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CARIBBEAN FOOD CROPS SOCIETY

PROCEEDINGS



**ELEVENTH ANNUAL
MEETING**

PRIMARY SCREENING OF NEW UNREGISTERED PREEMERGE VEGETABLE HERBICIDES

by

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and

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INTRODUCTION

With the rapid release of new unregistered preemerge herbicides with a potential of weed control activity, the necessity arises for a simultaneous evaluation of a number of materials on a wide spectrum of vegetable crop in the shortest time possible. Furtick and Romanowski (1971) have described such a system. It consists of planting on the flat, one row each of the vegetable crops to be tested, and then applying the herbicides at right angles over the crop. Banding is made at the desirable width and at any concentration, and may or may not be replicated with the inclusion of as many check plots as considered necessary. An experiment was established at the Fruit Substation, at Juana Díaz, Puerto Rico, on March 8, 1973, evaluating nine new materials at three levels on twenty vegetable crops. Only the level recommended by the manufacturer will be reported in this paper.

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MATERIALS AND METHODS

The planting was established on a well prepared field of Paso Seco Loamy Sand (Loam 39%, Sand 39% and Clay 22%). Soil pH was 7.16, with 2.39% organic matter and a base exchange capacity of 25.3 meq. per 100 grams.

Seeding was accomplished with a Stanhay MK II precision seed spacing drill, using the correct size belt for each vegetable planted and depth depending on variety. Planting speed was 2.4 kph (1.5 m.p.h.). Tractor Ford Series 3000 was power source. Seeding was extra heavy to assure a good stand of crop, with between row spacing of 0.45 m. (1.5 ft.).

One row each of the following crops, variety in brackets, were included in the test: Sorghum (C-17), Sweet corn (Hawaii 68), Rice (Sinaloa), Onion (Texas Grano 502), Collard (Georgia), Cabbage (Stonehead), Chinese Cabbage (Michihli), Radish (Scarlet Globe), Bushbean (Contender), Pigeon Pea (Kaki), Okra (Drawf Long Green Pod), Eggplant (Florida Market), Tomato (Pink Deal), Sweet Pepper (Yolo Wonder), Watermelon (Charleston Sweet), Cantaloupe (Edisto), Endive (Broad Leaved Batavian), Head Lettuce (Great Lakes 659), Leaf Lettuce (Salad Bowl), and Sunflower (Mammouth Gray Stripe).

All herbicides were tested for preemergence activity at manufacturers recommended rate. Materials and rates were: Hercules-22234 at 1.36 Kg. Ai/Ac., Bay Kue-2236 at 0.68 Kg. Ai/Ac, Bay-94337 at 0.24 Kg. Ai/Ac, Gulf S-6044 at 1.81 Kg. Ai/Ac, Gulf S-6797 at 3.63 Kg. Ai/Ac, Mobil 4379EC at 0.68 Kg. Ai/Ac, Mobil 4379WP at 0.34 Kg. Ai/Ac, IMC-3950 at 2.72 Kg. Ai/Ac, and Ansul-56477 at 2.72 Kg. Ai/Ac.

All herbicides were applied using a Chem-Farm Sprayer with P.T.O. pump powered and transported by a Ford 3000 tractor. Four NW-5 nozzles adjusted to spray a band 1.83 meters (6.0 ft.) were used, with each nozzle delivering 1395 cc/min at 10 psi. Pressure was

maintained using a tachometer setting of 1500 rpm and a speed of 2.4 Km/h (1.5 mph). Plots were sprayed at 90° to crop rows. Each plot was 12.7 x 1.8 meters (42 x 6 ft). Sprayer was washed out thoroughly between treatments using water a/o ammonia detergent solution.

Quality of water used for mixing chemicals applied is as follows: a pH of 7.07, Na 4.82 meq/L, Ca & Mg 2.78 meq/L, a conductivity of 0.76 mmhos/L, and a temperature of 31°C. (88.2°F).

The day was partly cloudy with wind south east at 16.8 Km/Hr (10.2 mph), air temperature 30.8°C (87.5°F.), relative humidity 45%, soil temperature at 5.1 cm. (2 in.) 33.3°C. (92°F).

All irrigation was applied overhead. First irrigation was sufficient to saturate field to puddling and then turned off. Analysis of irrigation water gave a pH of 7.45, Ca & Mg 6.89 meq/L., with conductivity of 0.60 mmhos/cm. All irrigations were applied as required but to the point of run-off only. Total rainfall for duration on test was 1.52 cm (0.60 in.) with 1.19 cm. (0.47 in.) precipitation recorded on March 29.

The crop and weed responses to herbicides were evaluated primarily with the use of the following subjective rating system.

Crop Tolerance Ratings

1. No injury
2. Slight injury
3. Moderate injury
4. Severe injury
5. Dead

Weed Control Ratings

- S—Susceptible
I—Intermediate
T—Tolerant

The procedure for subjective rating was to study all the control plots before making the ratings; subsequently, the plots were rated without knowledge of treatments applied. This unbiased method often

resulted in ratings greater than "S" because of variable weed stand and crop growth. When more data were thought necessary, stand counts were thought necessary, stand counts were made to measure degree of weed control activity.

