unsprayed SLN but always the same mob of sheep was affected. A veterinary officer from the Department of Agriculture at Horsham was contacted and with the aid of the Regional Veterinary Laboratory (R.V.L.) at Hamilton, postmortem examinations and laboratory tests, including pathological and bacteriological, were performed. It was concluded that death was due to poisoning but that the symptoms were different to that of heliotrope poisoning. Controlled tests were then organized by the Crown Lands Department at Hopetoun in conjunction with the R.V.L. at Hamilton.

TECHNIQUE

An area of SLN was sprayed with 2,4-D ester at 1.2 kg ha^{-1}. The stem, fruit and leaves from the sprayed plants were harvested twice weekly. At the same time samples were harvested from unsprayed SLN. Two sheep were fed with the collected material at the R.V.L. at Hamilton. Twenty sheep purchased by the Crown Lands Department had been put in the same paddock, where death occurred earlier. Periodical blood sampling and postmortem examinations followed.

RESULTS

Large quantities of 2,4-D treated and untreated SLN plant material fed to sheep did not induce pathological symptoms as toxicity could not be induced. Blood tests and autopsies on dead sheep did not reveal any toxicity.

SUMMARY

Under controlled conditions sheep death could not be induced by feeding SLN plants with neither 2,4-D sprayed nor unsprayed plants.

5-0-0-0 Field trials

The field trials will be discussed according to the aim they were designed for. It will be stated how many trials yielded the presented results.

5-1-0-0 Screening trials

INTRODUCTION

Promising chemicals were usually tested at two different times of the year, most at four rates but only with one replication. If the performance proved to be promising, more detailed trials followed.

5-1-1-0 List of results of chemicals screened

TECHNIQUE

The chemicals were screened on 9 m^2 plots but the presented figures correspond to 10 m^2 infestation for uniformity. All plots were sprayed with the mistifier unit.

RESULTS

TABLE VIII. List and results of chemicals tested which did not provide adequate control

Chemical	Rate kg a.i. ha^{-1}	Time of spraying	No. of SLN 10 m^2 Day before spraying	No. of SLN 10 m^2 1 Year after spraying	Time of spraying	No. of SLN 10 m^2 Day before spraying	No. of SLN 10 m^2 1 Year after spraying
Dowco 290 (Lontrel)	0.50	Nov.74	54	71	-	-	-
	1.00	Nov.74	45	83	-	-	-
	2.00	Nov.74	54	90	-	-	-
	4.00	Nov.74	60	90	-	-	-
Control	0	-	73	53	-	-	-
Dicamba	0.25	Feb.75	26	55	-	-	-
	0.50	Feb.75	34	62	-	-	-
	1.00	Feb.75	43	69	-	-	-
	2.00	Feb.75	17	50	-	-	-
Control	0	-	32	65	-	-	-
Cyanatryn	0.50	Feb.75	32	52	-	-	-
	1.00	Feb.75	35	80	-	-	-
	2.00	Feb.75	47	92	-	-	-
	4.00	Feb.75	32	73	-	-	-
Control	0	-	46	105	-	-	-

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TABLE VIII (cont'd)

Dowco 233 (triclopyr ester)	0.50	Dec.75	132	74	-	-	-
	1.00	Dec.75	115	52	-	-	-
	2.00	Dec.75	140	57	-	-	-
	4.00	Dec.75	142	90	-	-	-
Control	0	-	117	69	-	-	-
Dowco 233 (triclopyr amine)	0.50	Dec.75	105	75	-	-	-
	1.00	Dec.75	100	90	-	-	-
	2.00	Dec.75	105	62	-	-	-
	4.00	Dec.75	109	45	-	-	-
Control	0	-	83	105	-	-	-
Dicamba	4.00	Dec.75	54	45	March 77	95	43
	8.00	Dec.76	61	26	March 77	60	53
Ban. 750 (Dicamba + 2,4-D)	4.00	Dec.76	56	22	March 77	63	51
	8.00	Dec.76	26	26	March 77	65	45
Dicamba (Banex)	10.00	Dec.76	33	27	March 77	93	39
	15.00	Dec.76	42	11	March 77	71	35
Fosamine (Krenite)	2.00	Dec.76	99	73	March 77	69	56
	4.00	Dec.76	90	30	March 77	54	43
Asulam (Asulox)	3.00	Dec.76	75	43	March 77	62	41
	6.00	Dec.76	76	30	March 77	62	51
Atrazine	3.00	Dec.76	53	55	March 77	70	90
	6.00	Dec.76	61	34	March 77	74	63
M-3972	3.00	Dec.76	67	0	March 77	77	17
	6.00	Dec.76	96	0	March 77	97	51
Dowco 233 (triclopyr amine)	3.00	Dec.76	69	25	March 77	80	66
	6.00	Dec.76	85	23	March 77	100	52
2,4-DB (Embutox)	2.00	Dec.76	103	31	March 77	81	49
	4.00	Dec.76	74	52	March 77	60	40
Hexazinone (Velpar)	3.00	Dec.76	92	5	March 77	61	32
	6.00	Dec.76	61	3	March 77	52	16
Turbutryne (Igran)	4.00	Dec.76	62	26	March 77	-	-
	8.00	Dec.76	55	26	March 77	-	-

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TABLE VIII (cont'd)

Isoproturon	3.00	Dec.76	74	32	March 77	-	-
	6.00	Dec.76	132	43	March 77	-	-
Metribuzin (Sencor)	3.00	Dec.76	109	85	March 77	97	53
	6.00	Dec.76	82	60	March 77	60	52
Vel.5026 (Ravage)	3.00	Dec.76	65	12	March 77	121	42
	6.00	Dec.76	70	12	March 77	116	54
Control	0	-	63	50	-	83	48
Control	0	-	84	63	-	70	61
Control	0	-	95	95	-	53	64
Control	0	-	85	45	-	95	65
-	-	-		2 months after	-	-	2 months after
2,4,5-T ester	0.50	Nov.77	43	40	Oct.78	13	75
	1.00	Nov.77	44	30	Oct.78	19	86
	1.50	Nov.77	40	37	Oct.78	10	34
	2.00	Nov.77	32	29	Oct.78	14	11
Control	0	-	58	80	-	10	54
2,4-DB (Embutox)	0.50	Nov.77	62	104	Oct.78	25	59
	1.00	Nov.77	58	94	Oct.78	13	66
	1.50	Nov.77	45	74	Oct.78	13	47
	2.00	Nov.77	53	49	Oct.78	20	52
Control	0	-	46	87	-	16	93
2,4-D ester	0.50	Nov.77	70	47	Oct.78	3	104
	1.	Nov.77	71	43	Oct.78	10	51
	1.50	Nov.77	81	20	Oct.78	2	51
	2.00	Nov.77	56	19	Oct.78	7	42
Control	0	-	44	80	-	21	92
-	-	-	-	1 year later	-	-	-
EL171	2.50	Dec.77	88	62	-	-	-
	5.00	Dec.77	82	62	-	-	-
	7.50	Dec.77	26	20	-	-	-
	7.50	Dec.77	22	6	-	-	-
Control	0	-	31	23	-	-	-

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TABLE VIII (cont'd)

-	-	-	-	-	-	-	4 months after
Metoxuron (Dosonex)	2.00	Feb.79	64	35	Nov.79	25	50
	3.00	Feb.79	67	40	Nov.79	27	56
	4.00	Feb.79	72	32	Nov.79	30	33
	6.00	Feb.79	60	35	Nov.79	15	25
Control	0	-	98	40	-	31	23
Dichlobenil (Casoron)	0.15	Feb.79	65	52	Nov.79	30	22
	0.30	Feb.79	65	47	Nov.79	20	8
	0.45	Feb.79	52	23	Nov.79	23	5
	0.60	Feb.79	46	18	Nov.79	47	37
Control	0	-	58	38	-	26	28
RH2919 (Goal)	1.00	Feb.79	77	38	Nov.79	62	37
	2.00	Feb.79	48	35	Nov.79	56	40
	4.00	Feb.79	44	25	Nov.79	53	57
	6.00	Feb.79	51	30	Nov.79	43	41
Control	0	-	73	47	-	16	26

SUMMARY

While there was some reduction in the number of SLN plants in response to most of the above-mentioned chemicals they did not provide good enough control for practical purposes.

5-1-2-0 Results with glyphosate

INTRODUCTION

Because of some previous experience with glyphosate two detailed trials were laid out in 1974/1975 on the Hopetoun research site and one small trial in 1976/1977 in the Red Cliffs district for demonstration purposes.

TECHNIQUE

The plot size was 9 m^2. The mistifier spray unit was used on all three trials.

5-1-2-1 Glyphosate timing trial: These were laid out in November 1974 - December 1974 - January 1975 - February 1975 - March 1975 and April 1975, to cover the entire SLN growing season. The volume rate used was 1500 L ha^{-1}.

5-1-2-2 Glyphosate with different water rates: In this trial a chemical rate of 2 kg a.i. ha^{-1} was applied using four volume rates of 200, 400, 800 and 1600 L ha^{-1} to determine their influence on the glyphosate performance.

5-1-2-3 Glyphosate for demonstration: The only trial which was not laid out on the Hopetoun research site, was in the Red Cliffs district and later a field day was held at the site of these plots.

