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# Field Evaluations of Herbicides on Vegetable, Small Fruit, and Ornamental Crops, 2000, 2001, & 2002

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**FIELD EVALUATIONS  
OF HERBICIDES ON  
VEGETABLE, SMALL FRUIT,  
AND ORNAMENTAL CROPS,  
2000, 2001, AND 2002**

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# CONTENTS

|  |    |
|--|----|
| <b>Introduction</b> .....  | 5  |
| <b>General Materials and Methods</b> .....   | 5  |
| <b>Specific Methods and Results, 2000</b> .....  | 6  |
| Evaluation of Ornamental Plant Responses to Various Herbicides, Fayetteville .....   | 6  |
| Preemergence Herbicide Evaluation in Snap Beans, Fairview, Mo. ....  | 6  |
| Postemergence Herbicide Evaluation in Snap Beans, Fairview, Mo. ....   | 6  |
| Herbicide Evaluation in Southern Peas, Fayetteville .....  | 7  |
| Herbicide Evaluation in Over-wintered Spinach, Kibler .....  | 7  |
| Herbicide Evaluation in Tomato, Fayetteville .....   | 8  |
| Tables, 2000 .....   | 9  |
| <b>Specific Methods and Results, 2001</b> .....  | 22 |
| Evaluation of Clomazone Drift on Newly Established Native Pecans, Fayetteville .....   | 22 |
| Herbicide Evaluation in Watermelons and Effects of Herbicide Carryover to<br>Overwinter Spinach and Mustard Greens, Kibler .....   | 22 |
| Preemergence Herbicide Evaluation in Snap Beans, Lowell .....  | 23 |
| Postemergence Herbicide Evaluation in Snap Beans, Newtonia, Mo. ....   | 23 |
| Herbicide Evaluation in Southern Peas and Effects of Herbicide Carryover to<br>Overwinter Spinach and Mustard Greens, Kibler ..... | 24 |
| Herbicide Evaluation in Over-wintered Spinach, Kibler .....  | 25 |
| Herbicide Evaluation in Winter Squash, Fayetteville .....  | 25 |
| Herbicide Evaluation in Sweet Potatoes, Newtonia, Mo. ....   | 25 |
| Evaluation of Metolachlor and Dimethenamid in Table Beets, Fayetteville .....  | 26 |
| Tables, 2001 .....   | 28 |
| <b>Specific Methods and Results, 2002</b> .....  | 44 |
| Evaluation of Ornamental Gourds, Fayetteville .....  | 44 |
| Herbicide Evaluation in Snap Beans, Fayetteville .....   | 44 |
| Evaluation of Herbicide Programs in Southern Peas, Kibler .....  | 44 |
| Herbicide Evaluation in Fall Greens, Kibler .....  | 45 |
| Evaluation of S-Metolachlor and Dimethenamid-P in Table Beets, Fayetteville .....  | 45 |
| Herbicide Evaluation in Grapes, Fayetteville .....   | 45 |
| Tables, 2002 .....   | 46 |



# **FIELD EVALUATION OF HERBICIDES ON VEGETABLE, SMALL FRUIT, AND ORNAMENTAL CROPS, 2000, 2001, AND 2002**

**R.E. Talbert, M.L. Lovelace, E.F. Scherder, and M.S. Malik<sup>1</sup>**

## **INTRODUCTION**

Field evaluations of herbicides provide the chemical industry, governmental agencies, such as IR-4, and the Arkansas Agricultural Experiment Station with an evaluation of herbicide performance on small fruit, vegetable, and ornamental crops grown under Arkansas conditions. This report provides a means for disseminating information to interested private and public service weed scientists.

## **GENERAL MATERIALS AND METHODS**

Experiments at the Arkansas Agricultural Research and Extension Center (AAREC) in Fayetteville were conducted on southern pea, tomatoes, and ornamental species in 2000; table beets, winter squash, pecans, and ornamentals in 2001; and table beets, ornamental gourds, snapbeans, and grapes in 2002. At the Vegetable Substation near Kibler, experiments were conducted on 2000-2001 over-wintered spinach. Experiments were also conducted on southern peas and watermelon in 2001, over-winter spinach in 2001-2002 and watermelon, southern peas, southern greens, and overwinter spinach in 2002. Snap bean trials were conducted on a private farm near Fairview, Mo., in 2000, and near Lowell, Ark., and Newtonia, Mo. in 2001.

Trials at AAREC were conducted on a Captina silt loam with 1% organic matter and pH of 6.2. At the Vegetable Substation at Kibler, trials were conducted on a

Roxana silt loam with 1% organic matter and pH of 6.9. Soil at the location near Lowell, Ark., was a Perridge silt loam with 0.5% organic matter and pH of 5.3. Tests at the cooperator site near Fairview, MO, were conducted on a Gerald silt loam with 1% organic matter, and tests at Newtonia, MO, were conducted on a Newtonia silt loam with 1% organic matter and pH of 5.9.

The experimental design for all experiments was a randomized complete block with four replications, unless stated otherwise. All liquid treatments were applied in 187 L/ha (20 gal/A) of water. Liquid herbicides were applied with a hand-held, carbon-dioxide pressurized sprayer. Granular herbicides were mixed with sand and applied using a granular applicator to ensure proper coverage. Preemergence (PRE) treatments were applied to the soil surface soon after planting and postemergence (POST) treatments were applied at various stages of crop growth after emergence. Environmental conditions of air temperature (C); soil temperature (C) at 8 cm deep; soil surface moisture as wet, moist, or dry; and percent relative humidity (RH) were recorded at each application.

Percentage of weed control by species was visually estimated: 0 represents no effect, and 100 represents complete control. Ranges for weed control are as follows: 70 to 79%, fair; 80 to 89%, good; and 90 to 100%, excellent. Weed control less than 70% is considered to be poor. Crop injury was assessed by visual estimation of percent injury: 0 represents no effect, and 100 represents complete plant kill. Crop injury ratings of less than 30% indicate crop tolerance. Crop yields are reported in metric tons per hectare unless stated oth-

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erwise. Least Significant Difference (LSD) values at the 0.05 level of significance were calculated for each set of treatment means.

Pertinent experimental details and a summary of results of each experiment follows and tabulated results are shown in accompanying tables. Additional abbreviations used in the tables are: cm, centimeter; COC, crop oil concentrate; cv, cultivar; fb, followed by; kg/ha, kilograms active ingredient per hectare; NS, not significant; pl, plants; TM, tank mix; V2, first trifoliolate stage of legume; v/v, volume per volume; WA, wetting agent; wk, week(s); MT/ha, metric tons per hectare.

## SPECIFIC METHODS AND RESULTS, 2000

### Evaluation of Ornamental Plant Responses to Various Herbicides, Fayetteville, 2000 (Table 1, Field-Grown Ornamentals and Table 2, Potted Field-Grown Ornamentals).

Flumioxazin (Valor) applied at 0.2, 0.4, and 0.8 kg/ha was evaluated in established and potted liriopie and English ivy. Clopyralid (Stinger) was assessed on established liriopie and euonymous at rates of 0.28, 0.56, and 1.1 kg/ha. Napropamide (Devrinol) applied at 4.5, 9, and 18 kg/ha was evaluated on established cannas. Oxyfluorfen/pendimethalin (Rout 3G) applied at 3.4, 6.8, and 13.6 kg/ha were evaluated on potted cannas. Oxadiazon/pendimethalin (Kansel Plus) was assessed on potted euonymous plants at 3.6, 7.3, and 11 kg/ha.

**RESULTS:** Some yellowing and leaf tip burn was observed on liriopie plants treated with flumioxazin at 0.8 kg/ha, but no injury was observed on English ivy at any herbicide rate. With clopyralid, some stunting and yellowing was observed on liriopie plants and very little discoloration was observed on the euonymous plants. Napropamide at 18 kg/ha slightly stunted the cannas, and no noticeable injury was observed at 4.5 and 9 kg/ha. Oxyfluorfen/pendimethalin was slightly injurious at the 13.6 kg/ha rate, only causing some minimal leaf burn to cannas and euonymous.

