Table 4. Means of black spot fruit disorder in both bell and yellow pepper cultivars in 1982.

	Black spot					
	Bell fruit no.		Yellow fruit			
	1000/Acre		1000/Acre		%	
Cultivar	1982	1982	1982	1982	1982	1982
Tambel 1	9.0 a[z]	8.5 a				
Sharina	2.6 b					
Delray Bell	1.0 b	0.2 b				
Early Calwonder	0.2 b	0.0 b				
Valley Giant		5.4 ab				
P 7118		0.0 b				
Bell Tower		0.0 b				
80-1793		0.0 b				
FLBG-1			90 a	33.5[y]	30 a	22.2[y]
Cubanelle			0 b	0.0	0 b	0.0
Hungarian Yellow Wax				9.0		3.2
Sweet Banana				0.5		0.4

[z]Mean separation by Duncan's multiple range test, 5% level.
[y]Mean of 2 replications.

In summary 'Early Calwonder', a popular commercial cultivar in Florida, produced fewer black spot fruits than those counted from the tobacco mosaic virus-tolerant cultivars: 'Tambel 1', 'Hybelle Hybrid', 'Yolo Wonder', 'Grande Rio 66', 'Resistant Florida Giant', 'Pip', and 'Valley Giant'. Cubanelle tolerated the disorder in the yellow fruit trials.

The black spot disorder is not usually seen early in the fruit development. Therefore, in order to avoid or reduce losses, the fruits can be harvested at the mature green stage or earlier in the susceptible cultivars, a practice often followed by some growers including Mr. W. A. DuBois, Sr., Dubois Farms, Inc., Delray Beach.

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WEED CONTROL IN THE STRAWBERRY SUMMER NURSERY

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Abstract. **Herbicides and soil fumigants were evaluated for weed control and daughter plant production in a strawberry (*Fragaria* x *ananassa* Dutch.) summer nursery in 1981, 1982, and 1984. In 1981, napropamide (2-(naphthoxy)-N,N-diethylpropionamide) and DCPA (dimethyl tetrachloroterephthalate) were not injurious to 'Dover' strawberry plants, while they severely reduced plant vigor in 1982. Postemergence applications of acifluorfen (sodium 5-[2-chloro-4-(trifluoromethyl) phenoxy]-2-nitrobenzoate), fluazifop-butyl (butyl 2-[4-[(5-(trifluoromethyl)-2-pyridinyl)oxy]phenoxy]propanoate) and sethoxydim (2-[1-(ethoxyimino)butyl]-5-[2-ethylthio) propyl]-3-hydroxy-2-cyclohexen-1-one) did not reduce plant vigor in 1982, while application of bentazon (3-isopropyl-1H-2,1,3-benzothiadiazin-4(3H)-one2,2-dioxide) resulted in almost complete death.**

Multi-chemical weed management systems were evaluated in 1984 with 'Dover' and 'Florida Belle' strawberry plants. Two applications of napropamide and alachlor (2-chloro-2' ,6'-diethyl-N-(methoxymethyl)acetanilide) reduced strawberry plant vigor. After 3 applications of each preemergence herbicide, 1 application of fluazifop-butyl and 1 application of glyphosate, (N-(phosphonomethyl)glycine), plant vigor was reduced significantly. Four applications of napropamide, DCPA or alachlor, in conjunction with 2 applications of fluazifop-butyl and 3 wiper applications of glyphosate controlled beggarweed (*Desmodium tortuosum* (Sw.) DC.) and goosegrass (*Eleusine indica* (L.) Gaertn.) as well as hand weeding. Acceptable control of hairy indigo (*Indigofera hirsuta* Harvery) was obtained with napropamide + fluazifop-butyl + glyphosate. Total number of 'Florida Belle' daughter plants was reduced by treatments containing napropamide and alachlor, while all of the herbicide treatments reduced the number of 'Dover' plants produced.