RESULTS

5-1-2-0

TABLE IX. Results with glyphosate

Time of application	Rate kg a.i. ha^{-1}	Water rate L ha^{-1}	No. of SLN 10 m^{-2} Day before spraying	No. of SLN 10 m^{-2} December 1975
5-1-2-1				
Nov.1974	2	1500	60	66
	4	"	61	58
	no treatment	-	56	78
Dec.1974	2	"	55	72
	4	"	70	56
	no treatment	-	68	83

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TABLE IX (cont'd)

Jan.1975	2	1500	55	63
	4	"	54	75
	no treatment	-	46	82
Feb.1975	2	1500	38	65
	4	"	60	76
	no treatment	-	47	57
March 1975	2	1500	27	85
	4	"	27	62
	no treatment	-	43	47
April 1975	2	1500	40	84
	4	"	28	77
	no treatment			
5-1-2-2				
Nov.1974	2	200	70	85
	2	400	72	85
	2	800	62	84
	2	1600	57	72
	no treatment	-	84	87
5-1-2-3				March 1978
Nov.1976	2	1500	25	15
	4	"	18	9
	no treatment	-	26	5
Feb.1977	2	1500	20	13
	4	"	17	6
	no treatment	-	11	7

SUMMARY

5-1-2-1)
5-1-2-2)
5-1-2-3) Glyphosate failed to significantly reduce the numbers of SLN plants under all conditions and at all rates tested. After initially burning the topgrowth off, the plants soon recovered, flowered and set seed in the same season.

5-1-3-0 Results with Bromacil as 'Hyvar X' and 'XL'

5-1-3-1

5-1-3-2

INTRODUCTION

Bromacil liquid (Hyvar XL) and powder (Hyvar X) formulations gave sufficiently promising results as to justify detailed studies.

TECHNIQUE

Starting in May 1977 a trial was laid out every month for a year to find the optimum time of application. Four rates of the chemical were used every month. Plot size was 9 m^2. The chemical was applied with the mistifier spray unit. First counts were taken on the day before spraying, followed by monthly counts.

5-1-3-1

5-1-3-2

TABLE X. Results with Bromacil as 'Hyvar X' and 'XL'

Time of application	Hyvar XL kg a.i. ha^{-1}	No. of SLN 10 m^{-2}	
		day before spraying	October 1978
5-1-3-1 Bromacil as 'Hyvar XL' (liquid)			
May 1977	2	45	6
	4	35	5
	8	37	4
	16	40	4
	Untreated	35	4
June 1977	2	7	17
	4	11	9
	8	11	10
	16	7	5
	Untreated	8	2
July 1977	2	2	9
	4	1	16
	8	2	7
	16	3	11
	Untreated	3	4

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TABLE $\overline{X}$ (cont'd)

August 1977	2	0	8
	4	0	12
	8	0	8
	16	0	6
	Untreated	0	2
September 1977	2	0	7
	4	0	14
	8	0	13
	16	0	14
	Untreated	0	5
October 1977	2	2	16
	4	2	22
	8	2	14
	16	2	13
	Untreated	4	4
November 1977	2	35	20
	4	40	19
	8	35	23
	16	47	24
	Untreated	41	6
December 1977	2	54	18
	4	51	18
	8	62	16
	16	58	7
	Untreated	55	4
January 1978	2	77	22
	4	55	23
	8	55	22
	16	58	10
	Untreated	45	6
February 1978	2	66	27
	4	77	51
	8	60	33
	16	58	31
	Untreated	72	13

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TABLE X (cont'd)

March 1978	2	55	25
	4	48	31
	8	48	27
	16	47	25
	Untreated	53	4
April 1978	2	40	35
	4	33	33
	8	11	35
	16	47	45
	Untreated	26	6

5-1-3-2 Bromacil as 'Hyvar X' (powder(and 'Hyvar XL' (liquid) comparison

Bromacil powder (Hyvar X)		October 1978	March 1979
October 1978	8	12	50
	16	10	21
	Untreated	14	80
Bromacil liquid (Hyvar XL)			
October 1978	8	10	64
	16	11	54
	Untreated	17	82

5-1-3-0

5-1-3-1

5-1-3-2

SUMMARY

The new growing season started in October while the last spraying in April was applied at the end of the SLN growing season. Counts, taken monthly from May 1977 show no significant reduction in SLN at any time or at any rate. With the new season SLN started to emerge in greater numbers on the bromacil sprayed plots than on the unsprayed controls. This was probably due to the fact that the bromacil sprayed plots were void of any other growth but SLN. The initial trial was terminated and a comparison of the powder and liquid formulation followed with no better results. There was some response to the 16 kg a.i. ha^{-1} rate but for practical purposes was not really good

enough. The long lasting sterilization of the ground and the high cost does not warrant the use of this chemical on SLN for the return of a slight reduction in density.

5-1-4-0 Results with picloram as Tordon 520

5-1-4-1

5-1-4-2

INTRODUCTION

After successful SLN control with picloram as 'Tordon 50-D', picloram was tested as 'Tordon 520' to assess its effectiveness.

TECHNIQUE

Nine m^2 plots were used and the chemical was applied with the mistifier spray unit. Good results from the screening trials in 1976 encouraged a more detailed trial in 1977/1978. 'Tordon 520' was compared with 'Tordon 50-D', each at two rates. Tests were conducted every three months for a year. Original counts were taken on the day of spraying, followed by monthly counts during the growing season for two years.

RESULTS

5-1-4-1

TABLE XI. Results with picloram as 'Tordon 520' in screening trial

Time of application	kg a.i. ha^{-1}	No. of SLN 10 m^{-2}			
		Day before spraying	January 1977	April 1977	January 1978
Jan. 1976	0.50	82	5	41	52
Jan. 1976	1.00	80	0	16	46
Jan. 1976	1.50	109	0	4	15
Jan. 1976	2.00	84	0	0	3
-	Untreated	95	60	82	93

5-1-4-2

TABLE XII. Results with picloram as 'Tordon 520' and 'Tordon 50-D'

Time of application	Picloram formulation	kg a.i. ha^{-1}	No. of SLN 10 m^{-2}		
			Day before spraying	April 1979	January 1980
Nov.1977	520	2.00	40	9	25
Nov.1977	520	3.00	50	1	6
Nov.1977	50-D	2.00	50	6	19
Nov.1977	50-D	3.00	36	1	13
-	Untreated	-	42	66	42
Feb.1978	520	2.00	76	14	22
Feb.1978	520	3.00	57	4	15
Feb.1978	50-D	2.00	22	15	27
Feb.1978	50-D	3.00	66	2	12
-	-	-	66	66	90
May 1978	520	2	12	2	17
May 1878	520	3	11	1	8
May 1978	50-D	2	12	7	17
May 1978	50-D	3	12	2	10
-	Untreated	-	15	53	31
Aug.1978	520	2	0	4	17
Aug.1978	520	3	0	1	6
Aug.1978	50-D	2	0	2	11
Aug.1978	50-D	3	0	0	8
Aug.1978	Untreated	-	-	5	33

SUMMARY

The tests show that 'Tordon 520' and 'Tordon 50-D' produce similar levels of control at the rates tested. The results also show that SLN re-infestation occurred over the short duration of the trial with the high rates used.

5-1-5-0 Results with ethidimuron (Ustilan) and terbacil (Sinbar)

INTRODUCTION

As the 1979/1980 screening trials with ethidimuron (Ustilan) and terbacil (Sinbar) provided reasonable control of SLN more detailed trials were warranted however they were not completed. Therefore only the result from the screening trial will be presented.

TECHNIQUE

Nine m^2 plots were used. Both chemicals were applied at four different rates with the Mistifier spray unit. The same screening trial was laid out at two different times during one year. Original counts were taken the day before spraying, followed by monthly counts.

RESULTS

5-1-5-0

TABLE XIII. Results with ethidimuron and terbacil

Rate kg a.i. ha^{-1}	Ethidimuron				Terbacil			
	Feb.1979 sprayed		Nov. 1979 sprayed		Feb.1979 sprayed		Nov.1979 sprayed	
	Day before spraying	One year later	Day before spraying	Three months later	Day before spraying	One year later	Day before spraying	Three months later
5	56	2	13	13	71	1	12	12
10	57	0	15	6	61	0	15	6
15	76	0	9	3	58	0	8	3
20	62	0	20	2	63	0	20	2
Un-treated	76	42	21	32	76	42	21	32

SUMMARY

By one year both chemicals provided excellent control when applied in the spring. Longer term assessments are needed to evaluate both the spring and autumn applications.

5-2-0-0 Results of optimum time and rate applications with picloram

INTRODUCTION

The following is a summary of 21 field trials, testing SLN control and possible eradication with picloram and 2,4-D. At the time the trials started it was already known that 2,4-D would provide effective cheap short-term control. However the optimum dose rate was not established or if combinations of slashing or cultivation would improve its performance.

It was also known that there was a good response to picloram applications. Some claimed, and others hoped, that eradication could be achieved with this chemical. Optimum time and rate of application, response to split applications and cultivations, were all unknown.

In all the following trials, 2,4-D is applied as ester and picloram as 'Tordon 50-D'.

None of the trials were finished as they were originally designed, as the results yielded more questions. Thus to save time the trials were changed to cover the newly emerging problems. Some trials were conducted from 1974 till 1981. All were counted every month during the SLN growing season.

Where possible the trials are grouped to cover a common aim.

5-2-1-0

5-2-2-0

INTRODUCTION

One trial was designed to assess the optimum time and rate of application with picloram. Identical trials were laid out every month for one year. The trials provided such poor SLN control that the entire trial was repeated one year later. Control was still poor and therefore repeated applications were made in an attempt to improve the picloram performance. Rates and times of the repeated applications varied in the trials.

TECHNIQUE

Plot size was 9 m^2 and there were four replications of each treatment. The first set of 5-2-1-0 trials started in November 1974 with three rates of picloram (as Tordon 50-D) 0.5-1.0-1.5 kg a.i. ha^{-1}. All these plots were resprayed with 1.0 kg a.i. ha^{-1} in December 1975 and again with another 1.0 kg a.i. ha^{-1} four years after the initial spraying, starting in March 1978 and finishing in February 1979. In April 1979 an additional 1.0 kg a.i. ha^{-1} was applied (see Table XIV). The trial was terminated in April 1981.