### Preemergence Herbicide Evaluation in Snap Beans (*Phaseolus vulgaris* L.), Fairview, Mo., 2000 (Table 3).

Snap beans (cv. Bush Blue Lake 156) were planted 15 May 2000, in plots measuring 3 by 5.5 m with four

rows spaced 75 cm apart. PRE treatments were applied two days after planting (air 26°C; soil 27°C, moist; RH 78%). Weed control and crop injury evaluations were made at 2, 4, and 7 wk after planting and yield data were taken approximately 8 wk after planting. Weeds present at this location included common lambsquarters (CHEAL), common ragweed (AMBEL), giant foxtail (SETFA), and Palmer amaranth (AMAPA).

**RESULTS:** PRE applications of lactofen or fomesafen at 0.22 kg/ha alone or TM with S-metolachlor at 0.75 kg/ha provided excellent season-long control of the weeds, while showing excellent snap bean safety (Table 1). Yields from these plots were also among the best yielding treatments. PRE applications of flufenacet at 0.34 and 0.67 kg/ha also controlled the weeds present and showed little snap bean injury. Flufenacet at 0.67 kg/ha was the highest yielding treatment, while flufenacet at 0.34 was among the highest yielding treatments. Flumetsulam at 71 g/ha and diclosulam at 35 g/ha applied PRE provided acceptable weed control, but caused some injury to the snap beans. Injury from the diclosulam was too excessive for the snap beans to recover, thus adversely affecting yield. Dimethenamid at 1.12 kg/ha PRE provided excellent weed control, which resulted good yields. PRE applications of clomazone at 0.56 kg/ha provided excellent control of SETFA, but poor control of AMAPA and CHEAL. Lack of weed control from clomazone resulted in poor yields.

### Postemergence Herbicide Evaluation in Snap Beans (*Phaseolus vulgaris* L.), Fairview, Mo., 2000 (Table 4).

Snap beans (cv. Bush Blue Lake 156) were planted 15 May 2000, in plots measuring 3 by 5.5 m with four rows spaced 75 cm apart. POST treatments were applied 31 May when the snap beans were in the first trifoliolate stage (air 28°C; soil 26°C, moist; RH 65%). Weed control and crop injury evaluations were made at 2 and 4 wk after application. Yield data were taken approximately 8 wk after planting. Weeds present at this location included common lambsquarters (CHEAL), common ragweed (AMBEL), giant foxtail (SETFA), and Palmer amaranth (AMAPA).

**RESULTS:** Imazamox applied at 0.027 and 0.036 kg/ha provided greater than 90% control of AMAPA, AMBEL, and SETFA, but only provided 60 to 75% control of CHEAL. Snap bean yield ranged from 10.3

to 11.3 MT/ha, and were among the highest yielding treatments. Imazamox may need to be tank-mixed with other herbicides to control CHEAL. Halosulfuron applied at 0.052 and 0.071 kg/ha provided 100% control of AMAPA and AMBEL, but control of CHEAL and SETFA was very poor. Tank mixing bentazon at 0.84 kg/ha with halosulfuron at 0.036 kg/ha improved control of CHEAL from 25 to 98%, but still did not adequately control SETFA. Imazethapyr at 0.036 tank-mixed with halosulfuron at 0.036 kg/ha provided greater than 98% control of AMAPA and AMBEL, while SETFA control was 85%. Control of CHEAL with this combination was inadequate. Fomesafen at 0.22 kg/ha tank-mixed with halosulfuron at 0.036 kg/ha did not greatly improve the spectrum of weed control over halosulfuron applied alone. This tank-mix combination was effective for control of AMAPA and AMBEL, but did not effectively control CHEAL and SETFA. Snap bean yields (7.4 to 7.7 MT/ha) when halosulfuron was applied were less because of inadequate weed control. Mixing halosulfuron with other herbicides improved snap bean yield due to improved weed control. AMAPA control was excellent with imazethapyr applied at 0.036 kg/ha, but control of AMBEL and SETFA only ranged from 81 to 88% control. Imazethapyr did not provide any suppression of CHEAL. Tank-mixing bentazon at 0.84 kg/ha and imazethapyr greatly enhanced the spectrum of weed control. Bentazon + imazethapyr provided greater than 93% control of all species by 5 WAT. Snapbean yields reflected weed control, with imazethapyr applied alone yielding 9.2 MT/ha and bentazon + imazethapyr yielding 11.8 MT/ha, which was among the highest yielding treatments in the trial. Snap bean yellowing and stunting was detected when chloransulam was applied at 0.18 kg/ha. Chloransulam gave greater than 90% control of AMAPA and AMBEL, but did not control CHEAL and SETFA. Chloransulam at 0.016 kg/ha + flumetsulam at 0.007 kg/ha also stunted and yellowed the snap beans. The addition of flumetsulam to chloransulam improved CHEAL and SETFA control over chloransulam applied alone, but control was still inadequate. Chloransulam does not appear to be a promising compound in snap beans due to injury potential and a limited weed spectrum. Flumiclorac applied at 0.03 kg/ha provided excellent pigweed control, but AMBEL and SETFA control was poor. Flumiclorac did provide some suppression of CHEAL, but overall, control was inadequate. A standard program of fomesafen at 0.22 kg/ha + bentazon at 0.84 kg/

ha provided excellent control of all species except SETFA, and provided excellent snap bean yield (10 MT/ha).

#### **Herbicide Evaluation in Southern Peas (*Vigna unguiculata* L.), Fayetteville, 2000 (Table 5).**

Southern peas (cv. Encore) were planted 25 July 2000 in plots 2 by 6 m, with two rows spaced 1 m apart. PRE treatments were applied the same day as planting (air 23°C; soil 25°C, dry; RH 85%). POST treatments were applied 9 August (air 35°C; soil 40°C, moist; RH 56%). Crop injury and weed control was rated at 3 and 6 WAE. Weeds present included Palmer amaranth (AMAPA), goosegrass (ELEIN), and carpetweed (MOLVE). An early freeze killed plants before yields could be collected.

**RESULTS:** S-metolachlor applied at 1.12 kg/ha showed excellent crop safety and controlled AMAPA and ELEIN, but did not effectively control MOLVE (Table 5). Flufenacet applied at 0.28 kg/ha PRE provided excellent control of the weeds present, but did cause some early southern pea stunting. Halosulfuron applied at 0.029 kg/ha PRE showed moderate crop safety, but was much more injurious when applied POST. Furthermore, weed control seemed to be more consistent when applied PRE. Fomesafen applied PRE at 0.28 kg/ha alone or in combination with clomazone provided excellent weed control, but did not show acceptable crop safety. Imazapic applied at 0.07 kg/ha POST and imazamox applied at 0.039 kg/ha POST provided adequate control of AMAPA, ELEIN, and MOLVE, while causing little injury to the southern peas. Cloransulam applied at 0.02 kg/ha did not cause much southern pea injury, but did not effectively control the weeds present. The spectrum of cloransulam appears to be very minimal. Although crop injury and weed control was noted throughout the season, the observations are still somewhat inconclusive due the lack of yield data.

#### **Herbicide Evaluation in Over-Wintered Spinach (*Spinachia oleracea* L.), Kibler, 2000-2001 (Table 6).**

Spinach (cv. F-380) was planted 25 October 2000 in plots measuring 1.3 by 5 m, with each plot containing six rows spaced 23 cm apart. PRE treatments were applied 27 October 2000 (air 22°C, soil 17°C, moist; RH 90%). POST treatments were applied 21 November 2000 (air 16°C, soil 14°C, moist; RH 63%). Plots were har-

vested on 20 April 2001. Weed species present at Kibler included henbit (LAMAM), sibara (SIBVI), annual bluegrass (POANN), pineappleweed (MATMT), and shepherdspurse (CAPBP). Weed control ratings were taken at various intervals throughout the growing season and yield was determined in the spring of 2001.