RESULTS

Results obtained were encouraging from the performance tests with most vegetables. The trial clearly showed that many of the herbicides were phytotoxic under the test conditions. Table 1 contains a generalized summary of the test results. Weed control rating was largely to compare the herbicide treatments when considering crop tolerance and to the control when interpreting weed response. The data are presented in table 2 for more detailed study. Latin plant names are used for weed species encountered. Due to the variation of common plant names in the various Caribbean Islands, the reader is referred to Cardenas *et al* (1972) for English-Spanish description and color photographs of the species.

SUMMARY

Nine new unregistered preemergence herbicides were tested on twenty vegetable crops. Test duration was twenty-eight days evaluating the crop plant for phytotoxic resistance and weed plant for susceptibility. Self-explanatory data is summarized in two tables, indicating chemical effect on crop-weed plants.

LITERATURE CITED

1. CARDENAS, J., C. E. REYES, and J. D. DOLL 1972. Tropical weeds-Malezas-Tropicales. International Plant Protection Center, Univ. of Ore. Corvallis, Ore. Price \$3.50 (U.S.), 341 pp.
2. FURTICK, W. R., and R. R. ROMANOWSKI, Jr. 1971. Weed Research Methods Manual. International Plant Protection Center, Univ. of Ore. Corvallis, Ore. 80 pp.

Table 1
Primary Screening of New Unregistered Preemerge Herbicides
Effect of Chemical on Germination

CROP	CHEMICAL	Hercules 22234	Bay Kue 2236	Bay 94337	Gulf S-6044	Gulf S-6797	Mobil 4379EC	Mobil 4379WP	IMC 3950	Ansul 56477
Sorghum		2*+	1	2	3	1	2	1	2	2
Sweetcorn		1	1	1	1	1	1	1	1	1
Rice		3	1	2	3	1	1	2	1	1
Onion		2	2	3	1	5	4	3	1	1
Collard		1	5	5	4	5	3	3	1	1
Cabbage		1	5	5	4	5	3	4	2	2
Chinese Cabbage		1	5	5	3	5	3	3	1	1
Radish		1	5	5	2	4	3	3	1	1
Bush Bean		1	2	3	3	2	2	3	1	1
Pigeon Pea		2	4	2	1	1	2	1		
Okra		1	4	4	3	2	3	4	1	1
Eggplant		1	2	1	1	2	2	3	1	1
Tomato		1	5	1	1	5	3	3	1	2
Sweet Pepper		1	1	1	1	1	2	1	1	1
Watermelon		2	4	3	1	2	1	1	1	1
Cantaloupe		2	4	3	3	3	1	1	1	2

Table 1 — Concluded
Primary Screening of New Unregistered Preemerge Herbicides
Effect of Chemical on Germination

CROP	CHEMICAL	Hercules 22234	Bay Kue 2236	Bay 94337	Gulf S-6044	Gulf S-6797	Mobil 4379EC	Mobil 4379WP	IMC 3950	Ansul 56477
Endive		1	5	5	3	5	2	2	1	1
Head Lettuce		1	1	4	1	5	2	2	1	1
Leaf Lettuce		1	1	5	3	5	3	3	1	2
Sunflower		1	2	2	1	1	1	1	1	1

* Crop Rating: 1 — No Injury, 2 — Slight Injury, 3 — Moderate Injury, 4 — Severe Injury, 6 — DEAD

Table 2

Primary Screening of New Unregistered Premerge Herbicides. Control of
Prevalent Weed Species encountered in the Experiment

WEED SPECIES	HERCULES 22234	Bay Kue 2236	Bay 94337	Gulf S-6044	Gulf S-6797	Mobil 4397EC	Mobil 4397WP	IMC 3950	Ansul 56477
<i>Echinochloa colonum</i>	S*	S	T	S	S	S	S	S	S
<i>Eleusine indica</i>	S	T	S	S	S	I	I	T	S
<i>Sorghum balpense</i> (seedling)	S	S	I	I	I	T	T	I	S
<i>Triathema portolacastrum</i>	S	S	S	S	S	S	I	T	S
<i>Amaranthus dubius</i>	S	S	S	S	S	S	S	I	S
<i>Cleome speciosa</i>	S	S	S	S	S	S	S	S	S
<i>Ipomoea tiliaceae</i>	S	S	S	I	I	S	S	I	I
<i>Euphorbia heterophylla</i>	S	S	S	S	I	S	S	S	S
<i>Chamaecrysta aeshynomene</i>	S	S	S	S	S	S	S	S	S
<i>Crotalaria striata</i>	S	S	S	S	S	S	S	S	S
<i>Boerhaavia decumbens</i>	S	S	S	S	S	S	S	I	S
<i>Portulaca oleraceae</i>	S	S	S	S	S	I	S	I	S

*Weed Tolerance: T - Tolerant to the Herbicides

I - Intermediate

S - Susceptible