Weed control is a major factor limiting strawberry daughter plant production in Florida. Due to the general sensitivity of the crop to herbicides with variations between cultivars, the frequent presence of weeds which are difficult to control, and the season of plant production with its associated weed problems, most growers rely on cultivation and hand weeding. Locascio (3) reported good weed control with diphenamid and DCPA in the summer nursery; however, DCPA was observed to produce some injury on plants. Napropamide and DCPA are labelled for use in fruiting strawberries, yet growers have reported injury oc-

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casionally. Alachlor and acifluorfen have provided good weed control and little to no crop injury in research conducted on fruiting strawberries (1), but have not been evaluated for strawberry plant production.

This research was conducted in an effort to develop a chemical weed management system for production of strawberry daughter plants in the summer nursery.

Materials and Methods

Three experiments were conducted at the Agricultural Research and Education Center at Dover on a Scranton loamy sand. Treatments were arranged in a randomized complete block design and replicated 4 times. Herbicides were applied with a CO_2 back pack sprayer equipped with 11004 flat fan nozzles operated at 27 psi pressure and 3 mph delivering 26.6 gal/acre of spray solution. Strawberry plant vigor ratings were made using a pretransformed 0 to 10 scale (2) where 0 indicates all plants were dead and 10 represents no injury. Weed control was evaluated using a similar pretransformed rating scale where 0 indicates no control and 10 represents complete control. Grass species in the test areas consisted of crabgrass (*Digitaria cilaria* (Retz.) Kiel.) and goosegrass. Broadleaf weed species were beggarweed, crotolaria (*Crotolaria spectabilis* Roth), hairy indigo, and red weed (*Melochia corchorifolia* L.). Annual sedge (*Cyperus compressus* L.) was also present in some years. Plots which did not receive a fumigant treatment in 1981 and 1982 were treated with a nematicide. In 1984, the entire experimental area was fumigated with 400 lb./acre of 98% methyl bromide, 2% chloropicrin to reduce the population of nematodes and soil borne diseases. Fertility was supplied by an initial application of 20 N, 9 P, and 17 K lb./acre with additional sidedressings of fertilizer supplied as needed to maintain good plant growth. All data were analyzed by ANOVA and treatment means were ranked by Duncan's multiple range test.

Experiment 1. In 1981, treatments were 400 lb./acre of 67% methyl bromide and 33% chloropicrin fumigant, 400 lb./acre of 98% methyl bromide and 2% chloropicrin fumigant, 2 lb. a. i./ acre napropamide, 9 lb. a.i./acre DCPA, or 4 lb. a.i./acre diphenamid. Fumigants were injected into the beds 14 June and covered with 1.5 mil polyethylene film, which was removed 2 weeks later. Herbicides initially were applied pretransplant 1 July and a second application was made posttransplant over the top of the plants 4 Sept. 1981. Ten 'Dover' strawberry plants were planted 1 ft apart in a single row in 15-ft plots on a 4-ft wide bed with a row spacing of 5 ft on 2 June. Hoed checks were weeded as needed. Crotolaria and beggarweed were hoed from all plots before the second application of herbicide. Strawberry plant vigor was evaluated 16 July and 18 Sept. Weed control was evaluated 16 July, 18 Sept., and 19 Oct. 1981. Daughter plants were dug and counted 29 Oct. 1981.

Experiment 2. In 1982, treatments were an untreated check, a hoed check, fumigation with 400 lb./acre of 98% methyl bromide, 2% chloropicrin mixture, pretransplant applications (initial application) of 2 lb. a.i./acre napropamide, and 9 lb. a.i./acre DCPA, and postemergence applications of acifluorfen (0.25 and 0.50 lb. a.i./acre), fluazifop-butyl (0.25 and 0.50 lb. a.i./acre), sethoxydim (0.2 and 0.4 lb. a.i./acre), 0.4 lb. a.i./acre sethoxydim + 0.25 lb. a.i./acre acifluorfen, 0.25 lb. a.i./acre fluazifop-butyl + 0.25 lb. a.i./acre acifluorfen, and 0.75 lb. a.i./acre bentazon. Ten 'Dover' strawberry plants were planted in 15-ft plots as in experiment 1 on 28 May 1982. Hoes checks were weeded as needed. Pretransplant treatments were applied 28 May, while postemergence applications were made 12 June 1982. An additional application of each herbicide was applied 23 June by spraying over the top of the plants. Plant vigor and weed control were evaluated 23 June and 5 Aug. 1982. Plants were not dug due to severe weed competition.

