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REPORT OF WEED CONTROL AND WATER QUALITY STUDY IN THE
ZAPOTITAN VALLEY

by

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INTRODUCTION

As a graduate student in Weed Control from Utah State University, with a research assistantship from the Environmental Protection Agency, it was made possible for me to come to this beautiful land of El Salvador to do research work. I am deeply indebted to Richard Griffin, Irrigation Advisor, without whose help it would have been impossible for me to come. He and his family were extremely kind to me.

Upon arriving I was not sure of the area of weed control that needed research the most, whether it would be ditchbank or aquatic weed control. Upon investigation, however, it was decided that the area of most concern during the rainy season is the abundant growth of weeds, mainly deep rooted perennial grasses, in the irrigation and drainage ditches, restricting the flow of water.

An integral part of the research was to include a water quality study, dealing with the contamination of irrigation water by herbicides.

The area where the research was conducted is the Zapotitan Valley.

PROCEDURE

Up until this time, the only weed control method that has been used on ditches and canal is the cutting of weeds by workers with "machetes". This type of control is needed about every two months during the rainy season, due to the extremely rapid growth of vegetation.

Lupe L. Garcia, Weed Control Advisor, Central America, was instrumental in helping set up a chemical weed control program, and he was kind enough to allow me to use his equipment and chemicals, without which the research could not have even begun.

The chemicals used, amount per treatment, and kilograms per hectare are found on Page 1 of APPENDIX. Eight different chemicals were used, at different rates, and in different combinations. Some plots were sprayed only once, while others, were sprayed twice and still others, 3 times. A total of 28 treatments were used, each replicated 4 times, making a total of 112 different plots. These plots are each 20 meters long and approximately 3.5 meters wide. Between every plot is a 10-meter check plot, to compare the untreated with the treated areas.

Pages 2 to 5 of the APPENDIX contain the list of treatments per replication, the place, dates and numbers of applications.

A GEIGY representative, Christian Trutmann, gave me some GEIGY herbicides and asked that I try them. I used 3 of these herbicides at 3 different rates each, making a total of nine different treatments. These were also replicated 4 times, making 36 different plots. The data on this experiment is on page 6 of the APPENDIX.

Allan Griffin helped immensely by doing most of the spraying, which was made difficult by having to walk at times in the ditches, or on the sides, and at the same time weighted down with a sprayer.

With chemical weed control, contamination of water is always a threat. As is often the case in the Zapotitan Valley, clouds build up rapidly and can easily dump 5-10 millimeters of water in 1/2 hour. If, after spraying, the herbicide has not had ample time to translocate into the plant, it is washed off the plant and enters the water.

This phase of the research was particularly interesting, and a time or two, frightening. We would spray in the late morning or early afternoon, and then, if it rained later during the day or at night, samples would be taken at different time intervals during the storm. One night the storm was particularly frightening - lightning was hitting fairly close, and we were out until 2 am. the next morning taking water samples. It rained close to 90 millimeters that night.

The samples of water will be taken back to Utah State University and analyzed.

PROBLEMS ENCOUNTERED

Transportation was somewhat of a problem when I first arrived, and I am grateful to the Dirección General de Investigación y Extensión Agropecuaria for lending me a car for nearly a month. Later, Grandes Obras de Riego y Drenaje loaned me a pickup and supplied me with a driver.

Part of the sprayer we were using was evidently stolen from a chemical shed, but Avelar Hermanos, a chemical distributor here, was able to improvise and make another that was suitable.

At two different times, workers with "machetes" were sent out to clear the "cunetas", drainage ditches at the sides of the road, where I had my treatments. The first time they cut out 7 treatments and the second 29. This upsets the evaluation procedure and in general, throws off the coordination of the program. This error, I believe, was due in part to a breakdown in communication between the "jefes" and foremen. Also, I should have put out large signs so everyone could be aware that there were treatments in the "cunetas" and that they shouldn't be altered, although it is easily seen from the road that herbicides have been applied. This experience, however,

was not without value in learning to work better and have better communication with others.

PRELIMINARY RESULTS

It is hoped that a final evaluation will be made in November. At this time, however, some herbicides have shown up quite well.

The best treatment has seemed to be No. 17, MSMA, with Dalapon 2 weeks later, and then 2 weeks later, MSMA again. The kill is about 80-90%. The next best treatment is MSMA at 5 kilograms/hectare. Again the kill is 80-90%. For being sprayed only once per treatment, Diuron and Tandex have both given good results, the kill being around 60%.

CONCLUSION

The results of this research will be tabulated and copies sent to all interested parties.

As mentioned previously, a return trip in November to make a final evaluation is anticipated.

I am extremely grateful to all those whom I have mentioned and also to the Ministry of Agriculture for allowing me to come down and participate in research work. USAID/El Salvador, was also very helpful.

I thoroughly enjoyed my stay here and would sincerely like to return in a possible future assignment.

