

B. DEFOLIATION

Combinations of Defoliants and/or Desiccants on Cotton Marana Experimental Farm

G. D. Massey

Defoliant and desiccant combinations have been given increased attention the last few years in Arizona. A combination of two chemicals theoretically may exhibit a synergistic action (the two together give better results than either one alone) and thereby give better defoliation. If a desiccant-defoliant combination is used the plant may be dried as well as defoliated.

A test was initiated on October 4, 1965 to study various combinations of defoliants and desiccants and possible interaction between these compounds. The test also contained the various defoliant and desiccant treatments alone as well as several newly received compounds. The experiment was conducted on the Marana Experiment Farm using the variety Deltapine 5540.

The chemicals were applied with a 3-nozzle boom attached to a hand sprayer using approximately 40 gal. of water per acre. Plot size was 2, 40 inch rows, 20' long and the experiment was replicated twice. Weather conditions were as follows: Warm and clear with the wind, calm to gusty in the late afternoon. Temperatures for the first week after treatment ranged from a high of 85° F to a low of 46° F and time of day for treatment was 12:00 a.m. to 5:00 p.m. The readings were estimated in percentage of defoliation or desiccation as compared with the untreated adjacent rows and are averages of 2 replications. The plants were almost mature and approximately 75 percent of the bolls were open when treated. Plant height at treatment was 37 inches.

Results:

The treatment that gave the highest percent defoliation was Def alone at 1 qt. per acre, while from the desiccation standpoint Paraquat alone at 1 qt. per acre gave the best results (Table 1).

No chemical combination was better than single chemical treatments alone. Chemicals numbered 15 through 18 were newly received compounds. Results obtained from compound RP 2929 warrant further investigation.

There was no significant difference between treatments as to total yield (Table 2). Although there was no real difference in the percentage first pick data, the check was low in amount of cotton obtained on the first pick. Average yield for this variety was 3.57 bales/acre--an excellent yield.

The fiber data is also presented in Table 2. There were no significant differences found between any treatments for any of the fiber data.

Conclusions:

In this test no combination of chemicals was better than individual compounds alone. The individual compounds gave the highest rate of defoliation or desiccation. Def gave the highest percent defoliation and Paraquat the highest desiccation. The new compounds tested did not exhibit promise except for the numbered compound RP 2929.

No significant differences were found between treatments for total yield. Average yield per acre for solid planted Deltapine 5540 in this test was 3.57 bales. From the aspect of yield, first pick data showed that it helps to defoliate or desiccate but the benefit (obtaining more 1st pick cotton) is small.

The fiber (lint percentage, length, strength, and fineness) was not affected by treatment in this test.

Table 1. Defoliation and/or desiccation percent on Deltapine 5540 cotton, read at 2, 9, and 18 days after application for 18 various treatments.

Chemical	Treatment	Rate/acre	2nd day		9th day		18th day	
			def*	des**	def	des	def	des
1.	Def + Paraquat <u>1/</u>	1 qt + 1 pt	2	42	47	20	67	0
2.	Def + Paraquat	1-1/2 qt + 1 pt	0	20	50	17	67	0
3.	Def + Paraquat	3/4 qt + 1 pt	0	52	50	15	70	0
4.	Def + Paraquat	1 qt + 3/4 pt	0	32	62	12	75	0
5.	Shed-A-Leaf + Paraquat	1-1/2 gal + 1 pt	0	30	45	12	57	2
6.	Shed-A-Leaf + Paraquat	1-1/2 gal + 3/4 pt	2	35	45	15	57	7
7.	Shed-A-Leaf + Paraquat	2 gal + 3/4 pt	0	32	35	15	40	5
8.	Ammonia nitrate (NH ₄ NO ₃) + Paraquat	5 gal + 1 pt	2	75	15	52	52	15
9.	Ammonia nitrate (NH ₄ NO ₃) + Paraquat	7-1/2 gal + 1 pt	0	60	17	62	20	50
10.	"L-10" + Paraquat	1-1/2 pt + 1 pt	0	45	12	30	17	42
11.	Def	1 qt	0	0	31	40	89	0
12.	Shed-A-Leaf L	1-1/2 gal	0	5	15	5	65	0
13.	Paraquat	1 qt	0	70	1	91	0	100
14.	Ammonia nitrate (NH ₄ NO ₃)	10 gal	0	25	12	52	12	52
15.	TD 1199	1 gal	0	0	15	0	20	0
16.	Daxtron	2 qt	0	0	0	5	0	5
17.	RP 2929	2 gal	2	47	32	20	45	22
18.	Amizol	2 lbs	0	5	5	10	32	7