Experiment 3. In 1984, treatments were an untreated check, a hoed check, and pretransplant application of 2 lb. a.i./acre napropamide, 9 lb. a.i./acre DCPA, or 1.5 lb. a.i./acre alachlor. Ten plants of 'Dover' and 'Florida Belle' strawberry were planted 1 ft apart in a single row on 4-ft wide beds in 26-ft long plots on a 5-ft row spacing. After the initial pretransplant application (7 June), an additional application of each herbicide was made over the top of the strawberry plants on 26 June and 2 more applications of each was made as a tank mix with 0.25 lb. a.i./acre fluazifop-butyl on 10 Aug. and 25 Sept. 1984. Additionally, a 33% solution of glyphosate was applied to weeds taller than the strawberry plant canopy with a wiper applicator on 10 Aug., 28 Aug., and 25 Sept. Strawberry plant vigor was evaluated 26 June, 10 Aug., 28 Aug., and 25 Sept. 1984. Weed control (counts of numbers of weeds) was evaluated on the same dates as vigor and on 31 Oct. Daughter plants were dug, graded and counted 31 Oct. 1984.

Results and Discussion

Experiment 1. One application of each herbicide or fumigant had no effect on strawberry plant vigor, whereas, 2 applications of diphenamid reduced vigor relative to napropamide, but was not different from the other treatments (Table 1). All treatments provided equal and excellent control of grass weeds and annual sedge (Table 2). None of the treatments provided acceptable control (rating greater than 7.0) of beggarweed or crotolaria. On 18 Sept., 2 weeks after the second application of each herbicide, grass control was no longer acceptable in plots fumigated with 67% methyl bromide and 33% chloropicrin and was poorer than that obtained with the other treatments. Control of crotolaria, beggarweed and annual sedge was acceptable with all treatments after supplemental hoeing prior to the second application of herbicides on 4 Sept.

By the end of the season (29 Oct.), napropamide provided significantly better grass control than either of the 2 fumigants (Table 2). DCPA and diphenamid provided better grass control than the 67% methyl bromide, 33% chloropicrin mixture and were not different from napropamide. All treatments provided acceptable control of broadleaf weeds and had no effect on the number of daughter plants produced (Table 1).

Experiment 2. One application of napropamide or DCPA reduced plant vigor to an unnacceptable level (Table 3). Although vigor of strawberry plants treated with fluazifop-butyl + acifluorfen was commercially unacceptable (rating less than 7.0), it was not different from vigor of plants in the untreated or hoed checks. Vigor was not acceptable after 2 applications of napropamide, DCPA, 0.50 lb. a.i./acre fluazifop-butyl, or bentazon.

Table 1. Effect of fumigant and herbicide treatments on 'Dover' strawberry plant vigor and production of daughter plants in a summer nursery. Dover, Fla. 1981.

Treatment	Rate (lb. a.i./acre)	Application	Vigor rating[z] Applications (No.)[y] 1	2	Daughter plants (No./plot)
Methyl bromide (67%), chloropicrin (33%)	400	Preplant, broadcast	9.4 a[x]	9.2 ab	201 a
Methyl bromide (98)%, chloropicrin (2%)	400	Preplant, broadcast	9.0 a	8.8 ab	308 a
Napropamide	2	Posttransplant	9.5 a	9.8 a	357 a
DCPA	9	Posttransplant	8.8 a	8.9 ab	209 a
Diphenamid	4	Posttransplant	8.9 a	8.2 b	201 a

[z]Plant vigor was based on visual evaluation using a 0 to 10 scale where 0 = all dead and 10 = optimum growth.
[y]Treatments containing methyl bromide and chloropicrin were applied once.
[x]Mean separation in columns by Duncan's multiple range test, 5% level.

Table 2. Effect of fumigant and herbicide treatments on weed control in 'Dover' strawberry in a summer nursery, Dover, Fla. 1981.

