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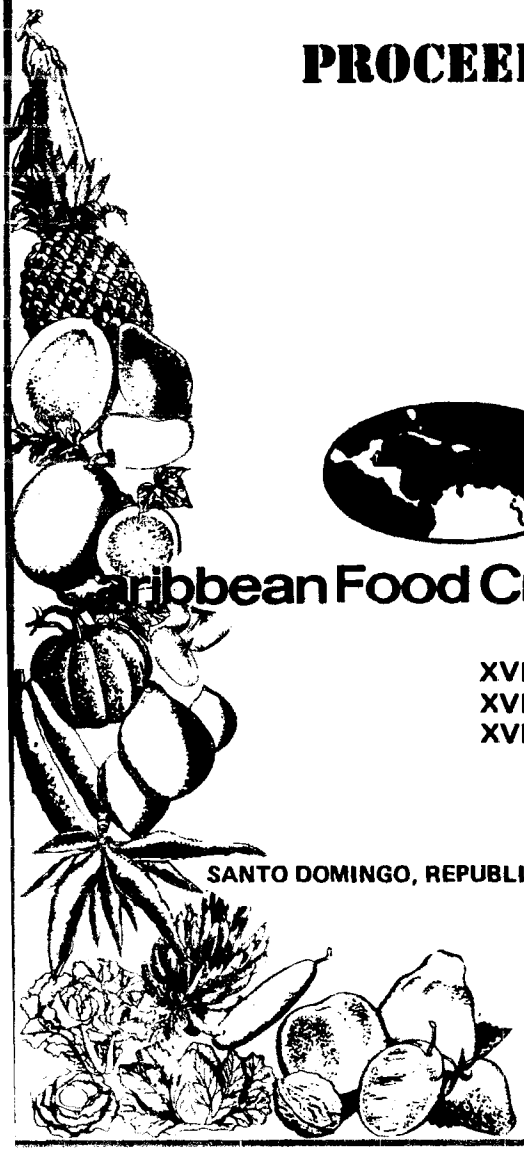

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TOLERANCE OF TOMATO CULTIVARS TO PREEMERGENCE APLICATION OF METRIBUZIN (SENCOR)

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INTRODUCTION

Eue & Tietz (1970) reported on the development and weed control activity in white potato *(Solanum tuberosum* L.) of a new compound; 4-Amino-6-(1,1- dimethylethyl)-3 (methylthio) 1,2,4-trizin-5 (4H)-one. This compound is knoun as metribuzin and is available under the trade names Sencor and Lexone. Velev & Elenkov (1972) conducted trials in Bulgaria in 1970 evaluating metribuzin (Senkor) as a preemergence herbicide on tomato, and found it very effective against weeds and not toxic to the crop at the 0.5*kg/ha level. In Puerto Rico, Jackson et al (1972) in their evaluation of new materials for preemergence activity, stated that metribuzin for tomato weed control merits further investigation. Kape (1972), also found that tomatoes displayed good tolerance, suggesting specific selectivity of metribuzin (sencor).. Jackson & Sierra (1973) reported the tomato 'Pink Deal' to be tolerant to metribuzin (Sencor) at the 0.24 ai/ac level and that ten of the 12 weed species present demonstrates susceptibility. Zeck et al (1973) sumarizes the results of forty-nine field trials conducted in the United States, indicating that the tomato cultivars tested were tolerant to preemergence rates of 0.28 and 0.56 kg/ha (0.25 and 0.50 lb ai/ac). Fortino & Spittstvesser(1974) found that metribuzin (Sencor) provided adequate preemergence weed control on direct-seeded and transplanted tomatoes growing under Illinois field conditions.

This paper does not contain recommendations, but is a report of injury evaluation to a number of tomato cultivars and weeds species. Interpretation of these results should be made with this in mind.

