THE USE OF ASULAM FOR THE CONTROL OF DOCKS

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Summary

During 1967-8, asulam was applied as both spring and autumn treatments to docks (*Rumex* spp.) in pasture. Spring applications of 1 or 1½ lb a.i./acre gave 80 to 99% control of all docks present at the time of spraying. Autumn applications resulted in 58 to 82% control with asulam at 1 lb a.i./acre and up to 100% control with asulam at 1½ lb a.i./acre. The material was very slow in action, particularly after the autumn applications, and under the cooler conditions a check and yellowing of some pasture species persisted until spring. Two replicated pasture tolerance trials were laid down in spring 1968 and the yields were measured for 3 to 4 months after spraying. Asulam at 1 lb a.i./acre caused a check to pasture starting about 11 days after spraying a recently grazed pasture. This check had disappeared 29 days later and total production from this treatment at the end of the trial period was very similar to that of the unsprayed control. On pasture which had not been grazed for 5 weeks prior to spraying, the effects of the treatments were less marked and the treated plots recovered to produce at a similar level to the control 28 days after spraying. Results obtained from a survey of 43 farmers who used asulam in spring 1968 confirmed the trial results.

INTRODUCTION

THE ACTIVITY of asulam against docks (*Rumex obtusifolius*, *R. crispus*) was first noted in New Zealand during preliminary trials in lucerne in 1964.

Further development work in the United Kingdom showed that asulam had a good potential for the control of young and "old man" docks in pasture.

In New Zealand a small programme of trials was laid down in spring 1967 to confirm the effectiveness of the material on docks at lower rates than used in 1964 and to observe effects on pasture species. Further trials were laid down in autumn to investigate the effectiveness in cooler conditions.

Some yellowing and check to growth of pasture was noticed during these trials and it was decided to conduct two tolerance trials with spring applications as these appeared more effective on docks and appeared less damaging to pastures than autumn treatments.

WEED CONTROL EXPERIMENTS

All treatments were applied using a single-wheeled sprayer applying 17.5 gal/acre. The treatments were applied to plots arranged in simple randomized blocks.

TABLE 1: CONTROL OF DOCKS

Treatment (lb)	Av. No. of Docks per sq. yd. Before Spraying	% Reduction in Dock Numbers and Cover							
		No. Cover		No. Cover		No. Cover		No. Cover	
SPRING APPLICATION									
Site No. 1	(2/10/68)	(8 wk)		(13 wk)					
Control	14								
asulam 1	11	81	92	82.5	91				
asulam 1½	14	91	95	89.5	95				
asulam 2	10	89.5	93	93	93				
MCPB 1½	8	27	54	2	54				
Site No. 2	(14/10/67)	(6 wk)		(18 wk)					
Control	9								
asulam 1	16	69	81	52	32				
asulam 1½	12	37	83	38.5	26				
asulam 2	12	57	85	80	82				
2,4-DB 1½	13	10	—	—	—				
Site No. 3	(8/11/67)	(5 wk)		(10 wk)		(15 wk)		(22 wk)	
Control	23								
asulam ½	30	27	75	71	71	80	89	51	77
asulam 1	17	31	83	84.5	83	84	95	80	98
asulam 1½	18	34	89	99	97	93	98	75	99
asulam 2	24	50	87	99	99	99	99.5	99	100
2,4-DB 1½	21	33	55	56	43	74	91	65	96
AUTUMN APPLICATIONS									
Site No. 2	(13/5/68)	(9 wk)		(17 wk)		(23 wk)			
Control	33	—	—	—	—	—	—		
asulam ½	18	37	81	63	89.5	82	90		
asulam 1	33	61	91	86	93	96	96		
asulam 1½	24	62	90	83	92.5	100	100		
4 CPA 3½	30	65	76	84	88	77	78		
Site No. 3	(14/5/68)	(4 wk)		(17 wk)					
Av. No./plot									
Control	33								
asulam ¾	24	15		58					
asulam 1½	27	—		67					
Site No. 4	(15/5/68)	(9 wk)		(17 wk)					
Control	9								
asulam ½	11	64	78	69	84				
asulam 1	11	61	85	73	89				
asulam 1½	9	62	87	70	92				
4-CPA 3½	9	79	90	86	93				

Plot sizes: 6 ft or 12 ft × 30 ft. Two replicates.