Treatment	Rate (lb. a.i./acre)	Control rating[z] Grasses[y] 16 July	18 Sept.	29 Oct.	Broadleaf weeds[x] 16 July	18 Sept.	29 Oct.	Annual sedge 16 July	18 Sept.
Methyl bromide (67%), chloropicrin (33%)	400	9.9 a[w]	6.2 b	5.2 c	0.8 a	7.9 a	7.5 a	10.0 a	7.5 a
Methyl bromide (98%), chloropicrin (2%)	400	9.9 a	8.6 a	7.1 bc	1.0 a	8.2 a	8.2 a	10.0 a	9.2 a
Napropamide	2	10.0 a	10.0 a	9.8 a	2.0 a	8.2 a	8.2 a	10.0 a	10.0 a
DCPA	9	10.0 a	9.2 a	8.4 ab	2.4 a	7.2 a	7.6 a	10.0 a	9.6 a
Diphenamid	4	10.0 a	9.0 a	8.4 ab	1.6 a	8.5 a	7.8 a	10.0 a	7.2 a

[z]Weed control was evaluated using a pretransformed rating scale where 0 indicates no control and 10 represents complete control.
[y]Grass weeds were crabgrass and goosegrass.
[x]Broadleaf weeds were beggarweed and crotolaria.
[w]Mean separation in columns by Duncan's multiple range test, 5% level.

Table 3. Effect of herbicide treatments on vigor of 'Dover' strawberry plants in a summer nursery. Dover, Fla. 1982.

Treatment	Rate (lb. a.i./acre)	Method of initial application	Vigor rating[z] Applications (No.) 1	2
Untreated check			8.2 ab[y]	2.9 d
Hoed check			8.4 ab	9.1 a
Napropamide	2.0	pretransplant	4.1 d	3.8 cd
DCPA	9.0	pretransplant	5.4 cd	2.5 d
Acifluorfen	0.25	postemergence	8.1 ab	8.4 ab
Acifluorfen	0.50	postemergence	7.6 ab	6.0 abc
Sethoxydim	0.20	postemergence	8.4 ab	7.2 ab
Sethoxydim	0.40	postemergence	7.0 abc	5.6 bc
Fluazifop-butyl	0.25	postemergence	8.5 ab	8.0 ab
Fluazifop-butyl	0.50	postemergence	8.2 ab	6.5 abc
Sethoxydim + acifluorfen	0.40 + 0.25	postemergence	7.0 abc	7.9 ab
Methyl bromide (98%), chloropicrin (2%)	400	preplant	8.8 a	8.0 ab
Fluazifop-butyl + acifluorfen	0.25 + 0.25	postemergence	6.5 bc	8.4 ab
Bentazon	0.75	postemergence	–	1.5 d

[z]Vigor was evaluated using a pretransformed 0 to 10 rating scale where 0 indicates all plants were dead and 10 represents no injury.
[y]Mean separation in columns by Duncan's multiple range test, 5% level.

Napropamide, acifluorfen, both alone and in combination with fluazifop-butyl or sethoxydim, and a mixture of 98% methyl bromide and 2% chloropicrin provided acceptable control of annual sedge early in the season; however, by midseason, after 2 applications of each herbicide, only napropamide, bentazon, and both rates of acifluorfen, alone, provided acceptable annual sedge control (Table 4). Acceptable grass control was obtained with napropamide, DCPA, the high rate of acifluorfen, both rates of sethoxydim and fluazifop-butyl, and tank mixes of sethoxydim or fluazifop-butyl with acifluorfen early in the season, but about 6 weeks later, after a second application of each herbicide, only napropamide and individual applications of sethoxydim or fluazifop-butyl were acceptable. Acifluorfen and combinations of acifluorfen with fluazifop-butyl or sethoxydim controlled beggarweed as well as hoeing early in the season, whereas, by midseason only the high rate of acifluorfen was acceptable. None of

Table 4. Effect of herbicide treatments on weed control in 'Dover' strawberry plants in a summer nursery. Dover, Fla. 1982.