**RESULTS:** Environmental conditions were very cool and wet after PRE treatments were applied. These environmental conditions seemed to be conducive for more excessive injury than had been seen in previous years. S-metolachlor applied at 0.56 kg/ha was the only treatment that had less than 10% injury. Weed control was greater than 90% for all species except MATMT, which was 85% by the end of the growing season. Spinach yield from S-metolachlor at 0.56 kg/ha was among the highest yielding treatments (9.1 MT/ha) in the trial. Increasing the rate of S-metolachlor did improve control of MATMT, but increased spinach injury which caused yields to decline. Linuron was also evaluated at 0.12, 0.24, and 0.36 kg/ha. At harvest, weed control was greater than 95% for all species but henbit (85% control), but injury ranged from 55 to 94% and greatly reduced yield, which ranged from 1.1 to 2.8 MT/ha. S-metolachlor + linuron provided greater than 98% control of all weed species, but injury at the end of the growing season ranged from 61 to 86% and decreased spinach yield. S-metolachlor applied at 0.56 kg/ha fb clopyralid provided excellent control of all weed species, but was very injurious to the spinach and caused substantial yield loss. S-metolachlor fb phenmedipham at 0.44 kg/ha also provided excellent control of all weed species, but caused 25% stunting. The excellent weed control coupled with little injury allowed for high spinach yields (10.7 MT/ha).

Various other herbicides not currently labeled in spinach were also evaluated. A new formulation of dimethenamid, dimethenamid-P, has shown promise for use in spinach although higher rates of each herbicide caused excessive injury. Excellent weed control was observed when dimethenamid-P was applied at 0.28 to 0.56 kg/ha, but injury potential at all rates was still very high. Injury ranged from 56 to 88% by the end of the season, which corresponded to low yields ranging from 6.5 to 2.4 MT/ha. Flufenacet applied at 0.33 and 0.67 kg/ha, quinclorac applied at 0.14 and 0.28 kg/ha, and clomazone applied at 0.11, 0.22, and 0.33 kg/ha were also evaluated. All showed promise by providing excellent weed control, but injury was excessive from all treatments.

#### **Herbicide Evaluation in Tomato (*Lycopersicon esculentum* Mill), Fayetteville, 2000 (Table 7).**

Tomatoes (cv. Mt. Supreme) were transplanted 7 July 2000 into 1- by 4-m plots at a spacing of 46 cm apart. There were four replications. PRE treatments were applied prior to transplanting (air 30°C; soil 29°C, moist; RH 65%) and POST treatments were applied on 3 August 2000 (air 28°C; soil 29°C, moist; RH 77%). Crop injury and yellow nutsedge (CYPES) control ratings were taken 3 and 6 wk after the initial herbicide applications.

**RESULTS:** Halosulfuron applied at 0.035 kg/ha PRE provided 79% control of CYPES, which was similar to control observed when halosulfuron was applied at 0.035 kg/ha POST. The greatest control of CYPES occurred with sequential applications of halosulfuron at 0.035 kg/ha, which was 93% at 6 WAT. Tomatoes showed excellent tolerance to all applications of halosulfuron.

**Table 1. Response of Field-Grown Ornamentals to Various Herbicides, Fayetteville, 2001.**

| Treatment             | Form.  | Rate<br>(kg ai/ha) | Growth<br>stage | Liriope injury<br>(%) |       |       |       |        |        |        |   |   |
|-----------------------|--------|--------------------|-----------------|-----------------------|-------|-------|-------|--------|--------|--------|---|---|
|                       |        |                    |                 | 2 WAE                 | 4 WAE | 6 WAE | 8 WAE | 10 WAE | 12 WAE | 14 WAE |   |   |
| Untreated check       |        |                    |                 | 0                     | 0     | 0     | 0     | 0      | 0      | 0      | 0 | 0 |
| Flumioxazin + NIS* fb | 51 WDG | 0.2                | EPOST           | 0                     | 0     | 0     | 0     | 0      | 0      | 0      | 0 | 0 |
| Flumioxazin + NIS*    | 51 WDG | 0.2                | LPOST           |                       |       |       |       |        |        |        |   |   |
| Flumioxazin + NIS* fb | 51 WDG | 0.4                | EPOST           | 0                     | 0     | 0     | 0     | 0      | 0      | 0      | 0 | 0 |
| Flumioxazin + NIS*    | 51 WDG | 0.4                | LPOST           |                       |       |       |       |        |        |        |   |   |
| Flumioxazin + NIS* fb | 51 WDG | 0.8                | EPOST           | 20                    | 10    | 5     | 0     | 1.5    | 5      | 5      | 5 | 5 |
| Flumioxazin + NIS*    | 51 WDG | 0.8                | LPOST           |                       |       |       |       |        |        |        |   |   |
| LSD (P=0.05)          |        |                    |                 | 3                     | 2     | 2     | NS    | 2      | 2      | 2      | 2 | 2 |

  

| Treatment             | Form.  | Rate<br>(kg ai/ha) | Growth<br>stage | English ivy injury<br>(%) |       |       |       |        |        |        |    |    |
|-----------------------|--------|--------------------|-----------------|---------------------------|-------|-------|-------|--------|--------|--------|----|----|
|                       |        |                    |                 | 2 WAE                     | 4 WAE | 6 WAE | 8 WAE | 10 WAE | 12 WAE | 14 WAE |    |    |
| Untreated check       |        |                    |                 | 0                         | 0     | 0     | 0     | 0      | 0      | 0      | 0  | 0  |
| Flumioxazin + NIS* fb | 51 WDG | 0.2                | EPOST           | 0                         | 0     | 0     | 0     | 0      | 0      | 0      | 0  | 0  |
| Flumioxazin + NIS*    | 51 WDG | 0.2                | LPOST           |                           |       |       |       |        |        |        |    |    |
| Flumioxazin + NIS* fb | 51 WDG | 0.4                | EPOST           | 0                         | 0     | 0     | 0     | 0      | 0      | 0      | 0  | 0  |
| Flumioxazin + NIS*    | 51 WDG | 0.4                | LPOST           |                           |       |       |       |        |        |        |    |    |
| Flumioxazin + NIS* fb | 51 WDG | 0.8                | EPOST           | 0                         | 0     | 0     | 0     | 0      | 0      | 0      | 0  | 0  |
| Flumioxazin + NIS*    | 51 WDG | 0.8                | LPOST           |                           |       |       |       |        |        |        |    |    |
| LSD (P=0.05)          |        |                    |                 | NS                        | NS    | NS    | NS    | NS     | NS     | NS     | NS | NS |

  

| Treatment             | Form. | Rate<br>(kg ai/ha) | Growth<br>stage | Canna injury<br>(%) |       |       |       |        |        |        |   |   |
|-----------------------|-------|--------------------|-----------------|---------------------|-------|-------|-------|--------|--------|--------|---|---|
|                       |       |                    |                 | 2 WAE               | 4 WAE | 6 WAE | 8 WAE | 10 WAE | 12 WAE | 14 WAE |   |   |
| Untreated check       |       |                    |                 | 0                   | 0     | 0     | 0     | 0      | 0      | 0      | 0 | 0 |
| Napropamide + NIS* fb | 50 DF | 4.5                | EPOST           | 0                   | 0     | 0     | 0     | 0      | 0      | 0      | 0 | 0 |
| Napropamide + NIS*    | 50 DF | 4.5                | LPOST           |                     |       |       |       |        |        |        |   |   |
| Napropamide + NIS* fb | 50 DF | 9                  | EPOST           | 0                   | 0     | 0     | 0     | 0      | 0      | 0      | 0 | 0 |
| Napropamide + NIS*    | 50 DF | 9                  | LPOST           |                     |       |       |       |        |        |        |   |   |
| Napropamide + NIS* fb | 50 DF | 18                 | EPOST           | 5                   | 3     | 1     | 0     | 3      | 1      | 1      | 0 | 0 |
| Napropamide + NIS*    | 50 DF | 18                 | LPOST           |                     |       |       |       |        |        |        |   |   |

continued

Table 1. Continued.

