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.

Literature Cited

1. Gilreath, J. P. and E. E. Albregts. 1984. Weed control in mulched strawberry production. Proc. Fla. State Hort. Soc. 97:171-174.
2. Little, T. M. and F. J. Hills. 1978. Agricultural experimentation: design and analysis. Wiley. New York.
3. Locascio, S. J. 1962. Strawberry nursery weed control. Proc. Fla. State Hort. Soc. 75:215-217.

Proc. Fla. State Hort. Soc. 98:263-266. 1985.

HERBICIDES FOR IRISH POTATOES ON ALKALINE MARL SOIL

R. V. TYSON
IFAS, University of Florida
Dade County Extension Service
18710 SW 288 Street
Homestead, FL 33030
W. M. STALL
University of Florida, IFAS
Vegetable Crops Department
1255 Fifield Hall
Gainesville, VL 32611
S. K. O'HAIR
IFAS, University of Florida
Tropical Research and Education Center
18905 SW 280 Street
Homestead, FL 33031

Additional index words. Solanum tuberosum, weed control, grass, broadleaf weeds.

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-as-triazin-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.

Florida Agricultural Experiment Stations Journal Series No. 7085.

All experiments were arranged in a completely randomized block design with 4 replications. Plot size was 13 × 20 ft in Expt. 1 and 2. The central 10 × 6.7 ft section was harvested for data collection. Plot size in Expt. 3 was 13 × 25 ft with the central 15 × 6.7 ft section harvested for data. Grade sizes were A—minimum diameter 1 and 7/8 inches with no maximum diameter, B—1 and ½ to 2 and ¼ inches in diameter, C—less than 1 and ½ inch diameter.

Herbicides were applied with a backpack CO_2 sprayer using 11003 teejet nozzles at 19.2 gal/acre and 20 psi for preemergence applications and 23.3 gal/acre and 30 psi for postemergence applications. Walking speed was 3 mph.

In all trials, 2 cultivations (standard practice before emergence) were made by the grower prior to the preemergence herbicide applications. Preemergence herbicides in experiments 1 and 2 were applied on 7 Jan. 1983; while in Expt. 3, they were applied on 16 Nov. 1983. In Expt. 1 and 2, postemergence applications of fluazifop-butyl were made on 3 Feb. 1983, when the herbicide was applied alone and for the first application when it was applied twice during the season. The second application of fluazifop-butyl was on 24 Feb. 1983. The postemergence applications in Expt. 3 were made on 13 Dec. 1983. All postemergence applications contained crop oil at the rate of 1 quart per 25 gal of water.

Weed control ratings for Expt. 1 and 2 were made on 28 Mar. 1983, and in Expt. 3 they were made on 16 Feb. 1984. Ratings were made in the normal fashion in Expt. 1 and 2 with the treatments uncultivated after the preemergence herbicide applications. The scale was from 0 (no weed control) to 10 (complete weed control). In Expt. 3, the area was mistakenly cultivated approximately one month after emergence. Consequently, uncultivated areas along the entire length of the experiment exhibiting maximum weed pressure were used for treatment comparison in the rating system.

The predominant weed species and their approximate distribution were; yellow nutsedge—18%, purple nutsedge—18%, bermudagrass [*Cynodon dactylon* (L.)Pers.]—15%, Smartweed (*Polygonum* species)—15%, common lambsquarters (*Chenopodium album* L.);fd15% and miscellaneous—19%. The miscellaneous category includes weeds that were not sufficiently uniform among plots to rate such as goosegrass [*Eleusine indica* (L.) Gaertn.], pigweed (*Amaranthus* species) and amaranth (*Amaranthus* species).

Results and Discussion

Yields in Expt. 1 (Table 1), regardless of grade or treatment, were not statistically different. All herbicide treatments except fluazifop-butyl provided excellent broadleaf weed control up to 88 days after planting. Excellent grass and sedge control was obtained where metolachlor was applied alone or in tank-mix combination with metribuzin or linuron. This tank-mix combination significantly improved grass and sedge control compared to the application of metribuzin or linuron alone.

Potato plants in plots receiving applications of metolachlor herbicide (Expt. 1.) were stunted 2-3 inches compared to other treatments when crop phytotoxicity ratings were made 25 days after planting. However, no crop phytotoxicity was observed among the treatments when plants were reevaluated 45 days later.