Sencor 5% WP) (EPA Reg. No.3125-277-AA), for use on soybean, potato, sugarcane (Hawaii only), alfalfa & sainfoin, asparagus (established), and tomato (established). Sencor 4F (EPA Reg. No.3125-314), for use on soybean and potato only. The trade name Sencor (U.S. Pat. No.3,671,523) is registered by Mobay (Chemical Corp., Chemago Agricultural Div., Kansas City, MO 64120 USA.

Lexone 50% WP (EPA Reg. No.352-375-AA) for use on soyban, potato, and

sugarcane (Hawaii only). Lexone 4L (EPA Reg. No.352-382-AA), for use on soybean only. The trade name Lexone (U.S. Pat. No.3,905,801) is registered by E.I. Du Pont de Nemours & Co., (inc.), Wilmington, DE 19898 USA.

METHODS & MATERIALS

The method of testing employed is described in detail by Furtich & Romanouski (1971). It consists of planting on the flat, one raw each of the cultivar to be tested, and the applying the herbicides at right angles over the crop. Band application of the herbicide is made at the desirable wath and concentration, This experiment consisted of **live treatments, and two replications, with one-hundred tomato cultivars in each treatment.**

This experiment was established at the Fruit Experiment Substation, Juana Díaz, P.R., on a well prepared field of San Anton Clay Loam. This neutral (pH 7.13) friable, brown soil, consists of loam 36, sand 33 and clay 31%with organic matter and a base exchange capacity of 27 meg. per 100g.

Seeding was accomplished with a Stanhay Mk II precision seed spacing drill following the recomendations of Eavis (1972). A plain rubber belt was subsitituted with a hole size and spacing which planted the seed in clumps of 6-9 seed each, with separation between clumps being 15 cm (6in). Planting depth was 0.63 cm (0.25in). Planting speedtwas 2.4 kg/ha (1.5 mi/hr), utilizing a Ford tractor of the 3000 series as the power source. Crop spacing between the row was also 15 cm (6 in), One row each of 100 tomato cultivars were included in the test. see Table 1.

Metribuzin (Sencor) was tested for preemergence weed control activity and for-crop tolerance. Materials are expressed as active ingredient per hectare and the rates applied were: 0.56, 1.12, 1.68, and 2.25 kg/ha, (0.5, 1.0, 1.5, and 2.0 lb/ac).

The herbicide applications were using a Chem-Farm Sprayer with PTO power and transported by a Ford 3000 tractor. Four Delvan FS-8-80 nozzles set to spray a band 1.8m (6. Oft) wide directly over the seeded area was used, with each nozzle delivering 2870 cc/min at 20 psi. Pressure was maintained using a tachometer setting of 1500rpm and a forward speed of 2.4 km/hr. (1.5mi/hr). Plots were sprayed at right angles to crop rows. Each treated plot was 21.9 x 1.8m (27 x 6ft). The day of treatments was partly cloudy with wind south-east at 5.2km/hr (3.2mi/hr), air temperature, 28.9°C (84.0F), and a relative humidity of 68%.

The first irrigation was made inmediately following the preemergence herbicide application, and was sufficient to saturate the field, and the turned off. All irrigations were applied as required, but to the point of saturation only. Total rainfall for the 28 day growing period was 0.25 cm (0.10in). Temperatures for the corresponding period was: highest, 31.1°C (88.0 oF) and the lowest being 15.0°C (59.0 °F), with a 28 day mean of 23.3°C (74.4 °F).

Crop injury ratings, based on reduction in vigor and plant population were obtained for the entire test, 28 days after the preemergence treatments. The subjective

rating system employed that offered the greatest practical value for measuring crop tolerance, was the counting of surviving plants in the treated plots and making comparison with the stand of plants in the untreated plots. Cultivars thus demonstrating more than 15% suceptability to the treatments were considered not to be tolerant of the treatment. Cultivars that were treated and at plant count demonstrated 100 to 85% crop stand were considered tolerant, and were judged to be the commercially acceptable standard for tolerance.