| Treatment       | Form. | Rate<br>(kg ai/ha) | Growth<br>stage | Canna injury |       |       |       |        |        |        |    |
|-----------------|-------|--------------------|-----------------|--------------|-------|-------|-------|--------|--------|--------|----|
|                 |       |                    |                 | 2 WAE        | 4 WAE | 6 WAE | 8 WAE | 10 WAE | 12 WAE | 14 WAE |    |
| Untreated check |       |                    |                 | 0            | 0     | 0     | 0     | 0      | 0      | 0      | 0  |
| Napropamide fb  | 2 G   | 4.5                | EPOST           | 0            | 0     | 0     | 0     | 0      | 0      | 0      | 0  |
| Napropamide     | 2 G   | 4.5                | LPOST           |              |       |       |       |        |        |        |    |
| Napropamide fb  | 2 G   | 9                  | EPOST           | 0            | 0     | 0     | 0     | 0      | 0      | 0      | 0  |
| Napropamide     | 2 G   | 9                  | LPOST           |              |       |       |       |        |        |        |    |
| Napropamide fb  | 2 G   | 18                 | EPOST           | 5            | 3     | 0     | 0     | 3      | 0      | 0      | 0  |
| Napropamide     | 2 G   | 18                 | LPOST           |              |       |       |       |        |        |        |    |
| LSD (P=.05)     |       |                    |                 | 2            | 1     | NS    | NS    | 1      | 1      | 1      | NS |

  

| Treatment         | Form. | Rate<br>(kg ai/ha) | Growth<br>stage | Liriope injury |       |       |       |
|-------------------|-------|--------------------|-----------------|----------------|-------|-------|-------|
|                   |       |                    |                 | 2 WAE          | 4 WAE | 6 WAE | 8 WAE |
| Untreated check   |       |                    |                 | 0              | 0     | 0     | 0     |
| Clopyralid + NIS* | 3 EC  | 0.28               | EPOST           | 0              | 0     | 0     | 0     |
| Clopyralid + NIS* | 3 EC  | 0.56               | EPOST           | 0              | 0     | 0     | 0     |
| Clopyralid + NIS* | 3 EC  | 1.12               | EPOST           | 13             | 4     | 2     | 0     |
| LSD (P=.05)       |       |                    |                 | 3              | 1     | 1     | NS    |

  

| Treatment         | Form. | Rate<br>(kg ai/ha) | Growth<br>stage | Euonymous injury |       |       |       |
|-------------------|-------|--------------------|-----------------|------------------|-------|-------|-------|
|                   |       |                    |                 | 2 WAE            | 4 WAE | 6 WAE | 8 WAE |
| Untreated check   |       |                    |                 | 0                | 0     | 0     | 0     |
| Clopyralid + NIS* | 3 EC  | 0.28               | EPOST           | 0                | 0     | 0     | 0     |
| Clopyralid + NIS* | 3 EC  | 0.56               | EPOST           | 0                | 0     | 0     | 0     |
| Clopyralid + NIS* | 3 EC  | 1.12               | EPOST           | 3                | 0     | 0     | 0     |
| LSD (P=.05)       |       |                    |                 | 1                | NS    | NS    | NS    |

\* NIS was applied at 0.25% volume per volume of water.

**Table 2. Response of Potted Field-Grown Ornamentals to Various Herbicides, Fayetteville, 2001.**

| Treatment                      | Form.  | Rate<br>(kg ai/ha) | Growth |       | Liriope injury     |       |       |       |        |        |        |    |    |
|--------------------------------|--------|--------------------|--------|-------|--------------------|-------|-------|-------|--------|--------|--------|----|----|
|                                |        |                    | stage  | stage | 2 WAE              | 4 WAE | 6 WAE | 8 WAE | 10 WAE | 12 WAE | 14 WAE |    |    |
| Untreated check                |        |                    |        |       | 0                  | 0     | 0     | 0     | 0      | 0      | 0      | 0  | 0  |
| Flumioxazin + NIS* fb          | 51 WDG | 0.2                | EPOST  |       | 0                  | 0     | 0     | 0     | 0      | 0      | 0      | 0  | 0  |
| Flumioxazin + NIS*             | 51 WDG | 0.2                | LPOST  |       |                    |       |       |       |        |        |        |    |    |
| Flumioxazin + NIS* fb          | 51 WDG | 0.4                | EPOST  |       | 6                  | 0     | 0     | 0     | 5      | 0      | 0      | 0  | 0  |
| Flumioxazin + NIS*             | 51 WDG | 0.4                | LPOST  |       |                    |       |       |       |        |        |        |    |    |
| Flumioxazin + NIS* fb          | 51 WDG | 0.8                | EPOST  |       | 20                 | 10    | 5     | 0     | 15     | 5      | 5      | 5  | 5  |
| Flumioxazin + NIS*             | 51 WDG | 0.8                | LPOST  |       | 4                  | 3     | 1     | NS    | 3      | 1      | 1      | 1  | 1  |
| LSD (P=.05)                    |        |                    |        |       |                    |       |       |       |        |        |        |    |    |
| Treatment                      | Form.  | Rate<br>(kg ai/ha) | Growth |       | English ivy injury |       |       |       |        |        |        |    |    |
|                                |        |                    | stage  | stage | 2 WAE              | 4 WAE | 6 WAE | 8 WAE | 10 WAE | 12 WAE | 14 WAE |    |    |
| Untreated check                |        |                    |        |       | 0                  | 0     | 0     | 0     | 0      | 0      | 0      | 0  | 0  |
| Flumioxazin + NIS* fb          | 51 WDG | 0.2                | EPOST  |       | 0                  | 0     | 0     | 0     | 0      | 0      | 0      | 0  | 0  |
| Flumioxazin + NIS*             | 51 WDG | 0.2                | LPOST  |       |                    |       |       |       |        |        |        |    |    |
| Flumioxazin + NIS* fb          | 51 WDG | 0.4                | EPOST  |       | 0                  | 0     | 0     | 0     | 0      | 0      | 0      | 0  | 0  |
| Flumioxazin + NIS*             | 51 WDG | 0.4                | LPOST  |       |                    |       |       |       |        |        |        |    |    |
| Flumioxazin + NIS* fb          | 51 WDG | 0.8                | EPOST  |       | 0                  | 0     | 0     | 0     | 0      | 0      | 0      | 0  | 0  |
| Flumioxazin + NIS*             | 51 WDG | 0.8                | LPOST  |       | NS                 | NS    | NS    | NS    | NS     | NS     | NS     | NS | NS |
| LSD (P=.05)                    |        |                    |        |       |                    |       |       |       |        |        |        |    |    |
| Treatment                      | Form.  | Rate<br>(kg ai/ha) | Growth |       | Canna injury       |       |       |       |        |        |        |    |    |
|                                |        |                    | stage  | stage | 2 WAE              | 4 WAE | 6 WAE | 8 WAE | 10 WAE | 12 WAE | 14 WAE |    |    |
| Untreated check                |        |                    |        |       | 0                  | 0     | 0     | 0     | 0      | 0      | 0      | 0  | 0  |
| Oxyfluorfen + Pendimethalin fb | 3 GR   | 3.4                | EPOST  |       | 0                  | 0     | 0     | 0     | 0      | 0      | 0      | 0  | 0  |
| Oxyfluorfen + Pendimethalin    | 3 GR   | 3.4                | LPOST  |       |                    |       |       |       |        |        |        |    |    |
| Oxyfluorfen + Pendimethalin fb | 3 GR   | 6.8                | EPOST  |       | 0                  | 0     | 0     | 0     | 0      | 0      | 0      | 0  | 0  |
| Oxyfluorfen + Pendimethalin    | 3 GR   | 6.8                | LPOST  |       |                    |       |       |       |        |        |        |    |    |
| Oxyfluorfen + Pendimethalin fb | 3 GR   | 13.6               | EPOST  |       | 13                 | 4     | 0     | 0     | 11     | 3      | 3      | 0  | 0  |
| Oxyfluorfen + Pendimethalin    | 3 GR   | 13.6               | LPOST  |       | 3                  | 1     | NS    | NS    | 3      | 1      | 1      | NS | NS |
| LSD (P=.05)                    |        |                    |        |       |                    |       |       |       |        |        |        |    |    |

continued

Table 2. Continued.