Assessments: At the time of spraying the number of dock crowns present in two 2 ft 6 in. × 5 ft quadrats were counted.

The presence or absence of docks, clover and grasses in fifty 6 sq. in. subdivisions of the quadrat was noted and an estimate of the ground cover of docks in each quadrat was made.

Observations on the effects of all treatments on the important pasture species at each site were also made at the time of each assessment.

Formulations used: At Site No. 1, a soluble powder containing 75% w/w asulam as its potassium salt was used. At all other sites an aqueous concentrate containing either 40% or 60% w/v asulam as its sodium salt was used.

The aqueous concentrate formulation containing 40% w/v asulam later became the commercial product. All rates are in lb a.i./acre.

RESULTS AND DISCUSSION

Table 1 lists the percentage reduction in dock numbers and percentage reduction in cover at the stated assessment times.

The control of docks after both spring and autumn applications was good, although the actual reduction in numbers did not often exceed 90%. The reduction in cover, however, frequently exceeded this figure.

The figures show that a spring application of asulam is quicker acting than an autumn application. Excellent control in spring or summer was obtained 8 to 10 weeks after application whereas the checked and yellowed docks were still visible 12 to 16 weeks after the autumn applications and took a further 6 to 8 weeks before they disappeared completely.

The results at Site No. 2 (spring) were rather variable and this is because spraying was carried out just after grazing by cattle and the docks and pasture were crushed and damaged. Further experience with asulam has shown that there must be a reasonable amount of actively growing entire leaves present at the time of spraying in order to obtain good control.

A further disadvantage of spraying very soon after grazing is that damage to some pasture species is more severe than if the pasture has had time to recover before spraying.

It was noticed during these trials that more docks were eliminated in vigorous pastures. This was due primarily to the ability of grasses and clovers to occupy the areas previously covered by the docks. On run-down or open pastures or where docks were the main species present, seedling docks were able to establish 3 to 4 months after spraying.

Any effects visible on pasture species after spring applications of asulam lasted for only 3 to 4 weeks. The check was more severe and lasted for up to 3 months after autumn applications of asulam. The check in both cases was more severe where the pastures contained Yorkshire fog (*Holcus lanatus*) and *Poa* spp.

Mixtures of asulam and 2,4-DB were included in the autumn trials and it was found that the addition of 2,4-DB to standard rates of asulam increased the overall speed of action on the docks but the final result was no better than the same rates of asulam applied alone.

PASTURE TOLERANCE TRIALS

Two pasture tolerance trials were laid down on weed-free dairy pasture. Details of the trial sites are given in Table 2.

TABLE 2: AVERAGE PASTURE YIELD (lb DM/ acre)

SITE 12. MASTERTON
 Pasture constituents: Perennial ryegrass (*Lolium perenne*), white clover (*Trifolium repens*), *Poa pratensis*, *Poa annua*
 Date of spraying: 11/10/68. Last grazing: 8/9/68.

Treatment (lb)	1/11/68		12/11/68		27/11/68		24/12/68		23/1/69		Total	
	lb DM/acre	Yield Index	lb DM/acre	Yield Index	lb DM/acre	Yield Index	lb DM/acre	Yield Index	lb DM/acre	Yield Index	lb DM/acre	Yield Index
asulam 1	918.4 c	59.4	341.5 c	116.1	389.9 b	131.8	380.8 a	91.2	373.2 b	107.1	2,403.8	84.0
asulam 2	649.6 b	42.0	284.5 b	96.7	383.5 b	129.7	406.6 b	97.4	372.7 b	106.9	2,097.3	72.1
asulam 4	492.8 a	31.9	180.2 a	61.3	302.8 a	102.4	359.8 a	86.2	304.9 a	87.5	1,640.5	56.4
Unsprayed control	154.56 d	100	294.2 b	100	295.8 a	100	417.3 b	100	348.5 b	100	2,901.4	100
CV	11.42%		10.71%		7.40%		4.348%		7.258%			

SITE 13. UPPER HUTT
 Pasture constituents: Perennial ryegrass, white clover, cocksfoot (*Dactylis glomerata*), timothy, Yorkshire fog.
 Date of spraying: 31/10/68. Cut before spraying: 21/10/68.