Treatment	Rate (lb. a.i./acre)	Control rating[z] Applications (No.) 1	2	1	2	1	2	1	2
		Annual sedge		Grass		Beggarweed		Crotolaria	
Untreated check	–	2.8 c[y]	0.0 e	0.0 e	0.0 e	0.8 cd	2.5 bc	0.2 e	4.9 abc
Hoed check	–	9.8 ab	9.2 ab	10.0 a	9.0 abc	9.8 a	8.1 a	10.0 a	9.1 a
Napropamide	2.0	9.7 ab	9.0 ab	9.5 a	7.4 abcd	4.0 bc	0.5 c	3.2 bcde	3.6 abc
DCPA	9.0	4.0 c	2.5 cde	8.1 b	4.8 d	2.2 cd	4.4 abc	0.5 e	5.2 abc
Acifluorfen	0.25	9.1 ab	9.8 a	4.2 c	0.0 e	6.9 ab	4.6 abc	2.2 cde	3.8 bc
Acifluorfen	0.50	9.9 a	9.6 a	8.9 ab	0.8 e	9.2 a	7.6 ab	6.2 b	1.1 bc
Sethoxydim	0.20	2.2 c	0.0 e	10.0 a	7.8 abcd	1.5 cd	3.1 abc	1.0 e	5.8 ab
Sethoxydim	0.40	5.9 bc	2.1 de	9.9 a	9.3 abc	2.0 cd	3.6 abc	3.0 bcde	2.6 bc
Fluazifop-butyl	0.25	4.6 c	2.0 de	10.0 a	9.6 ab	0.0 d	3.1 abc	0.2 e	5.0 abc
Fluazifop-butyl	0.50	3.8 c	0.5 e	10.0 a	9.9 a	1.0 cd	2.8 bc	1.2 de	5.8 ab
Sethoxydim + acifluorfen	0.40 + 0.25	9.1 ab	6.1 abc	9.9 a	5.8 cd	8.5 a	4.4 abc	5.5 bc	0.0 c
Methyl bromide (98%), chloropicrin (2%)	400	8.5 ab	5.3 bcd	2.0 d	0.0 e	0.0 d	2.4 bc	2.0 cde	5.6 ab
Fluazifop-butyl + acifluorfen	0.25 + 0.25	9.4 ab	6.5 ab	10.0 a	6.9 abcd	9.2 a	6.0 ab	4.8 bcd	0.0 c
Bentazon	0.75	–	9.5 a	–	0.0 e	–	2.8 bc	–	5.5 ab

[z]Weed control was evaluated using a pretransformed 0 to 10 rating scale where 0 indicates no control and 10 represents complete control.
[y]Mean separation in columns by Duncan's multiple range test, 5% level.

Table 5. Effect of herbicide treatments on vigor[z] of 'Dover' and 'Florida Belle' strawberry plants in a summer nursery. Dover, Fla. 1984.

Treatment	Rate (lb. a.i./acre)	Dover Applications (No.) 1	2	3[y]	3[x]	Florida Belle Applications (No.) 1	2	3[y]	3[x]
Untreated check	–	8.6 ab[w]	5.8 b	5.0 b	5.0 b	9.5 a	6.0 c	4.0 b	2.8 c
Hoed check	–	9.2 a	9.9 a	9.8 a	9.9 a	9.9 a	9.6 a	9.1 a	9.0 a
Napropamide	2.0	4.8 c	6.6 b	5.2 b	5.6 b	8.1 a	7.0 bc	4.4 b	5.6 b
DCPA	9.0	7.8 ab	8.8 a	7.0 b	7.8 ab	8.2 a	8.5 ab	5.9 b	6.8 b
Alachlor	1.5	6.5 bc	6.9 b	5.1 b	5.5 b	8.1 a	6.2 c	4.6 b	5.0 bc

[z]Vigor was evaluated using a pretransformed 0 to 10 rating scale where 0 indicates all plants dead and 10 represents no injury, optimum growth.
[y]Included 1 application of 0.25 lb. a.i./acre fluazifop-butyl tank-mixed with the preemergence herbicides and 1 wiper application of a 44% solution of glyphosate.
[x]Included 1 application of 0.25 lb. a.i./acre fluazifop-butyl tank-mixed with the preemergence herbicides and 2 wiper applications of a 33% solution of glyphosate.
[w]Mean separation in columns by Duncan's multiple range test, 5% level.

the chemical treatments provided acceptable control of crotolaria at either rating date. Strawberry plants were not dug in this experiment due to severe weed infestation and competition.