The photographic method of evaluation for weed control and susceptability as described in detail by Jackson, et al (1977), was employed. It involved the counting of plant species in transparencies made of the treated and untreated plots. The grid areas sampled were 0.55m2 or (5.89ft2). Species counted in the untreated plots were considered to be 100% population for that specie, and plants encountered in treated plots were considered representative as survivors. Tolerance was then calculated mathematically.

RESULT & DISCUSSION

Of the one-hundred tomato cultivars evaluated, fourteen demonstrated tolerance to metribuzin (Sencor) at the four rates tested. These cultivars are shown in Table 2.

Table 3 lists the fifteen cultivars that demonstrated tolerance to the 1.68, 1.12 and 0.56 kg/ha rates of metribuzin (Sencor) tested.

As shown in Table 4, forty-four of the 100 cultivars demonstrated tolerance at the 1.12 and 0.56 kg/ha levels treated.

At the 0.56 kg/ha level of application, eleven cultivars were tolerant to the treatment and are listed in Table 5.

There were sixteen cultivars that demonstrate no tolerance at all levels of treatment, see Table 6.

The tomato, ***Licopersicon esculentum***, is apparently more sensitive to preemergence than to postemergence application of metribuzin. Data from Jackson & Sierra (1975) indicates that 99 of 100 cultivars were tolerant to the 0.56 kg ai/ha (0.50 lb ai/ac) application of metribuzin as postemergence herbicide, while data presented here indicates that 84 of the same 100 cultivars were tolerant at the same rate applied as preemergent herbicide. At the higher rate of 1.12 kg ai/ha (1.00 lb ai/ac), 87 cultivars were tolerant the postemergent application, while only 72 were tolerant to the preemergent application at the same rate.

Fifteen weed species (Velez & van Overbeek, 1959) were evaluated in this experiment, and are shoun in Table 7. Fourteen were completely controled at all rates tested, this indicates that the preemergent potential of metribuzin at the lowest rates. (0.56 & 1.12 kg ai/ha) for weed control in tomato appears most promising. One weed specie ***Echinchloa colonum***, Junglerice or Arrocillo, demonstrated tolerance at all rates, indicating that metribuzin would leave much to be desired when used in geographical areas where E. colonum is considered a problem weed;

SUMARY

The herbicide, metribuzin (Sencor), at four concentrations was evaluated on 100 tomato cultivars. Test duration was thirty-eight days rating the crop and weeds for tolerance or susceptibility. Self-explanatory data is summarized in seven tables, indicating the herbicide effect on crop and weed plants. Of the 100 cultivars evaluated 16 demonstrated no tolerance to any of the levels of preemergence application. One of the fifteen weed species *Echinchloa colonum* demonstrated tolerance to all levels of preemergence application of metribuzin (Sencor).

RESUMEN

El nuevo yercibida, metribuzin (Sencor) fue probado en cien variedades de tomate usando cuatro niveles de concentración. La prueba duró trientiocho días, evaluándose la resistencia fitotoxica de la cosecha y la susceptibilidad de los yerbajos al yerbicida. Los datos que se explican por sí mismos están resumidos en siete tablas que indican el efecto químico en los yerbajos y en los cultivares incluidos en el estudio.

ACKNOWLEDGEMAENT

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Table 1.
One-hundred tomato cultivars evaluated for tolerance (100 to 85% crop stand) at four levels of metribuzin (Sencor) conducted at the Fruit Experiment Substation, Juana Diaz, Puerto Rico