| Treatment                      | Form.   | Rate<br>(kg ai/ha) | Growth<br>stage | Euonymous injury |       |       |       |        |        |        |    |
|--------------------------------|---------|--------------------|-----------------|------------------|-------|-------|-------|--------|--------|--------|----|
|                                |         |                    |                 | 2 WAE            | 4 WAE | 6 WAE | 8 WAE | 10 WAE | 12 WAE | 14 WAE |    |
| Untreated check                |         |                    |                 | 0                | 0     | 0     | 0     | 0      | 0      | 0      | 0  |
| Oxyfluorfen + Pendimethalin fb | 1.62 GR | 3.6                | EPOST           | 0                | 0     | 0     | 0     | 0      | 0      | 0      | 0  |
| Oxyfluorfen + Pendimethalin    | 1.62 GR | 3.6                | LPOST           |                  |       |       |       |        |        |        |    |
| Oxyfluorfen + Pendimethalin fb | 1.62 GR | 7.2                | EPOST           | 0                | 0     | 0     | 0     | 0      | 0      | 0      | 0  |
| Oxyfluorfen + Pendimethalin    | 1.62 GR | 7.2                | LPOST           |                  |       |       |       |        |        |        |    |
| Oxyfluorfen + Pendimethalin fb | 1.62 GR | 14.4               | EPOST           | 9                | 3     | 0     | 0     | 5      | 1      | 1      | 0  |
| Oxyfluorfen + Pendimethalin    | 1.62 GR | 14.4               | LPOST           | 2                | 1     | NS    | NS    | 1      | 1      | 1      | NS |

LSD (P=.05)

**Table 3. Preemergence Herbicide Evaluation in Snap Beans, Fairview, MO, 2000.**

| Treatment                   | Form.          | Rate<br>(kg ai/ha) | Growth<br>stage | Snap bean injury |       |       | Palmer amaranth control |       |       | Giant foxtail control |       |       |     |     |
|-----------------------------|----------------|--------------------|-----------------|------------------|-------|-------|-------------------------|-------|-------|-----------------------|-------|-------|-----|-----|
|                             |                |                    |                 | 2 WAT            | 4 WAT | 6 WAT | 2 WAT                   | 4 WAT | 6 WAT | 2 WAT                 | 4 WAT | 6 WAT |     |     |
| Untreated check             |                |                    |                 | 0                | 0     | 0     | 0                       | 0     | 0     | 0                     | 0     | 0     | 0   | 0   |
| Hand-weeded check           |                |                    |                 | 0                | 0     | 0     | 100                     | 100   | 94    | 100                   | 100   | 100   | 100 | 100 |
| Clomazone                   | 3 ME           | 0.56               | PRE             | 3                | 5     | 3     | 56                      | 35    | 24    | 100                   | 100   | 100   | 100 | 100 |
| Diclosulam                  | 84 WG          | 0.036              | PRE             | 30               | 64    | 64    | 100                     | 100   | 100   | 86                    | 79    | 64    |     |     |
| S-metolachlor               | 7.62 EC        | 0.75               | PRE             | 3                | 0     | 0     | 100                     | 100   | 100   | 100                   | 99    | 99    | 99  | 99  |
| Dimethenamid-P              | 8 EC           | 1.12               | PRE             | 5                | 4     | 0     | 100                     | 100   | 99    | 100                   | 100   | 100   | 100 | 100 |
| Flufenacet                  | 60 WG          | 0.33               | PRE             | 5                | 8     | 8     | 98                      | 98    | 92    | 88                    | 95    | 96    |     |     |
| Flufenacet                  | 60 WG          | 0.67               | PRE             | 3                | 3     | 0     | 99                      | 100   | 100   | 93                    | 99    | 100   |     |     |
| Lactofen                    | 2 E            | 0.22               | PRE             | 4                | 8     | 4     | 99                      | 99    | 90    | 61                    | 54    | 38    |     |     |
| Fomesafen                   | 2 L            | 0.22               | PRE             | 0                | 0     | 0     | 99                      | 96    | 93    | 92                    | 91    | 84    |     |     |
| Flumetsulam                 | 80 WDG         | 0.071              | PRE             | 10               | 22    | 28    | 98                      | 100   | 98    | 88                    | 84    | 68    |     |     |
| S-metolachlor +<br>Lactofen | 7.62 EC<br>2 E | 0.75<br>0.22       | PRE             | 5                | 3     | 0     | 100                     | 100   | 100   | 99                    | 100   | 99    |     |     |
| Clomazone +<br>Lactofen     | 3 ME<br>2 E    | 0.56<br>0.22       | PRE             | 5                | 0     | 0     | 100                     | 100   | 96    | 100                   | 100   | 100   |     |     |
| LSD (P=0.05)                |                |                    |                 | 6                | 10    | 10    | 4                       | 7     | 8     | 8                     | 8     | 12    |     |     |

continued



Table 3. Continued.

| Treatment                   | Form.          | Rate<br>(kg ai/ha) | Growth<br>stage | Common ragweed control |           | Common lambsquarters control |           | Snap bean yield<br>(MT/ha) |
|-----------------------------|----------------|--------------------|-----------------|------------------------|-----------|------------------------------|-----------|----------------------------|
|                             |                |                    |                 | 2 WAT                  | 4 WAT     | 6 WAT                        | 2 WAT     |                            |
| Untreated check             |                |                    |                 | 0                      | 0         | 0                            | 0         | 5.1                        |
| Hand-weeded check           |                |                    |                 | 100                    | 100       | 100                          | 100       | 10.3                       |
| Clomazone                   | 3 ME           | 0.56               | PRE             | 84                     | 71        | 33                           | 69        | 6.9                        |
| Diclosulam                  | 84 WG          | 0.036              | PRE             | 93                     | 100       | 100                          | 90        | 4.7                        |
| S-metolachlor               | 7.62 EC        | 0.75               | PRE             | 85                     | 56        | 34                           | 93        | 6.6                        |
| Dimethenamid-P              | 8 EC           | 1.12               | PRE             | 91                     | 86        | 61                           | 95        | 11.3                       |
| Flufenacet                  | 60 WG          | 0.33               | PRE             | 85                     | 80        | 58                           | 93        | 11.1                       |
| Flufenacet                  | 60 WG          | 0.67               | PRE             | 93                     | 90        | 79                           | 100       | 14.1                       |
| Lactofen                    | 2 E            | 0.22               | PRE             | 90                     | 85        | 71                           | 74        | 9.0                        |
| Fomesafen                   | 2 L            | 0.22               | PRE             | 95                     | 89        | 70                           | 53        | 11.4                       |
| Flumetsulam                 | 80 WDG         | 0.071              | PRE             | 90                     | 97        | 90                           | 100       | 9.7                        |
| S-metolachlor +<br>Lactofen | 7.62 EC<br>2 E | 0.75<br>0.22       | PRE<br>PRE      | 97<br>100              | 94<br>100 | 91<br>93                     | 99<br>100 | 11.2<br>12.2               |
| Clomazone +<br>Lactofen     | 3 ME<br>2 E    | 0.56<br>0.22       | PRE<br>PRE      | 100<br>6               | 100<br>11 | 93<br>15                     | 98<br>15  | 12.2<br>2.6                |
| LSD (P=,05)                 |                |                    |                 |                        |           |                              |           |                            |