The results of the treatments on potato yield and weed control in Expt. 2 (Table 2) were very similar to those obtained in Expt. 1. The major differences between the two experiments was that no stunting of potato plants with metolachlor applications was observed in 'LaChipper' (Expt. 2.) compared to some stunting of 'LaRouge' (Expt. 1.) when this herbicide was used. Thus, it appears that the stunting affect was a cultivar response. Metolachlor treatments were increased in Expt. 3 with 'LaRouge' to further investigate this affect.

Fluazifop-butyl provided excellent control of the grass weeds but no control of the sedges in Expt. 1 and 2. Selected weed species from these two groups were rated

Table 1. Yield of 'LaRouge' potatoes and weed control as influenced by herbicide treatment, Expt. 1, 1982-83.

Treatment	Rate (lb. a.i./acre)	Method of[z] application	Yield (cwt/acre) Size A[y]	B	C	Total	Weed control rating[x] Broadleaf	Grasses and sedges
Metribuzin	0.5	pre	86[w]	26	6	118	9.5 ab	6.9 b
Linuron	0.75	pre	86	25	6	117	9.9 a	7.5 b
Metolachlor	1.5	pre	97	33	9	138	9.0 b	9.0 a
Metribuzin + metolachlor	0.5 + 1.5	pre	95	33	9	137	9.6 a	9.0 a
Linuron + metolachlor	0.75 + 1.5	pre	82	26	5	112	9.9 a	9.3 a
Fluazifop-butyl	0.125	post	81	32	10	122	0.0 c	5.3 c
Fluazifop-butyl	0.25	post	69	35	6	109	0.0 c	6.3 bc
Fluazifop-butyl	0.5	post	75	33	9	117	0.0 c	7.0 b
Fluazifop-butyl + fluazifop-butyl	0.25 + 0.25	post post	72	25	9	105	0.0 c	6.8 b
Fluazifop-butyl + fluazifop-butyl	0.5 + 0.5	post post	84	26	8	117	0.0 c	7.1 b
Control	—	—	55	22	6	82	0.0 c	0.0 d

[z]Herbicides were applied preemergence to the crop and weeds (pre), or postemergence to the crop and weeds (post).
[y]Grade size A = minimum diameter 1⅞ inches and no maximum, size B = 1½ to 2¼, size C = less than 1½ inch diameter.
[x]0 = no weed control, 10 = complete weed control: evaluated on 28 Mar. 1983.
[w]Mean separation in columns by Duncan's multiple range test, 5% level.

Table 2. Yield of 'LaChipper' potatoes and weed control as influenced by herbicide treatment, Expt. 2, 1982-83.

Treatment	Rate (lb. a.i./acre)	Method of[z] application	Yield (cwt/acre) Size A[y]	B	C	Total	Weed control rating[x] Broadleaf	Grasses and sedges
Metribuzin	0.5	pre	73[w]	39	8	120	9.9 a	5.3 c
Linuron	0.75	pre	78	40	13	131	9.9 a	6.8 bc
Metribuzin + metolachlor	0.5 + 1.5	pre	83	36	9	128	9.8 a	9.4 a
Linuron + metolachlor	0.75 + 1.5	pre	81	48	15	143	9.8 a	9.3 a
Fluazifop-butyl	0.25	post	63	37	9	108	0.0 b	7.5 ab
Fluazifop-butyl	0.5	post	58	35	12	104	0.0 b	7.3 a-c
Fluazifop-butyl + fluazifop-butyl	0.25 + 0.25	post post	75	39	13	127	0.0 b	7.0 bc
Fluazifop-butyl + fluazifop-butyl	0.5 + 0.5	post post	58	32	11	99	0.0 b	6.9 bc
Control	—	—	63	36	9	108	0.0 b	0.0 b

[z]Herbicides were applied preemergence to the crop and weeds (pre), or postemergence to the crop and weeds (post).
[y]Grade size A = minimum diameter 1⅞ inches and no maximum, size B = 1½ to 2¼, size C = less than 1½ inch diameter.
[x]0 = no weed control, 10 = complete weed control: evaluated on 28 Mar. 1983.
[w]Mean separation in columns by Duncan's multiple range test, 5% level.

Table 3. Yield of 'LaRouge' potatoes and response of selected weed species to herbicide treatment, Expt. 3, 1983-84.