TRATAMIENTOS CON HERBICIDAS

<u>Herbicida</u>	<u>Gramos o Ml.por Tratamiento</u>	<u>Kg./ha</u>
1. DALAPON	21.6	5
2. DALAPON	32.0	7.5
3. DALAPON	43.0	10
4. MSMA	15.2	3
5. MSMA	20.5	4
6. MSMA	25.5	5
7. DSMA	13.5	3
8. DSMA	18.0	4
9. DSMA	22.5	5
10. WEEDAZOL TL	61.0	4
11. WEEDAZOL TL	91.0	6
12. WEEDAZOL TL	122.0	8
13. PHYTAR	42.5	3.5
14. PHYTAR	86.0	7
15. PHYTAR	120.0	10
16. DALAPON	21.5	5
17. MSMA	20.5	4
18. DALAPON	21.5	5
19. DSMA	18.0	4
20. ATRAZINE	18.2	4
21. ATRAZINE	36.5	8
22. ATRAZINE	55.0	12
23. DIURON	18.2	4
24. DIURON	36.5	8
25. DIURON	55.0	12
26. TANDEX	18.2	4
27. TANDEX	36.5	8
28. TANDEX	55.0	12

REPLICA I

CAMINO A - Lado Este -
Entre los canales - Los Patos y Belen
Primera Aplicación - 7 de Julio, 1971
Segunda Aplicación - 27 de Julio, 1971
Tercera Aplicación - 12 de Agosto, 1971

A P L I C A C I O N E S

<u>I - kg/ha</u>		<u>II - kg/ha</u>		<u>III - kg/ha</u>	
1	PHYTAR 10	PHYTAR 10			
2	DALAPON 5	DSMA 4		DALAPON 5	
3	GESAPRIM 4	---		---	
4	MSMA 3	MSMA 3		MSMA 3	
5	WEEDAZOL TL 6	WEEDAZOLTL6		---	
6	DSMA 3	DSMA 3		DSMA 3	
7	MSMA 5	MSMA 5		MSMA 5	
8	DALAPON 10	DALAPON 10		DALAPON 10	
9	TANDEX 4	---		---	
10	ATRAZINE 8	---		---	
11	DIURON 12	---		---	
12	TANDEX 8	---		---	
13	PHYTAR 7	PHYTAR 7		---	
14	MSMA 4	MSMA 4		MSMA 4	
15	DSMA 5	DSMA 5		DSMA 5	
16	DALAPON 5	MSMA 4		---	
17	DIURON 8	---		---	
18	DSMA 4	DALAPON 5		DSMA 4	
19	DALAPON 5	DALAPON 5		DALAPON 5	
20	ATRAZINE 12	---		---	
21	WEEDAZOL TL 8	---		---	
22	DSMA 4	DSMA 4		DSMA 4	
23	DIURON 4	---		---	
24	WEEDAZOL TL 4	WEEDAZOLTL4		---	
25	PHYTAR 3.5	PHYTAR 3.5		---	
26	TANDEX 12	---		---	
27	MSMA 4	DALAPON 5		---	
28	DALAPON 7.5	DALAPON 7.5		---	

REPLICA II

CAMINO F - Lado Este

PRIMERA APLICACION : 8 de Julio, 1971

SEGUNDA APLICACION : 28 de Julio, 1971

TERCERA APLICACION : 12 de Agosto, 1971

A P L I C A C I O N E S

I	-	<u>kg/ha</u>	II	-	<u>kg/ha</u>	III	-	<u>kg/ha</u>
1	DALAPON	7.5	Dalapon	7.5		Dalapon	7.5	
2	TANDEX	4		--			---	
3	WEEDAZOL	4	Weedazol	4			---	
4	MSMA	4	Dalapon	5		MSMA	4	
5	DIURON	4		--			---	
6	DIURON	8		--			---	
7	MSMA	4	MSMA	4		MSMA	4	
8	DSMA	3	DSMA	3		DSMA	3	
9	DSMA	4	Dalapon	5		DSMA	4	
10	MSMA	3	MSMA	3		MSMA	3	
11	DIURON	12		--			---	
12	MSMA	5	MSMA	5		MSMA	5	
13	WEEDAZOL	8	WEEDAZOL	8			---	
14	DALAPON	5	DSMA	4		Dalapon	5	
15	PHYTAR	7	PHYTAR	7			---	
16	DSMA	5		--		DSMA	5	
17	PHYTAR	10	PHYTAR	10			---	
18	DALAPON	5	MSMA	4		Dalapon	5	
19	WEEDAZOL	6	WEEDAZOL	6			---	
20	ATRAZINE	4		--			---	
21	TANDEX	8		--			---	
22	TANDEX	12		--			---	
23	DSMA	4	DSMA	4		DSMA	4	
24	ATRAZINE	8		--			---	
25	ATRAZINE	12		--			---	
26	PHYTAR	3.5	PHYTAR	3.5			---	
27	DALAPON	5	DALAPON	5		Dalapon	5	
28	DALAPON	10	DALAPON	10		Dalapon	10	