**Table 4. Postemergence Herbicide Evaluation in Snap Beans, Fairview, MO, 2000.**

| Treatment                        | Form.   | Rate<br>(kg ai/ha) | Growth<br>stage | Snap bean injury |       | Palmer amaranth control |       | Giant foxtail control |       |
|----------------------------------|---------|--------------------|-----------------|------------------|-------|-------------------------|-------|-----------------------|-------|
|                                  |         |                    |                 | 2 WAT            | 4 WAT | 2 WAT                   | 4 WAT | 2 WAT                 | 4 WAT |
| Untreated check                  |         |                    |                 | 0                | 0     | 0                       | 0     | 0                     | 0     |
| Imazamox + NIS <sup>1</sup>      | 1 AS    | 0.027              | V2              | 0                | 1     | 94                      | 100   | 67                    | 60    |
| Imazamox + NIS                   | 1 AS    | 0.038              | VS              | 4                | 5     | 93                      | 100   | 84                    | 75    |
| Halosulfuron + NIS               | 75 DF   | 0.053              | V2              | 0                | 0     | 93                      | 100   | 0                     | 26    |
| Halosulfuron + NIS               | 75 DF   | 0.072              | V2              | 0                | 0     | 95                      | 100   | 0                     | 25    |
| Halosulfuron + Bentazon + NIS    | 75 DF   | 0.036              | V2              | 4                | 3     | 94                      | 100   |                       |       |
| Halosulfuron + Bentazon + NIS    | 4 SL    | 0.84               |                 |                  |       |                         |       |                       |       |
| Halosulfuron + Bentazon + NIS    | 75 DF   | 0.053              | V2              | 6                | 5     | 97                      | 100   | 93                    | 98    |
| Halosulfuron + Bentazon + NIS    | 4 SL    | 0.84               |                 |                  |       |                         |       |                       |       |
| Halosulfuron + Imazethapyr + NIS | 75 DF   | 0.036              | V2              | 0                | 0     | 91                      | 98    | 68                    | 61    |
| Halosulfuron + Imazethapyr + NIS | 70 DF   | 0.036              |                 |                  |       |                         |       |                       |       |
| Halosulfuron + Fomesafen + NIS   | 75 DF   | 0.036              | V2              | 11               | 0     | 97                      | 100   | 81                    | 75    |
| Halosulfuron + Fomesafen + NIS   | 2 L     | 0.22               |                 |                  |       |                         |       |                       |       |
| Imazethapyr + NIS                | 70 DF   | 0.036              | V2              | 0                | 0     | 93                      | 100   | 21                    | 0     |
| Fomesafen + NIS                  | 2 L     | 0.22               | V2              | 11               | 0     | 79                      | 80    | 91                    | 91    |
| Imazethapyr + Bentazon + NIS     | 70 DG   | 0.036              | V2              | 3                | 0     | 93                      | 96    | 94                    | 98    |
| Imazethapyr + Bentazon + NIS     | 4 SL    | 0.84               |                 |                  |       |                         |       |                       |       |
| Cloransulam + COC <sup>2</sup>   | 84 WG   | 0.018              | V2              | 10               | 6     | 84                      | 90    | 18                    | 0     |
| Cloransulam + Flumetsulam + COC  | 84 WG   | 0.018              | V2              | 14               | 16    | 78                      | 73    | 43                    | 40    |
| Flumetsulam + COC                | 80 WDG  | 0.063              |                 |                  |       |                         |       |                       |       |
| Flumiclorac + COC                | 0.86 EC | 0.03               | V2              | 0                | 0     | 93                      | 100   | 78                    | 74    |
| Bentazon + Fomesafen + NIS       | 4 SL    | 0.84               | V2              | 13               | 3     | 95                      | 96    | 93                    | 99    |
| Fomesafen + NIS                  | 2 L     | 0.22               |                 |                  |       |                         |       |                       |       |
| LSD (P=0.05)                     |         |                    |                 | 4                | 6     | 5                       | 8     | 7                     | 8     |

continued

Table 4. Continued.

| Treatment                           | Form.           | Rate<br>(kg ai/ha) | Growth<br>stage | Common ragweed control |       | Common lambsquarters control |       | Snap bean yield |
|-------------------------------------|-----------------|--------------------|-----------------|------------------------|-------|------------------------------|-------|-----------------|
|                                     |                 |                    |                 | 2 WAT                  | 4 WAT | 2 WAT                        | 4 WAT |                 |
| Untreated check                     |                 |                    |                 | 0                      | 0     | 0                            | 0     | 7.1             |
| Imazamox + NIS <sup>1</sup>         | 1 AS            | 0.027              | V2              | 87                     | 95    | 88                           | 94    | 10.3            |
| Imazamox + NIS                      | 1 AS            | 0.038              | VS              | 91                     | 93    | 90                           | 94    | 11.3            |
| Halosulfuron + NIS                  | 75 DF           | 0.053              | V2              | 96                     | 100   | 21                           | 23    | 7.7             |
| Halosulfuron + NIS                  | 75 DF           | 0.072              | V2              | 97                     | 100   | 28                           | 28    | 7.4             |
| Halosulfuron +<br>Bentazon + NIS    | 75 DF<br>4 SL   | 0.036<br>0.84      | V2              | 95                     | 100   | 64                           | 63    | 10.8            |
| Halosulfuron +<br>Bentazon + NIS    | 75 DF<br>4 SL   | 0.053<br>0.84      | V2              | 97                     | 100   | 68                           | 45    | 9.4             |
| Halosulfuron +<br>Imazethapyr + NIS | 75 DF<br>70 DF  | 0.036<br>0.036     | V2              | 94                     | 100   | 84                           | 85    | 9.7             |
| Halosulfuron +<br>Fomesafen + NIS   | 75 DF<br>2 L    | 0.036<br>0.22      | V2              | 95                     | 96    | 49                           | 25    | 8.9             |
| Imazethapyr + NIS                   | 70 DF           | 0.036              | V2              | 81                     | 81    | 85                           | 88    | 9.2             |
| Fomesafen + NIS                     | 2 L             | 0.22               | V2              | 84                     | 71    | 18                           | 0     | 8.3             |
| Imazethapyr +<br>Bentazon + NIS     | 70 DG<br>4 SL   | 0.036<br>0.84      | V2              | 93                     | 97    | 88                           | 93    | 11.8            |
| Cloransulam + COC <sup>2</sup>      | 84 WG           | 0.018              | V2              | 96                     | 100   | 28                           | 35    | 5.0             |
| Cloransulam +<br>Flumetsulam + COC  | 84 WG<br>80 WDG | 0.018<br>0.063     | V2              | 96                     | 100   | 48                           | 50    | 4.4             |
| Flumiclorac + COC                   | 0.86 EC         | 0.03               | V2              | 14                     | 0     | 15                           | 19    | 7.3             |
| Bentazon +<br>Fomesafen + NIS       | 4 SL<br>2 L     | 0.84<br>0.22       | V2              | 96                     | 100   | 77                           | 67    | 10.0            |
| LSD (P=,05)                         |                 |                    |                 | 5                      | 8     | 10                           | 8     | 0.7             |

<sup>1</sup> NIS was applied at 0.25% volume per volume of water.

<sup>2</sup> COC was applied at 1% volume per volume of water.

**Table 5. Herbicide Evaluation in Southern Peas, Fayetteville, 2000.**

| Treatment                       | Form.            | Rate<br>(kg ai/ha) | Growth<br>stage | Southern pea injury |       | Palmer amaranth control |       | Goosegrass control |       | Carpetweed control |       |
|---------------------------------|------------------|--------------------|-----------------|---------------------|-------|-------------------------|-------|--------------------|-------|--------------------|-------|
|                                 |                  |                    |                 | 3 WAT               | 6 WAT | 3 WAT                   | 6 WAT | 3 WAT              | 6 WAT | 3 WAT              | 6 WAT |
| Untreated check                 |                  |                    |                 | 0                   | 0     | 0                       | 0     | 0                  | 0     | 0                  | 0     |
| S-metolachlor                   | 7.62 EC          | 1.12               | PRE             | 5                   | 0     | 95                      | 81    | 100                | 100   | 51                 | 48    |
| S-metolachlor +<br>Flumetsulam  | 7.62 EC<br>80 EG | 1.12<br>0.07       | PRE             | 19                  | 14    | 100                     | 98    | 100                | 100   | 89                 | 85    |
| Diclosulam                      | 84 DG            | 0.04               | PRE             | 58                  | 25    | 100                     | 100   | 100                | 98    | 98                 | 95    |
| Flufenacet                      | 60 DF            | 0.28               | PRE             | 16                  | 5     | 98                      | 90    | 100                | 98    | 94                 | 93    |
| Halosulfuron                    | 75 DF            | 0.029              | PRE             | 11                  | 3     | 94                      | 85    | 70                 | 43    | 73                 | 49    |
| Fomesafen                       | 2 L              | 0.28               | PRE             | 45                  | 15    | 100                     | 100   | 100                | 97    | 100                | 97    |
| Clomazone +<br>Fomesafen        | 3 ME<br>2 L      | 1.12<br>0.28       | PRE             | 30                  | 16    | 100                     | 100   | 100                | 100   | 100                | 100   |
| Clomazone fb                    | 3 ME             | 1.12               | PRE             | 24                  | 25    | 50                      | 88    | 100                | 100   | 49                 | 43    |
| Halosulfuron + NIS <sup>1</sup> | 75 DF            | 0.029              | POST            |                     |       |                         |       |                    |       |                    |       |
| Imazapic + NIS                  | 70 DF            | 0.07               | POST            |                     | 6     | 0                       | 93    | 0                  | 86    | 0                  | 89    |
| Cloransulam + COC <sup>2</sup>  | 84 DF            | 0.02               | POST            |                     | 5     | 0                       | 21    | 0                  | 25    | 0                  | 25    |
| Imazamox + NIS                  | 1 AS             | 0.04               | POST            |                     | 5     | 0                       | 83    | 0                  | 88    | 0                  | 88    |
| Halosulfuron + NIS              | 75 DF            | 0.029              | POST            |                     | 15    | 0                       | 53    | 0                  | 30    | 0                  | 39    |
| LSD (P=0.05)                    |                  |                    |                 | 10                  | 5     | 5                       | 11    | 4                  | 6     | 11                 | 13    |

<sup>1</sup> NIS was applied at 0.25% volume per volume of water.