Treatment[z]	Rate 9lb. a.i./acre)	Method of[y] application	Yield (cwt/acre) Size A[x]	B + C	Total	Weed control rating[w] CL	SS	BG	YN
Metribuzin	0.75	pre	186[v]	18	203	9.0	7.7 b-d	5.0 c-e	5.3 b-e
Linuron	1.25	pre	199	21	220	8.5	6.8 d	6.0 cd	5.8 a-d
Metolachlor	1.0	pre	200	15	213	7.3	7.3 b-d	5.3 c-e	5.8 a-d
Metolachlor	1.25	pre	208	19	213	8.3	7.5 b-d	5.3 c-e	6.5 ab
Metolachlor	1.5	pre	185	22	207	9.3	7.8 b-d	6.8cd	6.3 a-c
Oryzalin	0.75	pre	180	15	195	9.5	6.3 d	4.8 de	5.0 c-e
Metribuzin + oryzalin	0.5 + 0.75	pre	199	20	218	8.5	7.0 cd	6.0 cd	5.5 a-e
Metribuzin + metolachlor	0.5 + 1.0	pre	238	19	257	6.7	9.0 ab	7.3 bc	6.7 a
Metribuzin + metolachlor	0.5 + 1.25	pre	192	20	213	8.5	8.8 a-c	6.8 cd	6.8 a
Metribuzin + metolachlor	0.5 + 1.5	pre	196	15	211	8.3	9.0 ab	5.8 cd	6.3 a-c
Linuron + metolachlor	0.75 + 1.0	pre	191	16	206	7.0	6.3 d	5.0 c-e	6.3 ab
Linuron + metolachlor	0.75 + 1.25	pre	208	19	227	8.8	7.0 cd	6.3 cd	6.3 a-c
Linuron + metolachlor	0.75 + 1.5	pre	173	18	191	8.0	6.5 d	5.0 c-e	6.3 a-c
Metribuzin	0.5	post	194	20	213	10.0	10.0 a	6.3 cd	5.5 a-e
Fluazifop-butyl	0.25	post	200	22	221	8.0	6.3 d	9.7 a	4.3 e
Metribuzin + fluazifop-butyl	0.5 + 0.25	post	173	19	191	10.0	10.0 a	9.3 ab	5.0 c-e
Control	—	—	179	20	199	6.5	6.0 d	3.3 e	4.5 de

[z]All treatments cultivated 1 time by the grower—weed control ratings compared with uncultivated guard areas.
[y]Herbicides were applied preemergence to the crop and weeds (pre), or postemergence to the crop and weeds (post).
[x]Grade size A = minimum diameter 1⅞ inches and no maximum, size B = 1½ to 2¼, size C = less than 1½ inch diameter.
[w]CL—Common lambsquarters, SS—Smartweed species, BG—Bermudagrass, YN—Yellow nutsedge, 0 = no weed control, 10 = complete weed control: evaluated on 16 Feb. 1983.
[v]Mean separation in columns by Duncan's multiple range test, 5% level.

separately in Expt. 3 to verify the effectiveness of fluazifop-butyl in potato herbicide control programs.

Since the planting dates were early for Expt. 3 compared to Expt. 1 and 2, climatic conditions were warmer and (contrary to normal conditions) relatively dryer during the trial. Crop phytotoxicity due to herbicide treatment was not observed in Expt. 3. Thus the stunting response seen the previous year on 'LaRouge' appears to be a climatic affect. Extension Service herbicide recommendations (6) make note of this affect "under prolonged cool, wet conditions." Record breaking rainfall occurred in Dade County during Jan. and Feb. of 1983 when Expt. 1 and 2 were in progress.

Potato yields were not significantly affected by treatment in Expt. 3 (Table 3). Weed pressure was considerably higher compared to the previous year probably due to the warmer conditions in this trial. Metribuzin applied postemergence at a rate of 0.5 lb. a.i./acre significantly increased smartweed control compared to a preemergence application of metribuzin at 0.75 lb. a.i./acre. Excellent control of bermudagrass was obtained with a postemergence application of fluazifop-butyl (0.25 lb. a.i./acre). All treatments receiving applications of the herbicide metolachlor had significantly improved yellow nutsedge control compared to the control treatment (no herbicide application) except when metolachlor was applied alone at the low rate (1 lb. a.i./acre).

Potato herbicide control programs need continued investigation as herbicide products available to the grower change. Also, control programs need to be tailored to the crop season, local conditions and growers cultural practices. In Dade County, for instance, frequent cultivation of the marl soil where potatoes are grown is required to counteract poor structure (4) and provide appropriate aeration. Most weed pests except nutsedge are controlled early in the crop season as growers cultivate and build beds. Future herbicide experimentation should address the affect of existing cultural practices and date of planting on the effectiveness of applied pre and postemergence herbicides.