The second set of 5-2-2-0 trials started in January 1976, with three rates of picloram (as Tordon 50-D) 0.5-1.0-1.5 kg a.i. ha^{-1}. Respraying became necessary one year after the first application and the same rate of the original application was used. By April 1979 the number of recovering SLN plants warranted another application, and the plots were resprayed with 1.5 kg a.i. ha^{-1} (see Table XIV). The trial was terminated in February 1980.

5-2-1-0

5-2-2-0 TABLE XIV. Time and rates of picloram application

From Nov. 1974 to Oct. 1975	Dec. 1975	From March 1978 to Feb. 1979	April 1979	Total picloram
Picloram	kg a.i. ha^{-1}			
5-2-1-0				
0.5	1.0	1.0	1.0	3.5
1.0	1.0	1.0	1.0	4.0
1.5	1.0	1.0	1.0	4.5

From Jan. 1976 to Dec. 1976	From April 1977 to Dec. 1977	-	April 1979	
5-2-2-0				
0.5	0.5	-	1.5	2.5
1.0	1.0	-	1.5	3.5
1.5	1.5	-	1.4	4.5

RESULTS

The columns of total picloram applications of various dates are given to be able to assess the SLN recovery pattern before and after each re-spraying.

TABLE XV. Results of optimum time and rate applications with picloram (as Tordon 50-D)

Date of first application	Picloram kg a.i. ha^{-1}	No. of SLN $10\ m^2$ Original count	No. of SLN $10\ m^2$ Dec. 1975	Total picloram kg a.i. ha^{-1} applied by Dec. 1975	No. of SLN $10\ m^2$ March 1978	No. of SLN $10\ m^2$ February 1979	Total picloram kg a.i. ha^{-1} applied by Feb. 1979	No. of SLN $10\ m^2$ April 1979	Total picloram kg a.i. ha^{-1} applied by April 1979	No. of SLN $10\ m^2$ Jan. 1980	No. of SLN $10\ m^2$ April 1981
Nov. 1974	0.5	61	26	1.5	36	1	2.5	11	3.5	1	5
	1.0	73	14	2.0	24	1	3.0	9	4.0	1	3
	1.5	57	12	2.5	20	1	3.5	7	4.5	1	7
	Control	53	36	0	45	115	0	100	0	51	60
Dec. 1974	0.5	91	30	1.5	30	19	2.5	33	3.5	0	5
	1.0	97	21	2.0	29	20	3.0	39	4.0	0	6
	1.5	84	12	2.5	20	12	3.5	22	4.5	0	2
	Control	88	77	0	55	86	0	146	0	106	70
Jan. 1975	0.5	44	16	1.5	25	0	2.5	1	3.5	2	4
	1.0	43	10	2.0	24	0	3.0	1	4.0	1	5
	1.5	42	6	2.5	11	0	3.5	0	4.5	1	2
	Control	38	6	0	51	64	0	51	0	38	60
Feb. 1975	0.5	46	36	1.5	30	32	1.5	0	3.5	0	6
	1.0	46	13	2.0	24	35	2.0	1	4.0	0	4
	1.5	45	10	2.5	15	23	2.5	0	4.5	0	2
	Control	37	36	0	35	86	0	105	0	55	61
March 1975	0.5	30	12	1.5	38	28	2.5	21	3.5	1	4
	1.0	22	4	2.0	27	11	3.0	7	4.0	1	4
	1.5	28	3	2.5	11	7	3.5	12	4.5	0	3
	Control	25	36	0	40	140	0	76	0	84	53

5-2-1-0

TABLE IV (cont'd)

April 1975	0.4	46	35	1.5	25	2	2.5	6	3.5	0	1
	1.0	25	16	2.0	6	1	3.0	1	4.0	0	1
	1.5	35	20	2.5	4	3	3.5	1	4.5	0	1
	Control	25	87	0	76	213	0	91	0	83	53
May 1975	0.5	5	16	1.5	16	14	2.5	7	3.5	0	1
	1.0	11	19	2.0	13	13	3.0	6	4.0	0	1
	1.5	5	16	2.5	4	6	3.5	6	4.5	0	1
	Control	9	50	0	60	110	0	130	0	60	62
June 1975	0.5	3	32	1.5	40	13	2.5	6	3.5	0	2
	1.0	2	29	2.0	31	17	3.0	13	4.0	1	1
	1.5	7	15	2.5	12	6	3.5	5	4.5	1	1
	Control	4	53	0	64	107	0	74	0	57	57
July 1975	0.5	17	44	1.5	23	13	2.5	14	3.5	0	2
	1.0	25	35	2.0	7	21	3.0	9	4.0	0	1
	1.5	18	23	2.5	2	1	3.5	6	4.5	0	3
	Control	24	44	0	78	108	0	86	0	87	75
August 1976	0.5	25	11	1.5	37	20	2.5	6	3.5	1	9
	1.0	21	1	2.0	16	9	3.0	4	4.0	1	4
	1.5	20	1	2.5	8	6	3.5	2	4.5	1	6
	Control	17	36	0	56	140	0	43	0	84	79

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5-2-1-0

TABLE IV (cont'd)

Sept. 1975	0.5	22	6	1.5	24	7	2.5	11	3.5	1	4
	1.0	22	7	2.0	11	6	3.0	2	4.0	1	3
	1.5	17	4	2.5	4	3	3.5	1	4.5	0	3
	Control	17	36	-	30	203	0	43	0	22	53
Oct. 1975	0.5	17	0	1.5	10	4	2.5	9	3.5	0	2
	1.0	20	0	2.0	3	1	3.0	1	4.0	0	2
	1.5	17	0	2.5	2	1	3.5	1	4.5	1	1
	Control	11	37	0	46	52	0	95	0	60	67

5-2-2-0 The columns of total picloram applications at various dates are given to enable one to assess the SLN recovery pattern before and after each spraying.

TABLE XVI. Results of optimum time and rate applications with picloram (as Tordon 50-D)

Date of first application	Picloram kg a.i. ha^{-1}	No. of SLN 10 m^2 Original count	No. of SLN 10 m^2 April 1977	Total picloram kg a.i. ha^{-1} by Dec.1977	No. of SLN 10 m^2 Dec. 1977	No. of SLN 10 m^2 April 1979	Total picloram kg a.i. ha^{-1} by April 1979	No. of SLN 10 m^2 January 1980
Jan. 1976	0.5	46	15	1.0	6	17	2.5	0
	1.0	42	2	2.0	1	1	3.5	0
	1.5	42	2	3.0	0	1	4.5	0
	Control	36	22	0	80	29	4.5	32
Feb. 1976	0.5	66	11	1.0	4	40	2.5	0
	1.0	85	1	2.0	1	22	3.5	1
	1.5	66	1	3.0	0	5	4.5	0
	Control	68	90	0	83	110	0	52
March 1976	0.5	85	16	1.0	2	44	2.5	0
	1.0	72	2	2.0	2	13	3.5	0
	1.5	63	0	3.0	0	13	4.5	0
	Control	70	75	0	84	75	0	17
April 1976	0.5	66	6	1.0	2	40	2.5	1
	1.0	76	2	2.0	0	27	3.5	1
	1.5	66	2	3.0	0	12	4.5	0
	Control	66	76	0	97	105	0	56

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5-2-2-0

TABLE XVI (cont'd)

May 1976	0.5	47	1.0	2	52	2.5	1	0
	1.0	57	1	2.0	1	27	3.5	0
	1.5	45	1	3.0	0	13	4.5	0
	Control	36	50	0	74	94	0	52
June 1976	0.5	30	6	1.0	2	27	2.5	1
	1.0	35	3	2.0	1	18	3.5	0
	1.5	21	1	3.0	0	4	4.5	1
	Control	32	44	0	42	60	0	46
July 1976	0.5	57	10	1.0	6	62	2.5	0
	1.0	55	2	2.0	1	46	3.5	0
	1.5	54	1	3.0	0	23	4.5	0
	Control	54	75	0	80	64	0	57
August 1976	0.5	27	10	1.0	9	50	2.5	0
	1.0	30	2	2.0	1	33	3.5	0
	1.5	30	3	3.0	1	10	4.5	0
	Control	30	95	0	95	102	0	85
Sept. 1976	0.5	21	15	1.0	12	30	2.5	1
	1.0	21	4	2.0	2	11	3.5	1
	1.5	23	2	3.0	0	5	4.5	0
	Control	23	57	0	55	57	0	30

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TABLE XVI (cont'd)

October 1976	0.5	31	14	1.0	11	51	2.5	0
	1.0	30	6	2.0	3	25	3.5	0
	1.5	33	3	3.0	2	27	4.5	0
	Control	25	17	0	16	35	0	19
November 1976	0.5	34	11	1.0	3	29	2.5	1
	1.0	30	2	2.0	1	6	3.5	1
	1.5	41	1	3.0	1	21	4.5	1
	Control	30	67	0	63	63	0	57
December 1976	0.5	60	5	1.0	17	40	2.5	1
	1.0	55	6	2.0	3	24	3.5	0
	1.5	73	1	3.0	1	10	4.5	3
	Control	61	91	0	100	50	0	71

REMARKS:

By February 1980 drought and mice affected the growth of the SLN plants so much that meaningful assessments became impossible.

