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WEED CONTROL IN THE STRAWBERRY FRUIT PRODUCTION FIELD[1]

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Abstract. **Herbicides were applied for 2 seasons to a strawberry** (Fragaria xananassa **Duch.) fruit production field. During the first season, herbicides were applied on October 3, 1980 in the row middles immediately after transplanting. Treatments were napropamide (2-(a naphthoxyl)-N,N-diethylpropionamide) at 6 lb. a.i./acre, DCPA (dimethyl tetrachloroterephthalate) at 12 lb. a.i./acre, chloroxuron (3-[p-chlorophenoxy]-1,1-dimethylurea) at 6 lb. a.i./acre, and an unhoed check. Plots were evaluated and then cultivated on November 10, December 4, and March 3. During the second season, herbicides were applied on October 6, 1981 prior to transplanting to row middles and to beds with mulch temporarily removed, and on December 28 to row middles only. Treatments were DCPA at 9 lb. a.i./acre, paraquat (1,1'-dimenthyl-4,4' bipyridinium dichloride) at 1 lb. a.i./acre, napropamide at 2 and 4 lb. a.i./acre, terbacil (3-tert-butyl-5-chloro-6-methyluracil) at 1/8 and 1/4 lb. a.i./acre, and hoed and unhoed checks. During the first season, chloroxuron and napropamide gave best weed control and smallest size weeds on November 10 and December 4 with no significant yield effects. During the second season, napropamide and paraquat gave best weed control on December 1 and December 28, and weed control was excellent in all herbicide treatments on February 26. Herbicide drift in the paraquat treatment the second season resulted in some plant damage which may have reduced yields. Evening primrose** (Oenothera laciniata **Hill) was the major weed both seasons.**

Cultivation can give good weed control in row middles of strawberry fruit production fields if the soil remains dry for a sufficient length of time. However, large amounts of water are applied for plant establishment and freeze protection. This results in row middles being wet for extended periods, especially if drainage is slow. Weeds on the bed shoulder or those adjacent to the bed are also difficult to control by cultivation. Weed control in the row middles is necessary to prevent weed encroachment onto the bed, to expedite harvesting, and to prevent interference with pesticide application. The application of various herbicides to row middles (2, 5) has given some degree of weed control, but there are limitations on herbicide use during flowering and fruiting. Weeds growing through the planting slits also create the same problems as those in the row middles. The purpose of this study was to determine weed control and crop response when various herbicides were applied to the bed and to the row middles in a fruit production field in conjunction with a fumigant (67% methyl bromide and 33% chloropicrin) applied to the mulched bed.

Materials and Methods

Herbicide experiments were conducted during the winter seasons of 1980-81 and 1981-82 at ARC-Dover on Scranton (adjunct) fine sand. A randomized complete block design with 4 replicates was used each season. Beds were prepared, fumigated with 400 lb./acre of MC-33 (67% methyl bromide and 33% chloropicrin), and mulched with black polyethylene 2 wk prior to transplanting on October 3, 1980, and October 12, 1981. Herbicides were applied to row middles immediately after transplanting the first season. During the second season herbicides were applied to the row middles and to the beds with mulch temporarily removed on October 6, and to row middles only on December 28. To establish plants, overhead sprinkler irrigation was applied at 1 inch/day for 14 days after transplanting. Irrigation after establishment was applied as needed for moisture or for freeze protection. Herbicide treatments the first season were napropamide at 6 lb. a.i./acre, DCPA at 12 lb. a.i./acre, chloroxuron at 6 lb. a.i./acre, and an unhoed check. On November 10, December 4, and March 3, plots were evaluated for weed control and then cultivated. Herbicide treatments the second season were DCPA at 9 lb. a.i./acre, napropamide at 2 and 4 lb. a.i./acre, paraquat at 1 lb. a.i./acre, terbacil at 1/8 and 1/4 lb. a.i./acre, and hoed and unhoed checks. Herbicides were applied with 40 gal of water per acre using a 2-gal, hand-held applicator. Plots were evaluated for weed control on December 1, December 28, and February 6 and cultivated on December 28.

Local 'Dover' and 'Dover' plus 'Pajaro' plants were used the first and second seasons, respectively. Fertilizer, pesticide, and cultural practices standard to the area were used (4). Fruit were harvested twice weekly from December to April, graded, counted and weighed. Plants were evaluated several times each season for growth and herbicide damage.

Results and Discussion

Foliage injury was noted with the December 28, 1981 application of paraquat. Foliage loss occurred and plant size was somewhat smaller for the next 2 months. No other damage was noted despite the reported toxicity of some of the herbicides (1, 5). However, only soil applications were made in these tests, while foliage was treated in the cited experiments. Since no significant growth variations occurred either year, these data are not presented.