REPLICA III

CAMINO A -- Lado Oeste
PRIMERA APLICACION : 10 de Julio
SEGUNDA APLICACION : 29 de Julio
TERCERA APLICACION : 14 de Agosto

APLICACIONES

<u>I</u>	<u>kg/ha</u>	II	<u>kg/ha</u>	III	<u>kg/ha</u>
1. Diuron	4		---		---
2. DSMA	4	Dalapon	5	DSMA	4
3. MSMA	5	MSMA	5	MSMA	5
4. ATRAZINE	4		--		--
5. DALAPON	10	DALAPON	10	DALAPON	10
6. PHYTAR	10	PHYTAR	10		--
7. TANDEX	4		--		--
8. DALAPON	5	DSMA	4	DALAPON	5
9. WEEDAZOL	8	WEEDAZOL	8		--
10 MSMA	4	MSMA	4	MSMA	4
11 MSMA	4	DALAPON	5	MSMA	4
12 TANDEX	8		--		--
13 DIURON	8		--		--
14 MSMA	3	MSMA	3	MSMA	3
15 DSMA	3	DSMA	3	DSMA	3
16 WEEDAZOL	6	WEEDAZOL	6		--
17 WEEDAZOL	4	WEEDAZOL	4	--	--
18 DSMA	5	DSMA	5	DSMA	5
19 PHYTAR	3.5	PHYTAR	3.5		--
20 TANDEX	12		--		--
21 ATRAZINE	12		--		--
22 ATRAZINE	8		--		--
23 DSMA	4	DSMA	4	DSMA	4
24 DALAPON	5	DALAPON	5	DALAPON	5
25 DALAPON	5	MSMA	4	DALAPON	5
26 PHYTAR	7	PHYTAR	7		--
27 DIURON	12		--		--
28 DALAPON	7.5	DALAPON	7.5	DALAPON	7.5

REPLICA IV

CAMINO AF - Lado Oeste
PRIMERA APLICACION : 12 de Julio
SEGUNDA APLICACION : 30 de Julio
TERCERA APLICACION : 14 de Agosto

A P L I C A C I O N E S

<u>I</u>	<u>kg/ha</u>	<u>II</u>	<u>kg/ha</u>	<u>III</u>	<u>kg/ha</u>
1. MSMA	3	MSMA	3	MSMA	3
2. MSMA	5	MSMA	5	MSMA	5
3. DSMA	4	DSMA	4	DSMA	4
4. TANDEX	8		--		--
5. WEEDAZOL	8		--		--
6. PHYTAR	3.5		--		--
7. WEEDAZOL	4		--		--
8. ATRAZINE	4		--		--
9. DSMA	3	DSMA	3	DSMA	3
10. DIURON	12		--		--
11. DALAPON	5	DSMA	4	DALAPON	5
12. WEEDAZOL	6		--		--
13. DSMA	4	DALAPON	5	DSMA	4
14. DALAPON	7.5	DALAPON	7.5	DALAPON	7.5
15. PHYTAR	7		--		--
16. ATRAZINE	12		--		--
17. DSMA	5	DSMA	5	DSMA	5
18. DALAPON	5	DALAPON	5	DALAPON	5
19. TANDEX	4		--		--
20. MSMA	4	MSMA	4	MSMA	4
21. DALAPON	10	DALAPON	10	DALAPON	10
22. ATRAZINE	8		--		--
23. DALAPON	5	MSMA	4	DALAPON	5
24. PHYTAR	10		--		--
25. TANDEX	12		--		--
26. DIURON	8		--		--
27. DIURON	4		--		--
28. MSMA	4	DALAPON	5	MSMA	4

GEIGY TRIAL

CAMINO F - Lado Este
Aplicación - 30 de Julio, 1971

Replica I	<u>kg/ha</u>	Replica II	<u>kg/ha</u>
1. Gesapax 80	10	1. Topazol 3419	20
2. Topazol H	30	2. Gesapax	10
3. Topazol 3419	10	3. Topazol H	30
4. Gesapax	25	4. Topazol H	25
5. Gesapax	20	5. Gesapax	25
6. Topazol 3419	15	6. Topazol 3419	15
7. Topazol 3419	20	7. Topazol H	15
8. Topazol H	15	8. Gesapax	20
9. Topazol H	25	9. Topazol 3419	10

Replica III	<u>kg/ha</u>	Replica IV	<u>kg/ha</u>
1. Topazol H	25	1. Gesapax	20
2. Topazol 3419	20	2. Topazol 3419	15
3. Gesapax	20	3. Gesapax	10
4. Topazol 3419	15	4. Topazol 3419	20
5. Topazol 3419	10	5. Topazol 3419	10
6. Topazol H	15	6. Gesapax	25
7. Gesapax	10	7. Topazol H	15
8. Topazol H	30	8. Topazol H	30
9. Gesapax	25	9. Topazol H	25