Treatment (lb)	11/11/68		29/11/68		19/12/68		22/1/69		Total	
	lb DM/acre	Yield Index	lb DM/acre	Yield Index	lb DM/acre	Yield Index	lb DM/acre	Yield Index	lb DM/acre	Yield Index
asulam 1	702.9 n.s.	89.1	402.3 b	56.5	662.8 d	136.9	1,617.4 b	109.3	3,385.4	97.9
asulam 2	638.0	80.8	188.8 a	26.5	377.5 b	78.0	1,694.1 b	114.5	2,898.4	83.6
asulam 3	634.6	80.4	131.5 a	18.5	252.8 a	52.2	1,525.4 a	103.1	2,544.3	73.3
Unsprayed control	789.2	100	712.3 c	100	484.3 c	100	1,479.3 a	100	3,465.1	100
CV	21.94%		15.06%		10.53%		5.097%			

Yields were measured at various intervals after spraying whenever the growth on controls reached a height suitable for cutting with a rotary mower.

RESULTS

The yields at each cut are listed in Table 2.

At Site 12 yields from all plots treated with asulam were significantly lower than the control at the first cut 11 days after spraying. Thereafter yields from 1 and 2 lb asulam were equal to or higher than that from the control. With 4 lb asulam, the yield depression was evident at all cuts except the third, 26 days after spraying, when a temporary boost in yield was recorded.

At Site 13 the yield depression 10 days after spraying was not significant but the treated plots yielded less than the control at the second cut 29 days after spraying. Production then increased but only the 1 lb plots outyielded controls at the third cut. All treatments outyielded controls at the 4th cut.

DISCUSSION

Asulam at the recommended rates of application caused a temporary depression in pasture yield. This depression was greater and lasted longer when the application was made to immature growth. This was particularly noticeable with the 2 lb rate. Immature pasture treated with this rate did not fully recover until 68 days after spraying while pasture which was sprayed five weeks after grazing was producing as well as the controls in half this time.

The presence at Site 13 of Yorkshire fog, which is more susceptible to asulam than the other grasses present, would also have contributed to the slow recovery.

The boost of growth after the initial depression was probably due to the release of nitrogen from clover plants checked by the treatments.

FIG. 1: Site 12. Relative pasture yields (Control = 100).

FIG. 2: Site 13. Relative pasture yields (Control = 100).

This boost nearly made up for the yield depression earlier in the trial on the 1 lb plots. Had the trial been continued longer, it appears that the total yield from both 1 lb and 2 lb would have at least equalled production on the controls.

FIELD APPLICATIONS

During late summer and autumn of 1969, results of commercial applications of asulam from 43 pasture sites were obtained.

These results are summarized in Table 3 and they confirm the earlier results obtained in the trials.

The one case of poor control was due to heavy rain soon after spraying. The three cases of only satisfactory control were the result of spraying too soon after grazing or spraying too late when the seed-head had developed.

Thirty-five farmers reported nil, or only slight effects on pasture after spraying. A moderate to severe check reported by the remaining eight farmers was probably due once again to spraying immediately after grazing or to spraying at an incorrect rate. These moderate effects disappeared and the farmers considered the check to be of little consequence when good control of docks was obtained.

TABLE 3: CONTROL OF DOCKS WITH ASULAM:
FIELD ASSESSMENTS 1968

Ratings	4 — complete control	1 — poor control
	3 — good control	0 — no effect
	2 — satisfactory control	

Figures are the number of sites at which the stated response was obtained.

Rate of application									
1 lb/acre					1½ lb/acre				
0	1	2	3	4	0	1	2	3	4
—	—	1	7	5	—	1	2	13	14

CONCLUSION

The results from the weed control trials show that a single spring application of asulam at 1 or 1½ lb gave up to 99% control of all docks present at the time of spraying.

Autumn applications also gave good control but the material was very slow in action and pasture was rather slow to recover.

The results from the two pasture tolerance trials indicate that spring applications of asulam at the recommended rates will give temporary depression of pasture yield but that subsequent growth will largely compensate for this depression.

The initial depression is aggravated if the asulam is applied to pasture which has been recently grazed or one which contains a substantial proportion of susceptible species such as Yorkshire fog.