<sup>2</sup> COC was applied at 1% volume per volume of water.

Table 6. Herbicide Evaluation in Over-Wintered Spinach, Fayetteville, 2000.

| Treatment                  | Form.   | Rate<br>(kg ai/ha) | Growth stage |         |        |         | Spinach injury (%) |        |         |         | Henbit control |         |     |     |
|----------------------------|---------|--------------------|--------------|---------|--------|---------|--------------------|--------|---------|---------|----------------|---------|-----|-----|
|                            |         |                    | 11/27/00     | 2/10/01 | 3/9/01 | 4/10/01 | 2/10/01            | 3/9/01 | 4/10/01 | 2/10/01 | 3/9/01         | 4/10/01 |     |     |
| Untreated check            |         |                    | 0            | 0       | 0      | 0       | 0                  | 0      | 0       | 0       | 0              | 0       | 0   | 0   |
| Linuron                    | 50 DF   | 0.11               | 54           | 88      | 85     | 53      | 86                 | 95     | 85      | 86      | 95             | 85      | 85  | 85  |
| Linuron                    | 50 DF   | 0.22               | 61           | 90      | 80     | 65      | 100                | 100    | 80      | 100     | 100            | 93      | 100 | 93  |
| Linuron                    | 50 DF   | 0.33               | 90           | 100     | 99     | 94      | 100                | 100    | 99      | 100     | 100            | 98      | 100 | 98  |
| S-metolachlor              | 7.62 EC | 0.56               | 5            | 14      | 8      | 6       | 99                 | 95     | 8       | 99      | 95             | 98      | 95  | 98  |
| S-metolachlor              | 7.62 EC | 0.8                | 21           | 29      | 20     | 29      | 100                | 100    | 20      | 100     | 100            | 100     | 100 | 100 |
| S-metolachlor              | 7.62 EC | 1.12               | 29           | 51      | 45     | 55      | 100                | 100    | 45      | 100     | 100            | 100     | 100 | 100 |
| Dimethenamid-P             | 6 EC    | 0.28               | 34           | 49      | 56     | 56      | 100                | 100    | 56      | 100     | 100            | 100     | 100 | 100 |
| Dimethenamid-P             | 6 EC    | 0.4                | 51           | 64      | 70     | 63      | 100                | 100    | 70      | 100     | 100            | 100     | 100 | 100 |
| Dimethenamid-P             | 6 EC    | 0.56               | 49           | 74      | 88     | 80      | 100                | 100    | 88      | 100     | 100            | 100     | 100 | 100 |
| S-metolachlor fb           | 7.62 EC | 0.56               | 13           | 18      | 25     | 14      | 100                | 100    | 25      | 100     | 100            | 100     | 100 | 100 |
| Phenmedipham               | 1.3 EC  | 0.45               | EPOST        |         |        |         |                    |        |         |         |                |         |     |     |
| S-metolachlor +<br>linuron | 7.62 EC | 0.56               | 44           | 61      | 79     | 61      | 100                | 100    | 79      | 100     | 100            | 100     | 100 | 100 |
| S-metolachlor +<br>linuron | 50 DF   | 0.11               | 84           | 90      | 93     | 86      | 100                | 100    | 93      | 100     | 100            | 100     | 100 | 100 |
| S-metolachlor +<br>linuron | 7.62 EC | 0.56               | 84           | 90      | 93     | 86      | 100                | 100    | 93      | 100     | 100            | 100     | 100 | 100 |
| S-metolachlor fb           | 50 DF   | 0.22               | 50           | 73      | 80     | 88      | 100                | 100    | 80      | 100     | 100            | 100     | 100 | 100 |
| S-metolachlor fb           | 7.62 EC | 0.56               | 50           | 73      | 80     | 88      | 100                | 100    | 80      | 100     | 100            | 100     | 100 | 100 |
| Clopyralid                 | 3 EC    | 0.09               | EPOST        |         |        |         |                    |        |         |         |                |         |     |     |
| Flufenacet                 | 60 WG   | 0.33               | 51           | 66      | 70     | 78      | 100                | 100    | 70      | 100     | 100            | 100     | 100 | 100 |
| Flufenacet                 | 60 WG   | 0.67               | 71           | 91      | 93     | 86      | 100                | 100    | 93      | 100     | 100            | 100     | 100 | 100 |
| Quinclorac                 | 75 DF   | 0.14               | 35           | 50      | 64     | 45      | 93                 | 91     | 64      | 93      | 91             | 100     | 100 | 100 |
| Quinclorac                 | 75 EF   | 0.28               | 44           | 68      | 85     | 74      | 99                 | 98     | 85      | 99      | 98             | 100     | 100 | 100 |
| Clomazone                  | 3 ME    | 0.11               | 66           | 88      | 99     | 91      | 100                | 100    | 99      | 100     | 100            | 100     | 100 | 100 |
| Clomazone                  | 3 ME    | 0.22               | 94           | 99      | 98     | 93      | 100                | 100    | 98      | 100     | 100            | 100     | 100 | 100 |
| Clomazone                  | 3 ME    | 0.33               | 95           | 99      | 99     | 96      | 100                | 100    | 99      | 100     | 100            | 100     | 100 | 100 |
| LSD (P=.05)                |         |                    | 13           | 10      | 12     | 13      | 3                  | 4      | 12      | 3       | 4              | 4       | 4   | 4   |

continued.

Table 6. Continued.