* Defoliation

** Desiccation

1/ Common or designated names. For chemical names of compounds, see Table 1A.

Table 1A. Common or designated names and chemical names of compounds used in the experiment.

Common or designated name	Chemical name
Def	S,S,S, Tributyl Phosphorotrithioate
Paraquat	1, 1'-dimethyl-4,4'-bipyridinium bis (methylsulfate)
Shed-A-Leaf "L"	Sodium chlorate
Ammonium Nitrate ($\text{NH}_4 \text{NO}_3$)	Ammonium nitrate
"L-10"	Arsenic acid
TD 1199	Di(N,N dimethylalkylamine) salt of endothall
Daxtron	2,3,5-trichloro-4-pyridinol
RP 2929	4-dimethylaminothicyanobenzene
Amizol	3-amino-1,2,4-triazole

Table 2. First pick percentage, yield in lint per acre, average lint percent, length, strength and fineness from 19 defoliation and/or desiccation treatments on Deltapine 5540.

Treatment	Rate/Acre	% 1st pick	Total #/Acre	Lint %	Length UHM	Strength	Fineness
1. Def + Paraquat	1 qt + 1 pt	72	1648 *	37	1.13	3.08	3.53
2. Def + Paraquat	1-1/2 qt + 1 pt	69	1617	39	1.09	3.08	3.55
3. Def + Paraquat	3/4 qt + 1 pt	71	1716	40	1.15	2.91	3.53
4. Def + Paraquat	1 qt + 3/4 pt	71	1716	38	1.13	2.97	3.53
5. Shed-A-Leaf + Paraquat	1-1/2 gal + 1 pt	74	1780	39	1.10	2.95	3.58
6. Shed-A-Leaf + Paraquat	1-1/2 gal + 3/4 pt	71	1716	37	1.14	2.91	3.58
7. Shed-A-Leaf + Paraquat	2 gal + 3/4 pt	68	1782	37	1.10	2.95	3.50
8. NH ₄ NO ₃ + Paraquat	5 gal + 1 pt	72	1648	38	1.11	2.91	3.60
9. NH ₄ NO ₃ + Paraquat	7-1/2 gal + 1 pt	68	1551	38	1.13	2.87	3.50
10. "L-10" + Paraquat	1-1/2 pt + 1 qt	71	1683	38	1.13	2.99	3.58
11. Def	1 qt	74	1747	38	1.15	2.93	3.75
12. Shed-A-Leaf	1-1/2 gal	67	1716	38	1.15	2.96	3.60
13. Paraquat	1 qt	72	1782	39	1.14	3.00	3.45
14. NH ₄ NO ₃	10 gal	76	1683	37	1.15	2.98	3.53
15. TD-1199	1 gal	76	1782	38	1.16	3.03	3.63
16. Daxtron	2 qt	68	1749	39	1.13	3.02	3.53
17. RP 2929	2 gal	67	1683	38	1.15	3.03	3.58
18. Amizol	2 lbs	66	1749	37	1.12	3.03	3.63
Check	---	66	1650	37	1.16	3.05	3.70

* No significant differences were found between treatments at the 1% level.