Experiment 3. Repeat applications of napropamide and alachlor reduced vigor of 'Dover' strawberry plants (Table 5). Although DCPA injured 'Dover' plants, vigor was comparable to the hoed check after 1 and 2 applications, but decreased immediately after the third application, then improved somewhat with time. 'Florida Belle' plants were not affected by one application of the herbicide treatments, but when applied 2 or more times, vigor decreased below that of the hoed check.

Although the population of goosegrass was not very high in this test, due to fumigation of the soil, goosegrass control was comparable to hoeing with all of the herbicide treatments (Table 6). Goosegrass control was beginning to decrease with DCPA and alachlor, even after 2 applications, but inclusion of fluazifop-butyl in the spray preparation corrected this problem. Beggarweed was one of the most prevalent weeds in the experimental area and was not adequately controlled with any herbicide treatment until wiper applications of glyphosate were made. Even after 3 applications, glyphosate did not control all of the beggarweed, but it did render it much more manageable. Competition from beggarweed and hairy indigo in the dense populations found in the untreated check probably accounts for the low populations of other weeds in the untreated check.

Control of hairy indigo at the first evaluation date was unacceptable with all treatments, including hoeing, presumably due to rapid emergence of seedlings after disturbance of the soil by hoeing (Table 7). Two applications of the preemergence herbicides did little to improve the situation. Plots treated with DCPA had more indigo seedlings than the hoed check. Treatments containing napropamide had fewer indigo plants than the untreated check after 1 and 3 applications of glyphosate. Wiper applications of glyphosate appeared to reduce the indigo population to a limited degree, but still were not totally satisfactory as evidenced by the higher populations of indigo in plots treated with DCPA or alachlor after 3 applications of glyphosate. Red weed became noticeable in plots after the second application of herbicides and began to senesce naturally before the fourth application. Treatments containing napropamide and alachlor provided control of red weed comparable to hoeing.

All herbicide treated plots produced fewer 'Dover' strawberry plants, both total number and number for each grade, than the hoed check and were not different from

Table 6. Effect of varying numbers of applications of herbicide treatments on control of goosegrass and beggarweed in 'Dover' and 'Florida Belle' strawberry plants in a summer nursery. Dover, Fla. 1984.

Treatment	Rate (lb. a.i./acre)	Goosegrass (No. of plants/plot) Applications (No.) 1	2	3[z]	3[y]	4[x]	Beggarweed (No. of plants/plot) Applications (No.) 1	2	3[z]	3[y]	4[x]
Untreated check	–	6 a[w]	7 a	6 a	6 a	4 a	39 a	29 a	36 a	28 a	28 a
Hoed check	–	0 b	0 b	0 b	0 b	0 b	0 b	2 b	0 b	0 b	0 b
Napropamide	2.0	0 b	0 b	0 b	0 b	0 b	23 ab	22 ab	13 b	10 b	5 b
DCPA	9.0	2 b	1 ab	0 b	0 b	0 b	28 ab	28 a	9 b	6 b	6 b
Alachlor	1.5	0 b	4 ab	0 b	0 b	0 b	18 ab	21 ab	12 b	8 b	6 b

[z]Included a wiper application of 33% solution of glyphosate and 1 application of 0.25 lb. a.i./acre of fluazifop-butyl tank-mixed with the preemergence herbicides.
[y]Included 1 application of 0.25 lb. a.i./acre of fluazifop-butyl tank-mixed with the preemergence herbicides and 2 wiper applications of 33% glyphosate solution.
[x]Included 2 applications of 0.25 lb. a.i./acre fluazifop-butyl tank-mixed with the preemergence herbicides and 3 wiper applications of 33% glyphosate solution.
[w]Mean separation in columns by Duncan's multiple range test, 5% level.