5-2-1-0

5-2-2-0

SUMMARY

Though the number of SLN plants are reduced, following a picloram application, recovery was noticed after repeated high rates of application. If the recovery process is left unchecked, the number of plants emerging will increase steadily. This fact is well documented in Trial No. 5-2-2-0 where after 1-2-3 kg a.i. ha^{-1} rates the control is good one year later but two years later the recovery rate became unacceptably high. These trials did not prove that picloram can eradicate SLN as at least three years are needed after the last application for a meaningful assessment. April-May seems to be the optimum time for spraying if eradication is the aim. Spraying later in the season is an advantage as respraying in the same season becomes unnecessary when high rates are applied. With late spraying flowering and seeding can become a problem which can be prevented either with repeated slashing or 2,4-D applications.

5-3-0-0 Results with split applications of picloram (as Tordon 50-D)

5-3-1-0

5-3-2-0

INTRODUCTION

The trials in this group are all split or repeated applications. The aim was to find the optimum time and rate for the most effective SLN control or possible eradication.

5-3-1-0

TECHNIQUE

This trial started in November 1974 and was terminated in February 1980. Plot size was 9 m^2 and counts were taken for the entire plot. There were four replications per treatment. The trial was repeated every three months for a year (1974/75). Plots were sprayed with the mistifier spray unit. In 1975/76 plots were resprayed whenever new rosettes emerged. By January 1977 the SLN recovery was so high that all plots were treated with an additional 1.0 kg a.i. ha^{-1} picloram. A standard rate of 1.5 kg a.i. ha^{-1} picloram was chosen and sprayed only once except for the final 1.0 kg a.i. ha^{-1} picloram. The results from all other treatments were compared with the results of the standard rate.

Treatments of picloram (as Tordon 50-D):

1974/75	1975/76
0.25 kg a.i. ha^{-1}	whenever new rosettes emerged
0.25 " " " x 2	" " " "
0.25 " " " x 3	" " " "
0.25 " " " x 4	" " " "
0.50 kg a.i. ha^{-1}	" " " "
0.50 " " " x 2	" " " "
1.00 kg a.i. ha^{-1}	" " " "
1.00 " " " + 0.50 " " "	" " " "
1.50 " " "	as standard plot, one application, without repeat.

5-3-2-0

TECHNIQUE

This trial started in February 1977 and was terminated in February 1980. It consisted of three independent trials. Plot size was 60 m^2 but only the middle 10 m^2 was counted. The original rates and the rates of the repeated applications were always the same, the difference was in the timing of the repeated applications. A tractor mounted boom was used for spraying.

TRIALS:

5-3-2-1 Resprayed whenever new rosettes emerged.

5-3-2-2 Resprayed every three months for a year and afterwards whenever new rosettes emerged.

5-3-2-3 Resprayed after one month and afterwards whenever new rosettes emerged.

Treatments of picloram (as Tordon 50-D):

kg a.i. ha^{-1}	kg a.i. ha^{-1}	kg a.i. ha^{-1}
0.30 + 0.30	0.50 + 0.30	1.00 + 0.30
0.30 + 0.50	0.50 + 0.50	1.00 + 0.50
0.30 + 1.00	0.50 + 1.00	1.00 + 1.00

1.2 kg a.i. ha^{-1} was included as a standard, without respraying and results from the split applications were compared with it.

Final results were disappointing with all combinations.

5-3-1-0

RESULTS

TABLE XVII. Results with split application of picloram (as Tordon 50-D)

Date of first application	Picloram kg a.i. ha^{-1}	No. of SLN 10 m^2 Original count	No. of SLN 10 m^2 Jan. 1977	Total picloram kg a.i. ha^{-1} by March 1977	No. of SLN 10 m^2 January 1980
Nov. 1974	0.25	39	62	1.25	26
	0.25 x 2	63	40	1.50	30
	0.25 x 3	59	6	1.75	29
	0.25 x 4	43	3	2.00	27
	0.50	62	53	1.50	34
	0.50 x 2	40	12	2.00	23
	1.00	25	24	2.00	23
	1.00 + 0.50	36	4	2.50	17
	1.50	35	14	2.50	24
	No treatment	40	72	0	80
Feb. 1975	0.25	30	38	1.25	22
	0.25 x 2	30	17	1.50	17
	0.25 x 3	30	5	1.75	13
	0.25 x 4	33	1	2.00	5
	0.50	23	30	1.50	16
	0.50 x 2	16	1	2.00	7
	1.00	17	19	2.00	17
	1.00 + 0.50	21	1	2.50	7
	1.50	30	14	2.50	15
	No treatment	23	43	0	55
May 1975	0.25	20	67	1.25	56
	0.25 x 2	24	15	1.50	40
	0.25 x 3	17	7	1.75	36
	0.25 x 4	22	1	2.00	40
	0.50	17	64	1.50	46
	0.50 x 2	24	12	2.00	40
	1.00	22	51	2.00	36
	1.00 + 0.50	17	4	2.50	33
	1.50	15	17	2.50	24
	No treatment	22	70	0	71

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5-3-1-0

TABLE XVII (cont'd)

August 1975	0.25	21	51	1.25	23
	0.25 x 2	12	8	1.50	13
	0.25 x 3	25	3	1.74	23
	0.25 x 4	20	1	2.00	19
	0.50	24	27	1.50	17
	0.50 x 2	11	1	2.00	6
	1.00	27	7	2.00	13
	1.00 + 0.50	26	0	2.50	6
	1.00	27	7	2.00	13
	1.00 + 0.50	26	0	2.50	6
	1.50	15	2	2.50	9
	No treatment	17	40	0	53

COMMENTS:

Better results in some months or at some rates are due to counts taken soon after respraying.

The difference disappeared for all practical purposes by January 1980.

5-3-2-0

5-3-2-1; 5-3-2-2; 5-3-2-3

TABLE XVIII. Results with split applications of picloram (as Tordon 50-D)

Feb. 1977	Mar. 1977	May 1977	Aug. 1977	Nov. 1977	Dec. 1977	Jan. 1978	Feb. 1978	Mar. 1978	Nov. 1978	Dec. 1978	Feb. 1979	Mar. 1979	Total Tordon 50-D	No. of SLN 10 m^2			
Picloram (as Tordon 50-D) kg a.i. ha^{-1}														Original count Feb. 1977	Feb. 1978	Feb. 1979	Feb. 1980
5-3-2-1																	
0.30	-	-	-	0.30	0.30	-	-	0.30	-	0.30	0.30	-	1.80	44	12	10	15
0.30	-	-	-	0.50	0.50	-	-	0.50	-	0.50	0.50	-	2.80	42	8	3	9
0.30	-	-	-	1.00	1.00	-	-	1.00	-	-	1.00	-	4.30	50	3	7	6
0.50	-	-	-	0.30	0.30	-	-	0.30	-	0.30	0.30	-	2.00	41	8	3	15
0.50	-	-	-	0.50	-	-	-	0.50	-	0.50	0.50	-	2.50	41	7	1	10
0.50	-	-	-	1.00	-	-	-	1.00	-	-	1.00	-	3.50	40	5	6	5
1.00	-	-	-	-	0.30	-	-	0.30	-	0.30	0.30	-	2.20	40	3	3	12
1.00	-	-	-	-	-	-	-	0.50	-	0.50	0.50	-	3.00	45	6	3	11
1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	-	4.00	54	3	2	6
1.20	-	-	-	-	-	-	-	-	-	-	-	-	1.20	43	5	19	16
0	-	-	-	-	-	-	-	-	-	-	-	-	-	46	27	48	29

../

5-3-2-0

TABLE XVIII (cont'd)

5-3-2-2																	
0.30	-	0.30	0.30	0.30	-	-	-	0.30	0.30	-	0.30	-	2.10	36	7	6	12
0.30	-	0.50	0.50	0.50	-	-	-	0.50	0.50	0.50	0.50	-	3.80	36	1	4	14
0.30	-	1.00	1.00	1.00	-	-	-	-	-	-	-	1.00	4.30	47	0	1	8
0.50	-	0.30	0.30	0.30	-	-	-	0.30	0.30	-	0.30	-	2.30	38	5	5	12
0.50	-	0.50	0.50	0.50	-	-	-	-	0.50	-	0.50	-	3.00	42	0	4	12
0.50	-	1.00	1.00	1.00	-	-	-	-	-	-	1.00	-	4.50	38	0	4	6
1.00	-	0.30	0.30	0.30	-	-	-	-	0.30	-	0.30	-	2.50	39	1	4	12
1.00	-	0.50	0.50	0.50	-	-	-	-	-	-	0.50	-	3.00	46	1	6	13
1.00	-	1.00	1.00	1.00	-	-	-	-	-	-	1.00	-	5.00	44	0	3	6
1.20	-	-	-	-	-	-	-	-	-	-	-	-	1.2	39	13	14	22
0	-	-	-	-	-	-	-	-	-	-	-	-	-	33	26	40	27
5-3-2-3																	
0.30	0.30	-	-	-	-	-	0.30	-	0.30	-	0.30	-	1.50	24	12	3	13
0.30	0.50	-	-	-	-	-	0.50	-	0.50	-	0.50	-	2.30	32	8	4	12
0.30	1.00	-	-	-	-	-	1.00	-	1.00	-	1.00	-	4.30	24	5	2	8
0.50	0.30	-	-	-	-	-	0.30	-	-	0.30	0.30	0.30	2.00	22	11	3	10
0.50	0.50	-	-	-	-	-	0.50	-	0.50	-	0.50	-	2.50	32	8	2	12
0.50	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	3.50	25	2	1	2
1.00	0.30	-	-	-	-	-	0.30	-	-	0.30	0.30	-	2.20	26	5	3	11
1.00	0.50	-	-	-	-	-	-	0.50	-	0.50	-	0.50	3.00	25	3	1	4
1.00	1.00	-	-	-	-	-	-	-	1.00	-	-	1.00	4.00	25	1	1	7
1.20	-	-	-	-	-	-	-	-	-	-	-	-	1.20	27	5	12	21
0	-	-	-	-	-	-	-	-	-	-	-	-	-	22	22	18	26

REMARKS:

Counts were taken monthly, when it coincided with respraying, they were taken before it.

