

Control of *Cynodon dactylon* by Mechanical and Chemical Methods

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Cynodon dactylon is a noxious perennial weed in black soil. The rhizomes grow very deep upto 30 to 60 cms in the soil. Due to creeping habit there is a quick spreading of this weed in a short period. The crop yields are low in lands infested with this weed. The weed competes for moisture and nutrients with crops. The control of this weed is a serious problem particularly in the black soils of Mysore State.

The eradication of *Cynodon dactylon* by hand digging or mechanical cultivation has been found to be costly and difficult. Verma and Bhardwaj (1963) reported that deep ploughing in summer when the soil moisture is low, was particularly helpful in controlling the perennial grasses. Arakeri (1957) reported that Monuron at 40 kg/ha and TCA at 50 and 100 kg/ha applied at the end of rains in October gave better control of *Cynodon dactylon*.

Klingman (1961) stated that TCA at high rates of 80-100 kg/ha is a temporary soils sterilant. It has given good results on successful control of Burmuda grass. Burt and Willard (1959) reported that herbicides used without ploughing were only half to two-third effective as those used after ploughing.

MATERIALS AND METHODS

An experiment was conducted in 1966 at the Agricultural College Farm, Dharwar to study the combination of mechanical and chemical methods of control of *Cynodon dactylon*. Herbicides used were Dalapon, TCA and Paraquat each with one level of concentration with two split doses of application. In the experimental plots, there was uniform patch of *Cynodon dactylon*, grown to a height of about 15 to 18 cm and rhizomes had penetrated to depth of 30 to 45 cm.

Main plot treatments :

1. Spraying of chemicals to green foliage.
2. Spraying of chemicals after ploughing.
3. Spraying of chemicals before and after ploughing.

Sub plot treatments :

1. Dalapon (2, 2-Dichloropropionic acid)
30 kg per ha in 2 split sprays with an interval of fortnight.

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2. Dalapon 30 kg per ha in one dose after 2 weeks of ploughing.
3. Dalapon 30 kg per ha in two split sprays before and after ploughing.
4. TCA (Trichloroacetic acid) 25 kg per ha in two split sprays with an interval of fortnight.
5. TCA 25 kg per ha in one dose after ploughing.
6. TCA 25 kg per ha in two split sprays before and after ploughing.
7. Paraquat (Dimethyl 4-4' bipyridylum)
25 litres per ha in two split sprays with an interval of fortnight.
8. Paraquat 25 litres per ha in one dose after ploughing.
9. Paraquat 25 litres per ha in two split sprays before and after ploughing.
10. Control.

The experiment was laid out in a split plot design with two replications. The main plot size was 3.03×24.2 metre. The sub plot size was 3.03×6.06 metre.

RESULTS AND DISCUSSION

Effect of herbicides on shoots :— The mortality of the shoots after the herbicidal treatment is given in Table—1. Paraquat was not so effective as compared to the Dalapon and TCA. Dalapon was found to be more effective herbicide as compared to TCA and paraquat.

Fresh and dry weight of rhizomes and foliage :— There was a reduction in the weight of rhizomes in the case of plots treated with the herbicides. The reduction in weight of rhizomes in case of Dalapon was more as compared to TCA and Paraquat. Next to Dalapon, TCA proved better,

Regrowth :— It was observed that generally there was suppression of new shoots upto 4 months where herbicides were used. There was better control of regrowth in plots receiving Dalapon and TCA.

Effect of herbicides after ploughing :— There was reduction of shoots after ploughing as seen from Table 1. One spray of Dalapon, TCA and Paraquat gave a good control of the shoots in all the plots. But the effect of Dalapon and TCA remained for longer period compared to Paraquat.

The dry weight of rhizome in 0-15 cms depth in control plot was 30 gm whereas it was 21, 18 and 23 gm in plots (30 sq cm) treated with TCA, Dalapon and Paraquat respectively. The combination of ploughing with herbicides spray suppressed the rhizome.

Dry weight of rhizome at 15 to 18 cm depth was 45 gm per plot in control and 15, 9 and 15 gm in plots sprayed with TCA, Dalapon and Paraquat respectively. Ploughing followed by Dalapon spray after 2 weeks gave better control than the rest of the treatments,

Table I. Effect of application of Dalapon, TCA and Paraquat on the control of (*Cynodon dactylon*)

Treatments	Number of shoots/30 Sq cm Average of 2 replications			No. of shoots regrowth/30 sq cm Average of 2 replications		Dry wt. of rhi- zomes/30 sq cm in grams on 30-3-67		Fresh wt of rhi- zomes/30 sq cms in grams on 30-3-1967		Fresh & Dry wt of foliage/30 sq cm in gm on 20-3-1967	
	Before spray on 25-11-66	After 1st spray on 15-12-66	After 2nd spray on 30-12-66	Regro- wth on 15-12-66	Regro- wth on 30-12-66	0-15 cm depth	15-30 cm depth	0-15 cm depth	15-30 cm depth	Fresh weight	Dry weight
I. Spraying to foliage											
Control	39	34	32	2	2	71	24	88	30	37	24
TCA	36	—	—	—	—	43	14	50	17	16	14
Dalapon	34	—	—	—	—	14	12	25	15	12	8
Paraquat	37	—	5	—	2	58	14	67	19	25	14
II. Ploughing and spraying											
Control	27	6	4	1	2	30	45	37	62		
TCA	27	—	—	1	—	21	15	23	19		
Dalapon	30	—	—	—	—	18	9	20	9		
Paraquat	31	—	—	1	1	23	15	25	27		
III. Spraying before and after ploughing.											
Control	36	34	11	2	1	36	28	46	30		
TCA	34	1	—	—	—	16	12	19	15		
Dalapon	30	1	—	—	—	14	12	14	12		
Paraquat	55	—	1	—	1	20	13	22	13		

Date of 1st spray 1-12-1966
 Date of 2nd spray 15-12-1966
 Date of 3rd spray 30-12-1966

Date of ploughing 1-12-1966 (First)
 Date of ploughing 15-12-1966 (Second)

Effect of herbicide spray before and after ploughing :— The effect of Paraquat remained only for a short period. The dry weight of rhizome at 0-15 cms depth in control plot was 36 gm whereas 16, 14 and 20 gm were recorded in plots sprayed with TCA, Dalapon and Paraquat respectively.

At 15-18 cm depth the weight of rhizome was 28 gm in control plot whereas 12, 12 and 13 in the plots treated with TCA, Dalapon and Paraquat respectively.

Visual observations revealed that the dessication of the rhizomes occurred upto about 15 to 18 cm depth in the Dalapon treated plot whereas in case of TCA and Paraquat only the rhizomes nearer to the surface were affected. It may be possible to control the weed more effectively by ploughing and spraying with Dalapon at the rate of 30 kg per ha about 2 to 3 times during the year at an interval of about 3 to 4 months.

SUMMARY

An investigation was carried out to study the effect of different chemicals in combination with ploughing for the control of *Cynodon dactylon* at the Agricultural College Farm, Dharwar during the year 1966-67. The herbicides tried were Dalapon, TCA and Paraquat in combination with ploughing. There was mortality of shoots and the reduction in weight of foliage, as well as rhizome to depth of 0-30 cm. The dessication of the rhizomes occurred upto about 15 to 18 cm depth in the Dalapon treated plot. Dalapon 30 kg per ha with split applications before and after ploughing of the land gave a better control of the weed. It may be possible to control the weed more effectively with spraying of Dalapon about 2 to 3 times during the year,

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