Table 7. Effect of varying numbers of applications of herbicide treatments on control of hairy indigo and red weed in 'Dover' and 'Florida Belle' strawberry plants in a summer nursery. Dover, Fla. 1984.

Treatment	Rate (lb. a.i./acre)	Hairy indigo (No. of plants/plot) Applications (No.) 1	2	3[z]	3[y]	4[x]	Red weed (No. of plants/plot) Applications (No.) 2	3[z]	3[y]
Untreated check	–	10 a[w]	14 ab	15 a	11 ab	16 a	8 a	12 a	3 a
Hoed check	–	7 a	0 b	0 c	0 b	0 c	0 b	0 b	0 b
Napropamide	2.0	6 a	7 ab	4 bc	3 ab	4 bc	1 b	2 b	1 ab
DCPA	9.0	24 a	34 a	9 abc	27 a	12 ab	2 ab	4 ab	2 ab
Alachlor	1.5	14 a	14 a	11 ab	8 ab	10 ab	0 b	1 b	0 b

[z]Included a wiper application of 33% solution of glyphosate and 1 application of 0.25 lb. a.i./acre of fluazifop-butyl tank-mixed with the preemergence herbicides.
[y]Included 1 application of 0.25 lb./acre of fluazifop-butyl tank-mixed with the preemergence herbicides and 2 wiper applications of 33% glyphosate solution.
[x]Included 2 applications of 0.25 lb. a.i./acre fluazifop-butyl tank-mixed with the preemergence herbicides and 3 wiper applications of 33% glyphosate solution.
[w]Mean separation in columns by Duncan's multiple range test, 5% level.

Table 8. Effect of herbicide treatments on production of 'Dover' and 'Florida Belle' strawberry daughter plants in a summer nursery. Dover, Fla. 31 Oct. 1984.

Treatment[z]	Rate (lb. a.i./acre)	Method of initial application	No. of applications	Dover (No./plot) Extra small	Small	Medium	Large	Total	Florida Belle (No./plot) Extra small	Small	Medium	Large	Total
Untreated check	–	–	–	64 b[x]	90 b	59 b	12 b	226 b	32 a	51 b	41 c	8 b	133 b
Hoed check	–	–	–	130 a	221 a	202 a	73 a	626 a	72 a	170 a	120 a	22 ab	384 a
Napropamide	2.0	preemergence	4										
+ Fluazifop-butyl[y]	+0.25	postemergence	2	39 b	68 b	81 b	38 b	225 b	68 a	75 b	40 c	18 ab	201 b
DCPA	9.0	preemergence	4										
+ Fluazifop-butyl[y]	+0.25	postemergence	2	70 b	120 b	108 b	35 b	333 b	55 a	96 b	87 b	30 a	268 ab
Alachlor	1.5	preemergence	4										
+ Fluazifop-butyl[y]	+0.25	postemergence	2	64 b	76 b	75 b	28 b	242 b	44 a	57 b	36 c	14 ab	152 b

[z]Existing weeds were removed from herbicide treated plots by applying a 33% solution of Roundup with a wiper application on 10 Aug., 28 Aug. and 25 Sept. 1984.
[y]Fluazifop-b applied as a tank mix with the indicated herbicides plus 1% crop oil concentrate v/v.
[x]Mean separation in columns by Duncan's multiple range test, 5% level.

the untreated check (Table 8). A slightly different trend was observed with 'Florida Belle' where greater numbers of medium and large plants was produced in plots treated with DCPA in combination with fluazifop-butyl and glyphosate as compared to the untreated check. Fewer 'Florida Belle' plants (total number) were produced with treatments containing napropamide or alachlor.

Results of these experiments indicate that the response of strawberry plants to herbicides varies between cultivars and year and suggests that development of effective chemical weed management programs suitable for all cultivars will be difficult. As long as the predominant cultivars grown commercially change from year to year, it will be difficult to determine what herbicides the industry can use safely. Additionally, weed control in the summer nursery will have to rely on soil fumigation combined with either cultivation and hand weeding or a multi-chemical approach augmented by cultivation and hand weeding to

control legumes, such as crotolaria, sesbania, sicklepod and hairy indigo. Growers who insist upon using herbicides would probably experience the least injury with preemergence applications of DCPA and postemergence applications of fluazifop-butyl for control of emerged grass weeds.