5-3-1-0

5-3-2-0

SUMMARY

These trials are most disappointing with the most depressing results as eradication was not achieved with any of the combinations. While in trial 5-3-1-0 the picloram rates used were low the same certainly cannot be said of trial 5-3-2-0. All possible combinations of the repeated applications failed completely to suppress the growth of this weed. In trial 5-3-2-2 where picloram was applied at 1 kg a.i. ha^{-1} rate five times, 6 SLN 10 m^2 recovered by one year after the fifth application.

Trials 5-3-2-1, 5-3-2-2 and 5-3-2-3 had to be terminated only one year after the last application. However by then recovery was evident so there is no reason to believe that this trend would have reversed itself during the second year. All the observations from all the trials have shown that the number of recovering SLN continue to rise with time. The obvious conclusion from the split application trials must be that while a picloram application will result in good control, it fails to eradicate SLN.

The same conclusion is reinforced with the results from trial No. 5-2-2-0.

5-4-0-0 Results with picloram (as Tordon 50-D) and 2,4-D ester in cultivation and cropping trials

5-4-1-0
5-4-2-0
5-4-3-0

INTRODUCTION

The trials were designed to find the best and most economical way to control SLN during the fallowing period. Instead of terminating the trials after harvest, they were all changed for continued use with repeated picloram applications to collect more information on the performance of this chemical.

5-4-1-0
5-4-2-0
5-4-3-0

TECHNIQUE

Plot size was 60 m^2 but counts were taken only on the middle 10 m^2. All work was performed by tractor. Cropping was included only to assess its effect on SLN control and not for yield studies.

5-4-1-0

Two trials made up this experiment. One trial initiated in November 1974 was terminated in February 1980. The other started in August 1975 and continued till March 1980. Slashing, cultivation, 2,4-D and different spraying rates of picloram were compared in all possible combinations on SLN control.

5-4-2-0

Five trials are included in this group. This experiment aimed to determine the effect of cultivation, combined with spraying 2,4-D and different rates of picloram. The first trial started in November 1974 and all were terminated in January or February 1980.

5-4-3-0

Two trials, one starting on pasture, the other on fallow aimed to determine the effect of different times of spraying 2,4-D and repeated sprayings of different rates of picloram on SLN control. Both these trials started in November 1975 with exactly the same treatments. The last picloram spraying was in February 1979 and both trials were terminated in April 1981.

5-4-1-0

5-4-1-1

5-4-1-2

RESULTS

TREATMENTS:

1. Slashing - repeated as necessary.
2. Slashing and 2,4-D at 1.2 kg a.i. ha^{-1} - repeated as necessary.
3. Slashing and picloram (as Tordon 50-D) at 0.3 kg a.i. ha^{-1} - repeated as necessary.
4. Cultivation - repeated as necessary.
5. Cultivation and 2,4-D at 1.2 kg a.i. ha^{-1} - repeated as necessary.
6. Cultivation and picloram (as Tordon 50-D) at 0.3 kg a.i. ha^{-1} - repeated as necessary.
7. 2,4-D at 1.2 kg a.i. ha^{-1} - repeated as necessary.
8. Picloram (as Tordon 50-D) at 0.3 kg a.i. ha^{-1} - repeated as necessary.
9. No treatment.

5-4-1-1: wheat was sown in May 1975 and harvested in December 1975.

5-4-1-2: wheat was sown in May 1976 and harvested in December 1976.

Both trials were changed after harvest to allow repeated picloram applications. Fallowing and cropping continued in a three-year rotation.

5-4-1-1

TABLE XIX. Results with slashing, cultivation, 2,4-D and picloram applications

Treatment No.	SLN 10 m^2 original count Nov.1974	Number of				SLN 10 m^2 after harvest Dec. 1975	No. of picloram applications			SLN 10 m^2 February 1979
		Slash-ings	Cultiv-ations	2,4-D ester 1.2 kg a.i.ha^{-1} applic'n	Picloram 0.3 kg a.i. ha^{-1} applic'n		0.3 kg a.i. ha^{-1}	1.2 kg a.i. ha^{-1}	Total picloram kg a.i. ha^{-1} by March 1979	
1	13	3	-	-	-	7	3	1	2.1	4
2	14	1	-	2	-	7	3	1	2.1	4
3	12	2	-	-	2	1	4	1	3.0	3
4	12	-	3	-	-	14	3	1	2.1	7
5	14	-	2	2	-	14	3	1	2.1	4
6	12	-	2	-	2	1	4	1	3.0	4
7	20	-	-	2	-	12	3	1	2.1	2
8	19	-	-	-	2	0	3	1	2.7	2
9	15	-	-	-	-	26	0	0	0	23

REMARKS:

Last picloram application in March 1979 at 0.3 kg a.i. ha^{-1}.

5-4-1-2

TABLE XIX (cont'd)

Treatment No.	SLN 10 m^2 original count Aug. 1975	Number of Slash-ings	Cultiv-ations	2,4-D ester 1.2 kg $a.i.ha^{-1}$ applic'n	Picloram 0.3 kg $a.i.ha^{-1}$ applic'n	SLN 10 m^2 after harvest Dec. 1976	No. of picloram applications 0.3 kg $a.i.\ ha^{-1}$	1.2 kg $a.i.\ ha^{-1}$	Total picloram kg $a.i.\ ha^{-1}$ by March 1979	SLN 10 m^2 March 1980
1	17	5	-	-	-	11	5	0	1.5	3
2	20	2	-	3	-	10	5	0	1.5	3
3	28	2	-	-	3	1	4	0	2.1	3
4	8	-	6	-	-	13	5	0	1.5	5
4	19	-	3	3	-	15	5	0	1.5	2
6	8	-	3	-	3	1	4	0	2.1	2
7	18	-	-	3	-	11	5	0	1.5	2
8	28	-	-	-	3	1	5	0	2.4	2
9	30	-	-	0	0	30	0	0	0	11

REMARKS:

Last picloram application in March 1979 at 0.3 $a.i.\ ha^{-1}$.

5-4-2-0

5-4-2-1

5-4-2-2

5-4-2-3

5-4-2-4

5-4-2-5

RESULTS

5-4-2-1

TREATMENTS:

1. Picloram at 1 kg a.i. ha^{-1} repeated as required, followed with cultivation.
2. Cultivation 4 weeks before picloram at 1 kg a.i. ha^{-1}.
3. Cultivation 4 weeks after picloram at 1 kg a.i. ha^{-1}.
4. Picloram at 1 kg a.i. ha^{-1} repeated as required, no cultivation till sowing.
5. 2,4-D ester at 1.2 kg a.i. ha^{-1}, repeated as required followed with cultivation.
6. Cultivation 4 weeks before 2,4-D ester at 1.2 kg a.i. ha^{-1}.
7. Cultivation 4 weeks after 2,4-D ester at 1.2 kg a.i. ha^{-1}.
8. 2,4-D ester at 1.2 kg a.i. ha^{-1} repeated as required, no cultivation till sowing.
9. Cultivation only.

All plots were sown to wheat in May 1975 and harvested in December 1975. After the harvest the trial was changed to a repeated application trial (with picloram as Tordon 50-D) and cropping continued in a three-year rotation.

5-4-2-1

TABLE XX. Results with different timing of cultivation combined with 2,4-D ester and picloram (as Tordon 50-D) application

Treatment No.	SLN 10 m^2 Original count Nov. 1974	picloram kg a.i. ha^{-1} Nov. 1974	Dec. 1974	Feb. 1975	Mar. 1975	Total	SLN 10 m^2 after harvest Dec. 1975	picloram kg a.i. ha^{-1} Dec. 1975	Dec. 1976	Feb. 1978	Jan. 1979	Total	No. of SLN 10 m^2 January 1979	January 1980
1	11	-	1.0	-	-	1.0	0	-	1.0	-	1.0	3.0	2	0
2	14	-	1.0	-	1.0	2.0	0	-	1.0	-	1.0	4.0	1	0
3	13	-	1.0	1.0	-	2.0	0	-	-	-	1.0	3.0	6	0
4	17	1.0	-	-	1.0	2.0	0	-	-	-	1.0	3.0	6	1
5	11	-	-	-	-	-	10	1.0	1.0	-	1.0	3.0	2	0
6	16	-	-	-	-	-	6	1.0	-	1.0	1.0	3.0	4	2
7	14	-	-	-	-	-	10	1.0	1.0	-	1.0	3.0	2	1
8	12	-	-	-	-	-	6	1.0	-	1.0	1.0	3.0	1	0
9	11	-	-	-	-	-	10	-	-	-	-	-	21	18

REMARKS:

SLN recovery started one year after the January 1978 picloram application. Recovery was not so marked after the January 1979 application as by January 1980 the drought and mice effect became obvious.

5-4-2-2

RESULTS

TREATMENTS:

1. 2,4-D ester at 1.2 kg a.i. ha^{-1} repeated spraying.
2. 2,4-D ester at 1.2 kg a.i. ha^{-1} on fallow - repeated fallowing.
3. 2,4-D ester at 1.2 kg a.i. ha^{-1} on stubble - repeated fallowing.
4. Picloram (as Tordon 50-D) at 0.6 kg a.i. ha^{-1}, repeated spraying.
5. Picloram (as Tordon 50-D) at 1.2 kg a.i. ha^{-1}, repeated spraying.
6. Picloram (as Tordon 50-D) at 0.6 kg a.i. ha^{-1} on fallow - repeated fallowing.
7. Picloram (as Tordon 50-D) at 1.2 kg a.i. ha^{-1} on fallow - repeated fallowing.
8. Picloram (as Tordon 50-D) at 0.6 kg a.i. ha^{-1} on stubble - repeated fallowing.
9. Picloram (as Tordon 50-D) at 1.2 kg a.i. ha^{-1} on stubble - repeated fallowing.
10. Fallowing only.
11. No treatment, no cropping.