Literature Cited

1. Florida Crop and Livestock Reporting Service. 1985. Florida Agricultural Statistics: Vegetable Summary 1984. p. 34-36. Fla. Crop Livestock Rpt. Serv., Orlando, Fla.
2. McCubbin, E. N. 1959. Chemical control of weeds in potatoes. Proc. Fla. State Hort. Soc. 72:194-196.
3. Noonan, J. C. 1961. Nut grass control in Irish potatoes. Proc. Fla. State Hort. Soc. 74:191-192.
4. Orth, P. G. 1981. Fertility management of Dade County soils. Proc. Soil Crop Sci. Soc. Fla. 40:1-3.
5. Shumaker, J. R. and S. J. Locascio. 1979. Herbicide evaluation for Florida potatoes. Proc. South. Weed Sci. Soc. 32:153-158.
6. Stall, W. M. 1983. Weed control guide for commercial vegetable production in Florida. Inst. Food Agr. Sci., Fla. Coop. Ext. Serv. Circ. 196-H.

Proc. Fla. State Hort. Soc. 98:266-268. 1985.

CONTROL OF LEPIDOPTEROUS PESTS OF SWEET CORN IN THE EVERGLADES

R. E. FOSTER
University of Florida, IFAS,
Everglades Research and Education Center,
P.O. Drawer A
Belle Glade, FL 33430

Additional index words. Spodoptera frugiperda, Heliothis zea, fall armyworm, corn earworm, insecticides.

Abstract. **A field experiment was conducted to evaluate insecticides for control of lepidopterous pests of sweet corn. The infestation was primarily of fall armyworms (*Spodoptera frugiperda* J. E. Smith) and to a lesser extent corn earworms (*Heliothis zea* Boddie). The experimental compound PP 321 and the labelled materials thodicarb and sulprofos provided satisfactory ear protection. Granular methomyl provided excellent control until tasseling. Permethrin worked well early when the temperatures were relatively cool but declined in effectiveness during hot weather. Liquid methomyl and chlorpyrifos did not provide satisfactory control.**

Sweet corn is an important vegetable crop in the Everglades agricultural area of southern Florida. Several lepidopterous insect pests attack the crop, including the fall armyworm, *Spodoptera frugiperda*; the beet armyworm, *S. exigua; S. latisfascia* Walter; and the corn earworm, *Heliothis zea*. These pests, especially the fall armyworm, can occur in high densities and can cause severe damage to sweet corn. Consumer demands require that fresh-market sweet corn be virtually free of insect damage. As a result, sweet corn grown in south Florida receives numerous insecticide applications to control these pests. Taylor and Wilkowske (1) reported that an average of $221.25 per acre was spent on pesticides during the 1982-83 growing season. This figure represents over 21% of the total production costs for sweet corn. The purpose of this study was to compare the efficacy of 5 labelled and 4 unlabelled insecticides in controlling lepidopterous pests of sweet corn in the Everglades.

Florida Agricultural Experiment Stations Journal Series No. 6948.
Mention of a proprietary product does not imply its endorsement by the author or by the University of Florida.

Materials and Methods

The experiment was conducted at the Everglades Research and Education Center during Spring 1985. The sweet corn cultivar 'Summersweet 7800' was planted on 18 Mar. The plot was arranged in a randomized complete block design with 4 replications. Each subplot was 4 rows by 30 ft long with 2 row borders between plots and 5 ft bare alleyways between blocks. The 15 treatments are listed in Table 1.

All liquid treatments were applied with a backpack boom sprayer at 60 psi in 32 gal of water per acre. Methomyl granules were sprinkled over the row from a coffee can with holes punched in the lid. Treatments were made on 1, 8, 17, 22, and 29 Apr.; 7, 13, 15, 17, 20, 22, 24, and 28 May; and 3 and 7 June. No methomyl granules were applied on 17 Apr. Plots treated with methomyl granules prior to tasseling were treated with liquid methomyl at a rate of 2 pints/acre beginning 13 May.

On 24 Apr., 10 plants from each plot were dissected and live caterpillars present were counted. Caterpillars were considered small if less then ⅜-inch long and large if greater than ⅜-inch. On 24 Apr. and 9 May, 10 plants in each plot were rated for damage according to a 1-5 rating scale with 1 = no damage, 2 = slight damage, 3 = moderate damage, 4 = severe damage, and 5 = very severe damage and plants in jeopardy of not surviving or producing ear.

On 11 June, ears from 20 ft of row from each of the center 2 rows of each plot were hand harvested. All ears