A Comparative Study of New Herbicides on *Cyperus rotundus* and *Trianthema portulacustrum*.

N. R. Bajpai, B. L. Porwal and D. K. Misra*

INTRODUCTION

Cyperus rotundus L. and *Trianthema portulacustrum* are the two serious weed in cropped and uncropped areas in India. *Cyperus rotundus* (purple nutsedge) locally known as 'Motha' is a perenial weed, propogated mostly through under ground tubers of nuts. *Trianthema partulacustrum* commonly known as "Patherchata" or "santha" in Rajasthan (India) is an annual weed which flowers and fruits during the rainy season. Flowers are axillary, solitary, sesile, white or pinkish and seed are black in colour by which mostly it is propogated. Both the weeds are capable of flourishing even under worst soil climatic conditions and utilize enough food material present in the soil to deprive the main crop from its food reserves.

REVIEW OF LITERATURE

Smith and Mayton (1938) suggested that frequent cultivation and rotation resulted in control of nutgrass. West Moreland *et al.* (1953) suggested thorough disking at 2 to 3 weeks interval over two growing season which could eradicate the nutgrass. Davis and Hawkins (1943), Krishna Rao and Moses (1949), Day and Russel (1956) and Christie (1960) recommended deep summer ploughing followed by repeated ploughing at 3 to 4 weeks interval (cited by Sinha and Thakur, 1967).

With the discovery of 2, 4-D in 1942 and subsequent realization of its selective herbicidal properties, great interest has been created in the field of weed control by chemicals. Krishna Rao *et al.* (1951), Thakur and Singh (1952), Lucero (1953), Pande (1956) reported that sodium salt of 2, 4-D was found to be effective against the *Cyperus spp. viz. C. iria L., C. difformis L., C. pilosus vahl, C. rotundus L.* Thakur (1952) reported that MCPA at 0.5 to 3.0 per cent concentrations kill the top growth of *cyperus*. Narayan and Meenakshi Sundaram (1957) found that mixture of sodium salt of 2, 4-D and MCPA at the rate of 5 kg each per hectare was very effective in killing *Cyperus rotundus*. Prettarudriab (1956) recommended amine salt of 2, 4-D and MCPA for the control of nutgrass. Similar

*The Head of the Agronomy Department, Jobner; Lectuer in Agronomy, Udaipur and Director of Extension Education, University of Udaipur (Rajasthan) respectively.

results were obtained by 2.5 kg. (a. e.) amine salt of 2, 4-D per hectare (Arakari and Adbata, 1957).

In Madras state (India) different formulations of 2, 4-D and 2, 4, 5-T esters in concentrations ranging from 0.5 to 2,0 per cent were found to be effective against the above ground parts of the weed, but no injury was caused to the under ground portions (I. C. A. R., 1956).

Besides 2, 4-D other weedicides like PCP, TCA, CMU, EPTC etc. were also tried. PCP and TCA scorched the weed only (Narayan and Meenakshi Sundaram, 1957), while CMU at higher rate (50 kg/ha) may render the soil sterile for some time (Bombay Department of Agriculture, 1954-55). Rea (1964) observed that repeated application of MSMA and DSMA obtained drastic reduction in *Cyperus* stand. Similar results were also obtained by the authors in previous experiments.

Practically very little work has been done to control the *Trianthema portulacustrum*. Narasimha Rao and Dutta (1954) found that application of 3.5 to 4.5 kg/ha of 2, 4-D effectively controlled the weed (cited by Gupta *et al.* 1960).

Keeping the results of above cited work in view, new weedicides were tried to control the above and under ground portion of these weeds more effectively.

MATERIALS AND METHODS

On the basis of results obtained earlier regarding control of *Cyperus* by chemicals, this experiment was laid out to study the effect of weedicides on *Cyperus rotundus* L. and *Trianthema portulacustrum* Linn. on uncropped land at S. K. N. College of Agriculture, Jobner (Rajasthan) on 23rd September, 1967. The MSMA and Dalapon were selected which gave some response in controlling the *Cyperus* in previous experiment. Effect of these weedicides were also noted on *Trianthema*,

To control these weeds MSMA and Dalapon were applied at 0, 1 and 2 levels of each (equivalent to 0, 2 and 3 per cent concentration of commercial product at the rate of 500 lit/ha or 0 0., 3.48 and 5.22 lit. (a. e.) MSMA/ha and 0.0, 3.0 and 4.5 kg (a. e.) Dalapon/ha respectively). It was also felt to see their combined effect. Therefore, in all there were 9 treatments including control (no weedicides). These 9 treatments were replicated thrice in a randomized block design of layout on sandy loam soil.

RESULTS

MSMA proved superior in controlling *Cyperus rotundus* over that of Dalapon (Table 1). Although there was not much difference between 2

and 3 per cent concentrations (one ond two levels) of MSMA but had significant effect in controlling *Cyperus rotundus* over control. Dalapon did not show appreciable effect on *Cyperus* as the percentage kill was negligible (7.8 and 7.2 under 2 and 3 per cent concentration or at two and three levels respectively).

Table I :— Main effect of weedicides on *Cyperus* and *Trianthema*.

Weedicides	Ave. no. of *Cyperus* plants		Ave. angular value of % kill *Cyperus*	% kill of *Cyperus*	Ave. no. of *Trianthema* plants	
	Before spray	After spray			B. Spray	A. Spray
M_0	14.6	14.6	00.0	00 0	10.6	10.6
M_1	9.6	1.6	71.4	89.8	14.6	7.3
M_2	11.3	2.6	68 5	86.6	21.3	4.3
D_0	14.6	14.6	00.0	00.0	10.6	10.6
D_1	9.3	8.3	15.3	7.8	18.3	13.0
D_2	11.6	10.6	15.5	7.2	20.0	16.0
C.D. at 5%	—	—	3 :.52	—	N.S.	N.S.