Wheat was sown for the first time in May 1976 and harvested in December 1976. To collect more information on picloram performance the trial was changed after harvest to allow respraying when necessary. Cropping continued on a three-year rotation.

TABLE XXI. Results with different timing of cultivation combined with 2,4-D ester and picloram (as Tordon 50-D) application

Treatment No.	SLN 10 m^2 original count Nov. 1975	2,4-D picloram kg a.i. ha^{-1} Nov. 1975	2,4-D picloram kg a.i. ha^{-1} Mar. 1976	SLN 10 m^2 after harvest Jan. 1977	Picloram kg a.i. ha^{-1} Jan. 1977	Picloram kg a.i. ha^{-1} Feb. 1977	SLN 10 m^2 Apr. 1977	SLN 10 m^2 Jan. 1978	Picloram kg a.i. ha^{-1} Jan. 1978	SLN 10 m^2 Jan.1979	Picloram kg a.i. ha^{-1} Jan. 1979	Total picloram kg a.i. ha^{-1} Jan.1978-1979	SLN 10 m^2 Jan. 1980
1	20	1.2 1.2 1.2	0	8	1.2	-	3	5	0.6	8	1.2	3.0	1
2	14	1.2	0	15	1.2	0	3	2	0.6	8	1.2	3.0	0
3	20	1.2	0	16	1.2	0	2	6	0.6	11	1.2	3.0	2
4	19	0	0.6 0.6	1	0	1.2	2	3	0.6	6	1.2	4.2	1
5	21	0	1.2	1	0	1.2	2	0	0	5	1.2	3.6	0
6	13	0	0.6	2	0	1.2	2	1	0	9	1.2	3.6	0
7	11	0	1.2	1	0	1.2	2	0	0	4	1.2	3.6	0
8	18	0	0.6	1	0	1.2	3	4	0.6	5	1.2	3.6	1
9	25	0	1.2	1	0	1.2	1	3	0.6	10	1.2	4.2	0
10	10	0	0	22	0	0	21	29	0	24	-	=	19
11	22	0	0	21	0	0	42	34	0	33	0	-	22

REMARKS:

The low SLN recovery is most likely due to the fact that only one year elapsed between counting and the last picloram application. Early 1980 was the year of the drought and mice plague.

5-4-2-3

RESULTS

TREATMENTS:

1. Cultivation 4 weeks before picloram (as Tordon 50-D) at 0.5 kg a.i. ha^{-1}.
2. Cultivation 2 weeks before picloram (as Tordon 50-D) at 0.5 kg a.i. ha^{-1}.
3. Cultivation 4 weeks after picloram (as Tordon 50-D) at 0.5 kg a.i. ha^{-1}.
4. Cultivation 2 weeks after picloram (as Tordon 50-D) at 0.5 kg a.i. ha^{-1}.
5. Picloram (as Tordon 50-D) at 0.5 kg a.i. ha^{-1} - no cultivation.
6. Cultivation only.
7. No treatment, no cultivation, no cropping.

The plots were sown with wheat in May 1975 and harvested in December 1975. To collect more information on picloram performance the trials were changed after harvest to allow on all treatments respraying when necessary. Cropping continued on a three-year rotation.

5-4-2-3

TABLE XXII. Results with different timing of cultivation regarding picloram (as Tordon 50-D) application

Treatment No.	SLN 10 m^2 original count Nov.1974	Pic.* Dec. 1974	SLN 10 m^2 Dec. 1975	SLN 10 m^2 Feb. 1976	Pic.* Feb. 1976	SLN 10 m^2 Apr. 1976	SLN 10 m^2 Jan. 1977	Pic.* Jan. 1977	SLN 10 m^2 Mar. 1977	Pic.* Mar. 1977	SLN 10 m^2 Jan. 1978	Pic.* Jan. 1978	SLN 10 m^2 Apr. 1978	SLN 10 m^2 Dec. 1978	Pic.* Dec. 1978	SLN 10 m^2 Mar.1978	Pic.* Mar.1978	Total Pic.*	SLN 10 m^2 Nov. 1979	SLN 10 m^2 Feb. 1980
1	23	0.5	1	6	0.5	5	3	0.5	8	0.5	6	0.5	5	5	0.5	2	0.5	3.5	0	3
2	22	0.5	0	6	0.5	5	2	0.5	12	0.5	3	0.5	6	4	0.5	1	0.5	3.5	0	2
3	22	0.5	1	4	0.5	6	2	0.5	6	0.5	2	0.5	4	2	0.5	1	0.5	3.5	0	2
4	21	0.5	1	5	0.5	4	4	0.5	7	0.5	6	0.5	7	7	0.5	2	0.5	3.5	0	2
5	30	0.5	0	9	0.5	8	2	0.5	11	0.5	8	0.5	5	8	0.5	1	0.5	3.5	0	3
6	24	0	15	33	0	32	30	0	20	0	21	0	21	34	0	27	0	0	33	17
7	20	0	14	44	0	30	28	0	30	0	26	0	26	34	0	28	0	0	26	22

*Picloram kg a.i. ha^{-1}.

5-4-2-4

TREATMENTS:

1. August 1975 application of picloram (as Tordon 50-D) at 0.6 kg a.i. ha^{-1}.
2. September 1975 application of picloram (as Tordon 50-D) at 0.6 kg a.i. ha^{-1}.
3. October 1975 application of picloram (as Tordon 50-D) at 0.6 kg a.i. ha^{-1}.
4. November 1975 application of picloram (as Tordon 50-D) at 0.6 kg a.i. ha^{-1}.
5. December 1975 application of picloram (as Tordon 50-D) at 0.6 kg a.i. ha^{-1}.
6. January 1976 application of picloram (as Tordon 50-D) at 0.6 kg a.i. ha^{-1}.
7. February 1976 application of picloram (as Tordon 50-D) at 0.6 kg a.i. ha^{-1}.
8. March 1976 application of picloram (as Tordon 50-D) at 0.6 kg a.i. ha^{-1}.
9. Fallowing only.
10. No treatment, no fallowing.

Plots were fallowed for the first time in December 1975 and fallowing continued till sowing as it became necessary. Wheat was sown in May 1976. To collect more information on picloram performance at various rates and times, the trial was changed after harvest to allow all treatments to be resprayed with picloram when necessary. Cropping continued on a three-year rotation.

5-4-2-4

TABLE XXIII. Results with different timing of cultivation regarding picloram (as Tordon 50-D) application

Treatment No.	Time of first applic'n of picloram (0.6 kg a.i. ha^{-1})	SLN 10 m^2 at spraying	SLN 10 m^2 Apr. 1976	after harvest 1977	Pic.* Jan. 1977	Pic.* Feb. 1977	Pic.* Apr. 1977	SLN 10 m^2 Apr. 1977	SLN 10 m^2 Dec. 1977	Pic.* Dec. 1977	SLN 10 m^2 Feb. 1978	Pic.* Feb. 1978	SLN 10 m^2 March 1979	Pic.* March 1979	Total pic.* 1975-1979	SLN 10 m^2 Feb. 1980
1	Aug.1975	16	8	15	0.6	0	0	3	7	0.6	6	0.6	9	0.6	3.0	0
2	Sep.1975	8	6	5	0.6	0	0	3	5	0.6	3	0.6	10	0.6	3.0	1
3	Oct.1975	13	2	5	0.6	0	0	1	6	0.6	2	0.6	5	0.6	3.0	0
4	Nov.1975	15	10	6	0.6	0	0	10	9	0.6	6	0.6	11	0.6	3.0	0
5	Dec.1975	25	8	1	0	0.6	0	3	5	0.6	3	0.6	8	0.6	3.0	1
6	Jan.1976	32	9	1	0	0.6	0	2	2	0.6	2	0.6	7	0.6	3.0	0
7	Feb.1976	28	25	1	0	0	0.6	4	2	0.6	3	0.6	8	0.6	3.0	0
8	Mar.1976	38	21	1	0	0	0.6	10	2	0.6	3	0.6	7	0.6	3.0	0
9	-	62	12	18	0	0	0	27	23	0	23	0	28	0	0	20
10	-	25	33	30	0	0	0	31	23	0	23	0	30	0	0	22

*Picloram kg a.i. ha^{-1}.

REMARKS:

Last picloram application March 1979 at 0.6 kg a.i. ha^{-1}.

5-4-2-5

RESULTS

This trial was a brief study on cultivation effect on SLN recovery after picloram (as Tordon 50-D) was applied at 1.2 kg a.i. ha^{-1}.

The area was sprayed in February 1975 and cultivated in February 1975 - July 1975 - October 1975 - November 1975. By March 1976 on the cultivated area 31 SLN 10 m^2 recovered compared to 5 SLN 10 m^2 on the uncultivated land.

5-4-2-1

5-4-2-2

5-4-2-3

5-4-2-4

5-4-2-5

SUMMARY

The trials as originally designed yielded no practical differences between slashing or cultivation at different times. Combining, slashing or cultivation with 2,4-D or picloram application, yielded no better SLN control than when the chemicals were used alone. Picloram at 0.3 kg a.i. ha^{-1} applied 2-3 times during the fallowing period gave excellent SLN control which lasted till after harvest.

All the trials in this group had to be terminated about one year after the last application of picloram. Therefore eradication cannot be claimed with any of the treatments as three years are needed after the last application before firm conclusions can be drawn. The pattern of a slow SLN recovery is already quite obvious.