Ace	Fireball	Manapal	Supermarket
Arc	Floradel	Marglobe supreme	Traveler
Atkinson	Floralou	Marion	Tropi Gro
Bradley	Florida MH–1	Mecheast 22	Tropi Red
Break O' Day	Glamour	Merit	UC – 90
Calmart VNF	Grand Prix	New Yorker	UC–105g
Campbell 17VF	Heinz 1350	Oxheart	UC–134
Campbell 28	Heinz 1370	Packmore	Valiant
Campbell 52–12	Heinz 1439	Pearson A-1 Imp.	Venus
Campbell 1327	Heinz 1706	Petonech II	VF–36
Castlemor II	Highlander	Pickrite	VF–44
Castlepear 237	Homestead Elite	Pirk Deal	VF–99
Castlemech H	Homestead 24	Ponderosa	VF–109
Castlemech 9	Homestead FM 61	Potomac	VF–198
Centennial	Hamestead 500	Red Bush	VF–315
Chet	Imperial	Red Cherry, Lge.	VF–317
Chicó III	Indian River	Red Pear	VF–65–433
Chico Grande	Italian Dwarf	Roma VF	VF–134–1–2
Chico Rex	June Piuk	Royal Ace	VG–145 gus
CpC–2	L–1626	Rutger's	VF–145–21–4
Del Mar	L–2624A	San Marzano	VFN–8
Dorchester	L–2624HC	Saturn	Wabash
Early Pak 7	L–2624H	September Daun	Ealter
Es–24	L–300R	Sioux	Yates
Es–58	Manalucie	Sunray	Yellow Plum

Table 2.
The 14 tomato cultivars that demonstrated tolerance (100 to 85% crop stand) at the 2.24, 1.68, 1.12 and 0.56 kg/ha levels of preemergence aplication of metribuzin (sencor) at the Fruit Experiment Substation, Juana Díaz, Puerto Rico.

Early Par7	June Pink	Potomac
Es–58	L–1626	Venus
Fireball	Mecheast 22	Wabash
Florida MH–1	Oxheart	Yates
Italian Dwarf	Pachmore	

Table 3.
The 15 tomato cultivars that demonstrated tolerance (100 to 85% cro Stand) at the 1.68, 1.12 and o.56 kg/ha levels of preemergence application of metribuzin (Sencor) at the Fruit Experiment Substation, Juana Diaz, Puerto Rico.

Calmart VFN	Heinz 1706	L–2624H
Castlepear 237	Homestead Elite	New Yorker
Castlemech H	Homestead 500	Ponderosa
Es–24	Imperial	VF–145 Gus
Heinz 1350	L–2624C	VF–145–21–4

Table 4.
The 44 tomato cultivars that demonstrated tolerance (100 to 85% crop stand) at the 1.12 and 0.56 kg/ha levels of preemergence application of metribuzin (Sencor) at the Fruit Experiment Substation, Juana Diaz, Puerto Rico.

Ace	Highlander	Tropic Gro
Atkinson	Hamestead 24	Tropi Red
Bradley	Indian River	Valiant
Break O'Day	L 2624A	VF--44
Campbell 17VF	L – 3000R	VF–99
Campbell 52–12	Manlicie	VF–109
Campbell 1327	Manapal	VF–198
Castlemor II	Marion	VF–315
Chef	Merit	VF–317
Del Mar	Petomech II	VF–65–433
Floradel	Pickrite	VF–134–1–2
Floralou	Pink Deal	VFM–8
Grand Prix	Red Bush	Walter
Heinz 1370	Rutger's	Yellow Plum
Heinz 1439	Sioux	

Table 5.
The 11 tomato cultivars that demonstrated tolerance (100 to 85% crop stand) at the 0.56 kg/ha level of preemerge application of metribuzin (Sencor) at the Fruit Experiment Substation, Juana Diaz, Puerto Rico.

Arc	Red Cherry, Lge.	September Dawn
Castlemech 9	Royal Ace	Supermarket
Chico Grande	Saturn	Traveler
CpC–2		UC–90

Table 6.
The 16 tomato cultivars that demonstrated no tolerance (less than 85% crop stand) at all levels of preemergence application of metribuzin (Sencor) at the Fruit Experiment Substation, Juana Diaz, Puerto Rico .

Campbell 28	Glamour	San Marzano
Centennial	Homestead FM 61	Sunray
Chico III	Marglobe Supreme	UC–105g
Chico Rex	Pearson A–1 Imp.	UC–134
Dorckester	Red Pear	VF–36
	Roma VF	