M = MSMA D = Dalapon

There was good control of *Trianthema* under two and three per cent concentrations of MSMA, however, effect was not statstically significant. Dalapon was still less effective against *Trianthema*. MSMA at one and two levels (2 and 3 per cent concentrations) gave significant control of *Cyperus* over control (zero levels of Dalapon plus MSMA). However, MSMA with increased levels of Dalapon did not prove sufficiently effective at all concentrations, whereas dalapon with increased levels of MSMA increased the percent kill of the weed at all concentrations except Dalapon plus MSMA (table 2).

Effectiveness of MSMA against the *Trianthema* was increased with concentration (table 3). MSMA at two level (3 per cent concentration) gave more kill of the weed as compared to one level (2 per cent concentration). In other words the kill of the weed under 3 and 2 per cent concentration was 79 3 and 50.0 per cent. Effectiveness of MSMA was decreased with increased level of Dalapon in combinations. Dalapon applied alone, proved relatively less effective as against when applied in combinations. However, none of these weedicides either singly or in combination proved effective to control *Trianthema*.

Average number of nuts (tubers) of *Cyperus rotundus* were counted 70 days after sprav and it was noted that there was no effect on nuts by any weedicides used either singly or in combination (table 4). Morover, there was minimum number of combination with Dalapon at 2 per cent concentration (at level one).

Table 2 :— Average angular value of percentage killed *Cyperus* after 15 days under interaction of MSMA and Dalapon.

Dalapon	MSMA 0%	MSMA 1%	MSMA 2%
Dalapon 0	00.00	71.42	68.54
Dalapon 1	16.26	49.61	62.95 CD at 5% 31.52
Dalapon 2	15.52	32.41	19.45

Table 3 :— Average number of *Trianthema* before and after (15 days) spray.

Dalapon		MSMA 0	MSMA 1	MSMA 2
Dalapon 0	Before	10.6	14.6	21.3
	After	10.6	7.3	4.3
	% kill	00.0	50.0	79.3
Dalapon 1	Before	18.3	16.3	13.3
	After	13.0	11 3	6.0
	% kill	29.0	30.6	52.6
Dalapon 2	Before	20.0	16.3	16.3
	After	16.0	12.3	8.3
	% kill	20.0	24.5	49.0
'F' test for		Before Spray		Non-significant
,, ,,		After Spray		— do —

Table 4 :— Average number of nuts (tubers) of *Cyperus rotundus* present 70 days after spray.

T. No.	Treatment	Ave. no. nuts (tubers)
1.	MSMA 0 + Dalapon 0	3.01
2.	MSMA 0 + Dalapon 1	3 96
3.	MSMA 0 + Dalapon 2	3.39
4.	MSMA 1 + Dalapon 0	2.98
5.	MSM - 1 + Dalapon 1	1.67
6.	MSMA 1 + Dalapon 2	3 46
7.	MSMA 2 + Dalapon 0	2 61
8.	MSMA 2 + Dalapon 1	3.00
9.	MSMA 2 + Dalapon 2	2.52
	'F' test	Non-Sig.

DISCUSSION

Effect of MSMA on the weeds :— MSMA was a contact weedicides applied as a foliar spray on a mixed natural stands of nutsedge and *Trianthema*. Being a contact weedicide it killed most of the plant cells of various parts to which it came across whiie spraying. The effect was noted by visual observations and also confirmed by experimental results. The killing effect was more pronounced in two per cent concentration, thus checking the physiological phenomena of weeds possibly food metabolism. A higher concentration probably proved equally effective due to paralysis of the contact cells.

Effect of Dalapon on the weeds :— It was a translocated weedicide which when applied as foliar application appeared to have moved down to all parts of the plant, but did not show any effect on either of the weeds. This chemical by its inherent properties does not accumulate in the storage organs e. g. tubers of the nutsedge (*Cyperus*) and hence did not show any effect. Due to morphological picularities of *Trianthema* (hard, smooth and cylindrical stem) peneteration of the chemical was difficult and thus its effect was more or less negligible on this weed.

Effect of weedicides on tuberization in cyperus :— It was interesting to observe that low concentration of MSMA and Dalapon in combination proved relatively effective in inhibiting the tubrization in *Cyperus rotundus*. Whereas none of the combination proved effective in controlling the tuberization. The probable reason may be that the low concentration of contact weedicide injured the living cells only partially and thus translocation of the Dalapon was not affected. It was felt that morphological studies should be conducted after application of this combination.

SUMMARY

The results obtained from the experiment conducted to control *Cyperus rotundus* L. and *Trianthema portulacastrum* chemically are summarised here :

1. MSMA (Ansar 529) when applied at the rate of 3·48 to 5.22 (a. e.)/ha *Cyperus rotundus* was controlled effectively. The repeated applications of this weedicide will control the weed most effectively.

2. Effective control of *Cyperus rotundus* was not obtained by the application of Dalapon even at the rate of 4.5 kg (a.e.)/ha.

3. Neither MSMA nor Dalapon was effective in controlling *Trianthema*.

4. Effectiveness of MSMA was decreased when it was applied in combination with Dalapon.

5. Tuberization in *Cyperus rotundus* was not effectively controlled by any of the two weedicides used either singly or in combination.

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