5-4-3-0

5-4-3-1

5-4-3-2

RESULTS

TREATMENTS:

1. 2,4-D ester at 1.2 kg a.i. ha^{-1} applied in November - repeated as necessary.
2. 2,4-D ester at 1.2 kg a.i. ha^{-1} applied in November and picloram (as Tordon 50-D) at 1.2 kg a.i. ha^{-1} in December.
3. 2,4-D ester at 1.2 kg a.i. ha^{-1} applied in November and picloram (as Tordon 50-D) at 1.2 kg a.i. ha^{-1} applied in January.
4. 2,4-D ester at 1.2 kg a.i. ha^{-1} applied in November and picloram (as Tordon 50-D) at 1.2 kg a.i. ha^{-1} applied in February.
5. 2,4-D ester at 1.2 kg a.i. ha^{-1} applied in November and picloram (as Tordon 50-D) at 1.2 kg a.i. ha^{-1} applied in March.
6. Picloram (as Tordon 50-D) at 0.6 kg a.i. ha^{-1} applied in November and January.
7. Picloram (as Tordon 50-D) at 0.6 kg a.i. ha^{-1} applied in November and February.
8. Picloram (as Tordon 50-D) at 0.6 kg a.i. ha^{-1} applied in November and March.
9. Picloram (as Tordon 50-D) at 1.2 kg a.i. ha^{-1} applied in November.
10. Picloram (as Tordon 50-D) at 1.2 kg a.i. ha^{-1} applied in December.
11. Picloram (as Tordon 50-D) at 1.2 kg a.i. ha^{-1} applied in January.
12. Picloram (as Tordon 50-D) at 1.2 kg a.i. ha^{-1} applied in February.
13. Picloram (as Tordon 50-D) at 1.2 kg a.i. ha^{-1} applied in March.
14. No treatment.

5-4-3-1 Started in October 1975 on fallow and fallowing continued as it became necessary. The first wheat was sown in May 1976 and harvested in December 1976.

5-4-3-2 Started in November 1975 on pasture. Fallowing commenced in August 1976 and the first wheat crop was sown in May 1977 and harvested in December 1977.

Both trials where changed in January 1977 after harvest (5-4-3-1) to allow for repeated applications of picloram (as Tordon 50-D). Cropping continued too, on a three-year rotation. The trials were terminated in April 1981.

5-4-3-1

5-4-3-2

TABLE XXIV. Results with different timing of 2,4-D and picloram (as Tordon 50-D) application on pasture and fallow

Treatment No.	SLN 10 m^2 original count Nov.1975	Pic.* Nov. 1975	Dec. 1975	Jan. 1976	Feb. 1976	Mar. 1976	Total	SLN 10 m^2 after harvest Jan.1977	Pic.* Jan. 1977	SLN 10 m^2 Feb.1977	Pic.*	SLN 10 m^2 Feb. 1978	Pic.*	SLN 10 m^2 Jan. 1979	Pic.*	Total pic.* 1975-1979	SLN 10 m^2 Jan. 1980	Apr. 1981
5-4-3-1																		
1	11	0	0	0	0	0	0	11	1.2	2	0	12	0.6	8	1.2	3.0	1	2
2	16	0	1.2	0	0	0	1.2	1	0	4	0.6	8	0.6	8	1.2	3.6	0	1
3	16	0	0	1.2	0	0	1.2	0	0	2	0.6	5	0.6	3	1.2	3.6	0	1
4	10	0	0	0	1.2	0	1.2	1	0	3	0.6	6	0.6	4	1.2	3.6	0	3
5	7	0	0	0	0	1.2	1.2	1	0	3	0.6	6	0.6	3	1.2	3.6	1	3
6	17	0.6	0	0.6	0	0	1.2	1	0	4	0.6	7	0.6	4	1.2	3.6	0	2
7	10	0.6	0	0	0.6	0	1.2	1	0	2	0.6	5	0.6	2	1.2	3.6	0	0
8	18	0.6	0	0	0	0.6	1.2	2	0	7	0.6	8	0.6	6	1.2	3.6	1	3
9	11	1.2	0	0	0	0	1.2	1	0	2	0.6	4	0.6	2	1.2	3.6	0	2
10	10	0	1.2	0	0	0	1.2	1	0	4	0.6	7	0.6	3	1.2	3.6	1	1
11	11	0	0	1.2	0	0	1.2	0	0	4	0.6	7	0.6	3	1.2	3.6	0	3
12	15	0	0	0	1.2	0	1.2	1	0	2	0.6	3	0.6	2	1.2	3.6	0	0
13	14	0	0	0	0	1.2	1.2	0	0	1	0.6	4	0.6	5	1.2	3.6	1	7
14	17	0	0	0	0	0	0	15	0	31	0	21	0	12	0	0	19	30

*Picloram kg a.i. ha^{-1}.

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TABLE XXIV (cont'd)

Treatment No.	SLN 10 m^2 original count Nov.1975	Nov. 1975	Dec. 1975	Jan. 1976	Feb. 1976	Mar. 1976	Total	SLN 10 m^2 on fallow Jan.1977	Pic.* Jan. 1977	SLN 10 m^2 Feb. 1977	Pic.* Feb. 1977	SLN 10 m^2 March 1978	Pic.* March 1978	SLN 10 m^2 Feb. 1979	Pic.* Feb. 1979	Total pic.* 1975-1979	SLN 10 m^2 Jan. 1980	SLN 10 m^2 Apr. 1981
5-4-3-2																		
1	14	0	0	0	0	0	0	12	1.2	2	0	2	0.6	2	1.2	3.0	0	3
2	19	0	1.2	0	0	0	1.2	2	0	5	0.6	1	0.6	2	1.2	3.6	1	4
3	15	0	0	1.2	0	0	1.2	1	0	2	0.6	5	0.6	1	1.2	3.6	1	2
4	18	0	0	0	1.2	0	1.2	0	0	2	0.6	5	0.6	2	1.2	3.6	0	3
5	20	0	0	0	0	1.2	1.2	1	0	5	0.6	11	0.6	1	1.2	3.6	1	3
6	17	0.6	0	0.6	0	0	1.2	1		3	0.6	4	0.6	4	1.2	3.6	0	2
7	20	0.6	0	0	0.6	0	1.2	0	0	1	0.6	4	0.6	3	1.2	3.6	1	2
8	19	0.6	0	0	0	0.6	1.2	1	0	4	0.6	8	0.6	2	1.2	3.6	1	6
9	19	1.2	0	0	0	0	1.2	0	0	4	0.6	4	0.6	1	1.2	3.6	1	3
10	10	0	1.2	0	0	0	1.2	2	0	6	0.6	6	0.6	2	1.2	3.6	1	3
11	21	0	0	1.2	0	0	1.2	0	0	2	0.6	3	0.6	1	1.2	3.6	0	1
12	28	0	0	0	1.2	0	1.2	1	0	2	0.6	7	0.6	5	1.2	3.6	1	5
13	46	0	0	0	0	1.2	1.2	1	0	2	0.6	6	0.6	2	1.2	3.6	2	9
14	19	0	0	0	0	0	0	31	0	36	0	23	0	19	0	0	10	26

*Picloram kg a.i. ha^{-1}.

5-4-3-1

5-4-3-2

SUMMARY

The difference in the recovery pattern is mainly due to the different times of cultivation and cropping. SLN recovery one year after the last application is very slow but by the second year it increased. It can be stated with safety that in spite of 3.6 kg a.i. ha^{-1} picloram SLN recovery would continue if left unsprayed. There is no doubt that the chemical is unable to eradicate SLN. The length of control depends only on the rate applied and practically on nothing else. Even low numbers of SLN m^2 add up to a heavy infestation per hectare.

5-4-4-0 Yield results from the cropping trials

INTRODUCTION

None of the trials were designed for yield studies but only to assess the cultivation and cropping effect on picloram (as Tordon 50-D) performance. In some years and on some trials the crop was too poor to harvest, due to the high picloram rates, heavy ryegrass infestation or drought conditions.

However, even the very poor yield results show the same trend when treated and untreated plot results are compared with each other. All the picloram rates are treated as the same in the Table XXV as the rates are not compared with each other only with the untreated plots.

RESULTS

5-4-4-0

TABLE XXV. Yield results from the cropping trials

Trial No.	1977			1978			1979		
	Pic.*	Untreated	Yield loss	Pic.*	Untreated	Yield loss	Pic.*	Untreated	Yield loss
	Yield of grain kg ha^{-1}		%	Yield of grain kg ha^{-1}		%	Yield of grain kg ha^{-1}		%
5-4-1-1	-	-	-	697	400	42	-	-	-
5-4-1-2	-	-	-	-	-	-	3449	1693	51
5-4-2-1	-	-	-	418	400	17	-	-	-
5-4-2-2	-	-	-	-	-	-	1984	1637	17
5-4-2-3	222	182	16	-	-	-	-	-	-
5-4-2-4	-	-	-	-	-	-	2196	1784	19
5-4-3-1	-	-	-	-	-	-	3655	2276	38
5-4-3-2	830	398	52	-	-	-	-	-	-

*Picloram

SUMMARY

While the grain loss in itself is not very convincing for such a poor crop, together with the yield studies (see 3-0-0-0) they support the findings regarding severe yield loss due to SLN infestation.

5-5-0-0 Results with picloram (as Tordon 50-D) absorption studies in the field

5-5-0-0
5-5-1-0
5-5-2-0
5-5-3-0

INTRODUCTION

There were three trials.

5-5-1-0 and 5-5-2-0 are the same trials but laid out at two different times during the SLN growing season in March 1977 and November 1977. The aim was to assess how picloram is best absorbed. In 5-5-3-0 picloram was assessed with different sized buffer zones when applied in October 1978 - January 1979 - April 1979 - July 1979.