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HERBICIDES FOR IRISH POTATOES ON ALKALINE MARL SOIL

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Abstract. **Pre and postemergence herbicides were applied to potatoes (*Solanum tuberosum* L.) to evaluate their affect on yield, weed control, and crop tolerance. Broadspectrum control of broadleaf weeds, grasses and sedges was obtained when metolachlor [2-chloro-N-(2-ethyl-6-methylphenyl)-N-(2-methoxyl-1-methylethyl)acetamide] was tank-mixed with either metribuzin [4-amino-6-tert-butyl-3-(methylthio-astriazin-5(4H)-one 4-amino-6-(1,1-dimethylethyl)-3-(methylthio)-1,2,4-triazin-5(411)-one] or linuron [3-(3,4-dichlorophenyl)-1-methoxy-1-methylurea (N'-(3,4-dichlorophenyl)-N-methoxy-N-methylurea)] in preemergence applications the first season (1982-83). Metolachlor applications stunted red- but not white-skinned potatoes; however, affected plants recovered and differences in yield did not occur among treatments. In the 1983-84 trial, control of bermudagrass (*Cynodan dactylon* L. Persoon) was significantly improved with a postemergence application of fluazifop-butyl [2-[4-[[5-(trifluoro-methyl)-2-pyridinyl]oxy]phenoxy]propanoate] at a rate of 0.25 lb. a.i./acre compared to all other treatments. Metribuzin applied postemergence at a rate of 0.5 lb. a.i./acre increased smartweed (*Polygonum* spp.) control compared to a preemergence application of metribuzin at 0.75 lb. a.i./acre. Crop phytotoxicity or yield difference did not occur the second season.**

Potatoes were produced on 5,400 acres in Dade County, Florida, with a total value of over 12.5 million dollars in the 1983-84 season (1). The crop is grown on Perrine marl (4) soil dominated by calcium carbonate. Alkaline soil conditions exist with the pH averaging between 7.6 and 7.8.

Dade County is the southernmost county on the east coast of the Florida Peninsula. Its location permits intensive production of vegetable crops during the winter. Planting of the potato crop begins in late Oct. and continues through Dec. Harvesting begins in mid-Feb. and continues through Apr. The red-skinned potato cultivar LaRouge makes up about 85% of the total acreage planted, while the white-skinned 'LaChipper' is the primary cultivar planted on the remaining 15% of the acreage. Essentially all of the crop is produced for the fresh market.

Several herbicide studies for potatoes in Florida have been conducted (2,3,5) but little recent information is available on potatoes grown in Dade County. Noonan (1961 found EPTC (S-ethyl dipropylthiocarbamate) applied both preplant and at layby gave acceptable control of purple and yellow nutsedge (*Cyperus rotundus* L. and *C. esculentus* L.). Layby applications alone were also effective. Local growers continue to use this control method where nutsedge populations are heavy. Metribuzin, applied postemergence is the only other herbicide commonly used in potato weed control programs by local growers.

Tests and evaluations of herbicides under the unique soil and climatic conditions in Dade County are essential to provide growers with the most current and effective weed control programs possible. The purpose of this study was to evaluate recently registered potato herbicides applied alone and in combination with standard potato herbicides. In addition, a promising new grass herbicide fluazifop-butyl was evaluated for its effectiveness in potato weed control programs.

Materials and Methods

Three studies were conducted in potato fields operated by Dan Williams & Sons, Inc., Homestead, Florida. Fertilizer applications and disease and insect control measures were per grower standards. Experiments 1 and 2 were conducted in the 1982-83 growing season. Red-skinned 'LaRouge' was used in Expt. 1 while white-skinned 'LaChipper' was used in Expt. 2. Both experiments were planted in adjacent plots on 30 Dec. 1982, and were harvested on 14 Apr. 1983. Experiment 3 was conducted during the 1983-84 season with 'LaRouge' and the planting date was 4 Nov. 1983. Potatoes were harvested on 19 Mar. 1984.

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