Herbicides had a significant effect on weed control in row middles and in the plant bed. During the first season (Table 1), chloroxuron gave the best weed control through November 10; but napropamide gave best seasonal weed control and weed size was small on all evaluation dates. Napropamide is quite resistant to leaching (3). Chloroxuron is also resistant to leaching but is very susceptible to photodestruction (3), which may have contributed to its decreased weed control with time. The principal weed species during the first season was evening primrose.

During the second season (Table 2), napropamide and paraquat gave best weed control in row middles with few weeds appearing in planting slits during the season. The rate of applied napropamide did not affect weed control. Except for the last evaluation date, weed control by terbacil was similar to that for the control. Terbacil is somewhat mobile in the soil since it has little tendency to be absorbed on soil colloids (3). Because large volumes of water were supplied to the plots, terbacil may have leached giving inferior weed control. Herbicide treatments had no significant effect on total marketable fruit yields (Tables 1 and 2). Yields from the paraquat-treated plots were somewhat low, probably the result of herbicide injury on December 28, 1981. Since January fruit were already on the plants at the

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Table 1. Effect of herbicides on weed control in row middles and on 'Dover' marketable fruit yields for the 1980-81 season.

Treatments	Rate (lb. a.i./acre)	Weed coverage (%)[z]			Weed ht (inches)			Fruit yield (flats/acre)
		A	B	C	A	B	C	
Unhoed check	—	88a[y]	90a	59a	2.6a	8.0a	7.0a	5070a
Napropamide	6	46b	53b	32b	1.0c	4.4c	2.8c	5312a
Chloroxuron	6	30c	62b	55a	1.2c	3.4c	5.8b	4936a
DCPA	12	74a	79a	54a	1.6b	5.6b	4.8b	5239a

[z]Percent of row middles covered with weeds on evaluation dates, A = Evaluated November 10, 1980; B = Evaluated December 4, 1980, C = Evaluated March 3, 1981.
[y]Mean separation in columns by Duncan's multiple range test, 5% level.

Table 2. Effect of herbicides on weed control in row middles and beds and on marketable strawberry fruit yields for the 1981-82 season.

Treatments	(lb. a.i./acre)	Weed[z] coverage (%)			Weed height (inches)			Planting[y] slit weeds	Fruit yield (flats/acre)	
		A	B	C	A	B	C		Dover	Pajaro
Hoed check		0	0	4b	0	0	1c	8ab	1911a	1721a
Unhoed check		33a[w]	61a	50a	3a	4a	8a	13a	1984a	1960a
Napropamide	2	13b	14b	1b	2a	2a	3bc	3b	2230a	1718a
Napropamide	4	10b	19b	1b	2a	3a	3bc	2b	2116a	1964a
Terbacil	1/8	30a	62a	1b	3a	4a	5b	14a	2267a	1898a
Terbacil	1/4	34a	56a	1b	3a	4a	5b	14a	2072a	2177a
DCPA	9	20ab	58a	2b	3a	4a	5b	4b	1667a	1817a
Paraquat	1	2c	14b	3b	2a	3a	3bc	5b	1572a	1645a

[z]Percent of row middles covered with weeds on evaluation dates: (A) December 1, 1981, (B) December 28, 1981, and (C) February 6, 1982.
[y]Total number of weeds per treatment growing in planting slits during season.
[w]Mean separation in columns by Duncan's multiple range test, 5% level.

time of spraying, no yield reduction occurred that month for 'Dover'. However, 'Dover' yields in February were 460 and 780 flats for the paraquat and check-hoed treatments, respectively. January and February yields of 'Pajaro' were lowest, numerically, for the paraquat treatment. Since 'Pajaro' plants fruit 2 to 3 weeks later than 'Dover' in central Forida, the first 2 months of fruit production of 'Pajaro' would more likely be affected by the paraquat damage of December 28.

The most important weeds in the bed middles during the second season were evening primrose, goosegrass (*Eleusine indica* (L.) Gaertn.), common purslane (*Portulaca oleracea* L.), and Carolina geranium (*Geranium carolinianum* L.). The most prominent weed in the planting slits was Carolina geranium.

Literature Cited

1. Albregts, E. E. and C. M. Howard. 1981. Weed control in the strawberry nursery. Proc. Fla. State Hort. Soc. 94:132-133.
2. Albregts, E. E. and C. M. Howard. 1975. Weed control in the strawberry fruiting field with paraquat. Proc. Fla. State Hort. Soc. 88: 208-211.
3. Herbicide Handbook. 1979. Weed Sci. Soc. Amer., 4th Ed. 479 pp.
4. Kostewicz, S. R. and J. Montelaro. 1974. Strawberry production guide. Univ. Fla. Coop. Ext. Serv. Cir. 142D, 14 p.
5. Rath, N. and T. O'Callaghan. 1968. Preliminary trials with terbacil for weed control in soft fruits. Proc. 9th Biennial Weed Control Conf., p. 922-927.