TECHNIQUE

5-5-1-0
5-5-2-0

Plot size was 9 m^2. The mistifier spray unit was used to apply picloram (as Tordon 50-D) at 0.5 kg a.i. ha^{-1}. As the aim was not eradication but to assess the difference between treatments the low rate was chosen for SLN recovery within a reasonable time.

5-5-3-0

Plot size was 360 m^2 where the central 9 m^2 plot was assessed and 120 m^2 in which the middle 10 m^2 was assessed. Picloram (as Tordon 50-D) was applied at the 1.2 kg a.i. ha^{-1}.

RESULTS

5-5-1-0
5-5-2-0

TREATMENTS:

1. Only the top growth was sprayed while the soil was covered with a plastic sheet.
2. Only the soil was sprayed while the top growth was covered with containers.
3. Plots were cultivated and spraying followed on the same day.
4. Both plants and soil were sprayed.
5. No treatment.

5-5-1-0

5-5-2-0

TABLE XXVI. Results with picloram (as Tordon 50-D) absorption studies in the field

Treatment sprayed with picloram 0.5 kg a.i. ha^{-1}	5-5-1-0 sprayed March 1977				5-5-2-0 sprayed November 1977			
	Original count Mar.1977	Dec. 1977	Jan. 1978	Feb. 1978	Original count Nov. 1977	Dec. 1977	Jan. 1978	Feb. 1978
	SLN 10 m^2				SLN 10 m^2			
Plant only	64	36	73	86	62	43	84	84
Soil only	53	9	22	44	72	66	40	20
Cultivated soil	51	1	10	20	56	5	11	15
Plant and soil	55	1	5	10	51	4	10	10
No treatment	64	70	92	93	71	83	92	91

5-5-2-3-

TREATMENTS:

1. 9 m^2 plot in the centre of 360 m^2
2. 9 m^2 plot in the narrow middle line of 120 m^2
3. No treatment.

5-5-2-3

TABLE XXVII. Results with picloram (as Tordon 50-D) with various buffer zones

Treatment size of buffer zone	Sprayed with picloram (as Tordon 50-D) at 1.2 kg a.i. ha^{-1}							
	Oct.1978		Jan.1979		Apr.1979		July 1979	
	Day of spraying	Jan. 1980	Day of spraying	Jan. 1980	Day of spraying	Jan. 1980	Day of spraying	Jan. 1980
	SLN 10 m^2				SLN 10 m^2			
360 m^2	3	36	37	25	40	10	6	12
120 m^2	10	35	54	26	65	9	7	15
No treatment	2	16	40	20	50	16	6	21

5-5-1-0

5-5-2-0

5-5-3-0

SUMMARY

5-5-1-0, 5-5-2-0. Results are most interesting in a number of ways as spraying the plant only is hardly better than not spraying at all. Such conditions might be found in a field with a very dense SLN stand. Cultivation is recommended before spraying, as it can be seen spraying the undisturbed soil only, while the SLN plant is not damaged did not provide as good control. Overall spraying or fallow spraying has been found to be nearly equally as good. The results confirm the bioassay test findings 2-0-0-0 that good shoot and soil (root) absorption of the chemical can be expected.

5-5-3-0. Unexpectedly success of control did not depend on the size of the surrounding buffer zone, as is the case with small patch infestations where it has been found that it is very important to spray at least a 10 m circle around such a patch otherwise plants will surface outside the sprayed area.

5-6-0-0 Results with high and low picloram (as Tordon 50-D) applications and farm management

5-6-1-0

5-6-2-1

5-6-2-2

5-6-3-0

INTRODUCTION

The aim of four trials was to assess the possibility of using high or repeated low picloram rates (as Tordon 50-D) during a three-year crop rotation period to assess the effect of cultivation and cropping on the performance of picloram in controlling a broadacre SLN infestation.

TECHNIQUE

On all four trials picloram (as Tordon 50-D) was applied with a tractor mounted boom on stubble in February.

5-6-1-0: consisted of three hectares, each ha sprayed with 1.2 kg a.i. ha^{-1} picloram, the first in 1975, the second in 1976 and the third in 1977. Recovering SLN plants were counted monthly during the growing season and spot sprayed at the same time.

5-6-2-1: plot size was 120 m^2, with four replications. The picloram rate was 1.2 kg a.i. ha^{-1}. The trial was designed for fallowing and cropping during a three-year rotation.

5-6-2-2: plot size was 60 m^2. Picloram rate was 0.1 and 0.3 kg a.i. ha^{-1} with 1.2 kg a.i. ha^{-1} included as standard. The trial was designed for fallowing and cropping during a three-year rotation.

5-6-3-0: the trial involved three farmers who each applied picloram (as Tordon 50-D) at 1.2 kg a.i. ha^{-1} on 20 ha. Recovery was monitored but no spot spraying followed the application.

RESULTS

5-6-1-0

TABLE XXVIII. Results with 1.2 kg a.i. ha^{-1} picloram (as Tordon 50-D) boom spraying, followed with spot spraying

Time of 1.2 kg a.i. ha^{-1} picloram applic'n	Months after boom spraying											Total No. of SLN/ha recovering
	11	12	13	21	22	23	24	26	33	34	37	
	No. of recovering and spot sprayed SLN/ha											
Feb.1975	900	45	652	11	43	1161	2106	28	1	15	111	5073
Feb.1976	370	203	239	3857	9317	-	6206	-	-	-	-	20192
Feb.1977	126	-	-	-	-	2038	-	-	-	-	-	2164

5-6-2-1

TABLE XXIX. Results with high picloram (as Tordon 50-D) rates in a three-year crop rotation

Time of picloram 1.2 kg a.i. ha^{-1} applic'n	No. of SLN 10 m^2			
	Original count day of spraying	April 1979	Nov. 1979	Feb. 1980
Feb.1977	74	34	28	29
Feb.1978	94	15	25	30
Feb.1979	69	1	1	3
No treatment	64	49	44	37

5-6-2-2

TABLE XXX. Results with low picloram (as Tordon 50-D rates in a three-year crop rotation

Time and rate (kg a.i. ha^{-1}) of picloram applications	No. of SLN 10 m^2				
	Feb. 1977	Feb. 1978	Feb. 1979	April 1979	Feb. 1980
Feb.1977 (0.1)	39	30	8	24	19
Feb.1977 (0.3)	32	22	12	14	14
Feb.1977 (1.2)	35	7	12	16	22
No treatment	35	26	26	20	27
Feb.1978 (0.1)	-	24	30	23	27
Feb.1978 (0.3)	-	21	10	23	22
Feb.1978 (1.2)	-	28	12	9	19
No treatment	-	21	26	20	27
Feb.1979 (0.1)	0	0	39	21	26
Feb.1979 (0.3)	-	-	35	19	25
Feb.1979 (1.2)	-	-	32	0	11
No treatment	-	-	26	20	27

5-6-3-0 Results with broadacre picloram (as Tordon 50-D) application

In February 1976 three farmers sprayed picloram (as Tordon 50-D) at the rate of 1.2 kg a.i. ha^{-1} on 20 ha of stubble. There was no regrowth on any of the paddocks by February 1977. However, digging revealed that many of the SLN roots were only dead to a depth of 15-20 cm. The expected SLN recovery started with the 1979 growing season. No spot spraying was recommended as the area involved was too big to carry it out successfully.

5-6-1-0
6-5-2-1
5-6-2-2
5-6-3-0

SUMMARY

5-6-1-0: the trial confirmed previous results regarding the SLN recovery pattern. Regrowth occurred in too great numbers for successful follow-up spot spraying on broadacres after a single application.

5-6-2-1: the same results as on 5-6-1-0 only on smaller plot size.

5-6-2-2: rates used on this trial were too low but the 1.2 kg a.i. ha^{-1} picloram rates show the same SLN recovery pattern as all the rest of the trials.

5-6-2-3: was an attempt to test the picloram effect on SLN control on a broadacre infestation applied by farmers with big machinery. The results did not differ from the ones observed on the research plots. Walking over again and again on 20 ha to find the emerging SLN plants for spot spraying was beyond practical possibilities.

6-0-0-0

EXTENSION WORK

Altogether four field days were organized on silver-leaf nightshade; three in Hopetoun district and one in the Red Cliffs district. The first was conducted in Hopetoun in 1974 to call the farmers' attention to the threat of the weed. The second field day in 1976 in Hopetoun and again in 1979 in Red Cliffs was a progress report, advising farmers on the methods of how to stop the spread of and effect of control SLN on broadacres and how to eradicate it on small infestations.

The final field day in Hopetoun in 1980 informed the farmers of all the research findings, including the positive and negative results. Pamphlets were written and updated for each of the field days which were attended by a total of 900 people.

There were, in addition, countless excursions of smaller groups and individual farmers and other research workers to the research site. Radio talks were given twice a year during the entire research period, in spring at the start of the SLN growing season and in autumn at the finish of it, warning of the threat and informing of the research results. The aim was the same with a number of press releases to the local newspapers.

Having a research officer stationed on the site made all that activity easier than if the research work had been conducted from Frankston.

CONTAINMENT PROGRAMME

The report would not be complete without mentioning the unique pilot programme of containing SLN to the known infestation areas. It was the result, and at the same time the start, of successful publicity given to the SLN question. This not only stopped the spread beyond the already infested farms but also enabled researchers time to come up with answers, if any, without the fear of spread during the period needed to study a weed like SLN.

The years of repeated 2,4-D spraying resulted in stunted, retarded SLN plants. It seems to be worthwhile to follow up these results and to observe the effect of repeated 2,4-D applications for a few more years.