| Treatment                  | Form.   | Rate<br>(kg ai/ha) | Growth<br>stage | Pineappleweed control |        |         | Shepherdspurse control |        |         |
|----------------------------|---------|--------------------|-----------------|-----------------------|--------|---------|------------------------|--------|---------|
|                            |         |                    |                 | 2/10/01               | 3/9/01 | 4/10/01 | 2/10/01                | 3/9/01 | 4/10/01 |
| Untreated check            |         |                    |                 | 0                     | 0      | 0       | 0                      | 0      | 0       |
| Linuron                    | 50 DF   | 0.11               | PRE             | 100                   | 100    | 98      | 98                     | 96     | 95      |
| Linuron                    | 50 DF   | 0.22               | PRE             | 100                   | 100    | 100     | 100                    | 100    | 95      |
| Linuron                    | 50 DF   | 0.33               | PRE             | 100                   | 100    | 100     | 100                    | 100    | 100     |
| S-metolachlor              | 7.62 EC | 0.56               | PRE             | 90                    | 89     | 85      | 98                     | 98     | 95      |
| S-metolachlor              | 7.62 EC | 0.8                | PRE             | 100                   | 100    | 93      | 100                    | 100    | 98      |
| S-metolachlor              | 7.62 EC | 1.12               | PRE             | 100                   | 100    | 96      | 100                    | 100    | 94      |
| Dimethenamid-P             | 6 EC    | 0.28               | PRE             | 100                   | 100    | 93      | 100                    | 100    | 90      |
| Dimethenamid-P             | 6 EC    | 0.4                | PRE             | 100                   | 100    | 98      | 100                    | 100    | 100     |
| Dimethenamid-P             | 6 EC    | 0.56               | PRE             | 100                   | 100    | 95      | 100                    | 100    | 98      |
| S-metolachlor fb           | 7.62 EC | 0.56               | PRE             | 100                   | 100    | 100     | 100                    | 100    | 100     |
| Phenmedipham               | 1.3 EC  | 0.45               | EPOST           |                       |        |         |                        |        |         |
| S-metolachlor +<br>linuron | 7.62 EC | 0.56               | PRE             | 100                   | 100    | 98      | 100                    | 100    | 100     |
| S-metolachlor +<br>linuron | 7.62 EC | 0.56               | PRE             | 100                   | 100    | 99      | 100                    | 100    | 98      |
| S-metolachlor fb           | 7.62 EC | 0.56               | PRE             | 100                   | 100    | 100     | 100                    | 100    | 91      |
| Clopyralid                 | 3 EC    | 0.09               | EPOST           |                       |        |         |                        |        |         |
| Flufenacet                 | 60 WG   | 0.33               | PRE             | 100                   | 100    | 99      | 100                    | 100    | 100     |
| Flufenacet                 | 60 WG   | 0.67               | PRE             | 100                   | 100    | 99      | 100                    | 100    | 100     |
| Quinclorac                 | 75 DF   | 0.14               | PRE             | 51                    | 54     | 75      | 90                     | 90     | 66      |
| Quinclorac                 | 75 EF   | 0.28               | PRE             | 64                    | 71     | 83      | 94                     | 89     | 53      |
| Clomazone                  | 3 ME    | 0.11               | PRE             | 100                   | 100    | 100     | 100                    | 100    | 100     |
| Clomazone                  | 3 ME    | 0.22               | PRE             | 100                   | 100    | 100     | 100                    | 100    | 100     |
| Clomazone                  | 3 ME    | 0.33               | PRE             | 100                   | 100    | 99      | 100                    | 100    | 100     |
| LSD (P=.05)                |         |                    |                 | 4                     | 7      | 7       | 2                      | 3      | 9       |

continued

Table 6. Continued.

| Treatment                  | Form.   | Rate<br>(kg ai/ha) | Growth<br>stage | Annual bluegrass control |        |         | Sibara control |        |         | Spinach<br>yield<br>(MT/ha) |
|----------------------------|---------|--------------------|-----------------|--------------------------|--------|---------|----------------|--------|---------|-----------------------------|
|                            |         |                    |                 | 2/10/01                  | 3/9/01 | 4/10/01 | 2/10/01        | 3/9/01 | 4/10/01 |                             |
| Untreated check            |         |                    |                 | 0                        | 0      | 0       | 0              | 0      | 0       | 4.7                         |
| Linuron                    | 50 DF   | 0.11               | PRE             | 100                      | 100    | 100     | 100            | 100    | 100     | 2.8                         |
| Linuron                    | 50 DF   | 0.22               | PRE             | 100                      | 100    | 98      | 100            | 100    | 100     | 1.3                         |
| Linuron                    | 50 DF   | 0.33               | PRE             | 100                      | 100    | 98      | 100            | 100    | 100     | 1.1                         |
| S-metolachlor              | 7.62 EC | 0.56               | PRE             | 98                       | 98     | 96      | 100            | 99     | 95      | 9.1                         |
| S-metolachlor              | 7.62 EC | 0.8                | PRE             | 100                      | 100    | 100     | 100            | 100    | 100     | 6.7                         |
| S-metolachlor              | 7.62 EC | 1.12               | PRE             | 99                       | 99     | 100     | 100            | 100    | 100     | 5.5                         |
| Dimethenamid-P             | 6 EC    | 0.28               | PRE             | 100                      | 100    | 100     | 100            | 100    | 100     | 6.5                         |
| Dimethenamid-P             | 6 EC    | 0.4                | PRE             | 100                      | 100    | 100     | 100            | 100    | 100     | 4.3                         |
| Dimethenamid-P             | 6 EC    | 0.56               | PRE             | 100                      | 100    | 100     | 100            | 100    | 98      | 2.4                         |
| S-metolachlor fb           | 7.62 EC | 0.56               | PRE             | 100                      | 100    | 100     | 100            | 100    | 100     | 10.7                        |
| Phenmedipham               | 1.3 EC  | 0.45               | EPOST           |                          |        |         |                |        |         |                             |
| S-metolachlor +<br>linuron | 7.62 EC | 0.56               | PRE             | 100                      | 100    | 100     | 100            | 100    | 100     | 6.1                         |
| S-metolachlor +<br>linuron | 7.62 EC | 0.56               | PRE             | 100                      | 100    | 100     | 100            | 100    | 100     | 3.6                         |
| S-metolachlor fb           | 7.62 EC | 0.56               | PRE             | 100                      | 100    | 100     | 100            | 100    | 99      | 3.1                         |
| Clopyralid                 | 3 EC    | 0.09               | EPOST           |                          |        |         |                |        |         |                             |
| Flufenacet                 | 60 WG   | 0.33               | PRE             | 100                      | 100    | 100     | 100            | 100    | 100     | 4.9                         |
| Flufenacet                 | 60 WG   | 0.67               | PRE             | 100                      | 100    | 100     | 100            | 100    | 100     | 1.6                         |
| Quinclorac                 | 75 DF   | 0.14               | PRE             | 68                       | 75     | 89      | 19             | 23     | 30      | 8.9                         |
| Quinclorac                 | 75 EF   | 0.28               | PRE             | 68                       | 73     | 86      | 29             | 45     | 54      | 6.8                         |
| Clomazone                  | 3 ME    | 0.11               | PRE             | 100                      | 100    | 100     | 99             | 99     | 91      | 1.7                         |
| Clomazone                  | 3 ME    | 0.22               | PRE             | 100                      | 100    | 100     | 100            | 100    | 96      | 1.1                         |
| Clomazone                  | 3 ME    | 0.33               | PRE             | 100                      | 100    | 100     | 100            | 100    | 98      | 1.1                         |
| LSD (P=.05)                |         |                    |                 | 2                        | 2      | 4       | 4              | 3      | 5       | 1.2                         |

**Table 7. Evaluation of Halosulfuron for Yellow Nutsedge Control in Tomatoes, Fayetteville, 2000.**

| Treatment                       | Form. | Rate<br>(kg ai/ha) | Growth<br>stage | Tomato injury |       | Yellow nutsedge control |       |
|---------------------------------|-------|--------------------|-----------------|---------------|-------|-------------------------|-------|
|                                 |       |                    |                 | 3 WAT         | 6 WAT | 3 WAT                   | 6 WAT |
| Untreated check                 |       |                    |                 | 0             | 0     | 0                       | 0     |
| Halosulfuron                    | 75 DF | 0.035              | PRE             | 0             | 0     | 76                      | 79    |
| Halosulfuron + NIS <sup>1</sup> | 75 DF | 0.035              | POST            | 0             | 0     | 0                       | 75    |
| Halosulfuron fb                 | 75 DF | 0.035              | PRE             | 0             | 0     | 73                      | 93    |
| Halosulfuron + NIS <sup>1</sup> | 75 DF | 0.035              | POST            |               |       |                         |       |
| LSD (P=.05)                     |       |                    |                 | NS            | NS    | 5                       | 5     |

<sup>1</sup> NIS was applied at 0.25% volume per volume of water in POST treatments.



## SPECIFIC METHODS AND RESULTS, 2001

### Evaluation of Clomazone Drift on Newly-Established Native Pecans, Fayetteville, 2001 (Table 8) and 2002 (Table 9).

An experiment was conducted in Fayetteville, Ark., in 2001 and 2002 to evaluate the potential hazard from drift to pecans using various formulations of clomazone. Command 3 ME, Command 4 EC, and propanil (Stam M4) + Command 3 ME were compared by direct application to seedling pecans. The standard rate of clomazone for this soil type was 0.45 kg/ha, which is the 1X rate. Command was also used at 0.1X and 0.01X rates. Propanil was applied at a 3.3 kg/ha rate. Two seedling pecan trees, 0.75- to 1-m tall, were utilized in each plot. Seedling pecans were transplanted on 2 April 2001. Pecan trees with 5 to 9 leaves were sprayed on 18 July 2001. The experiment was repeated on the same plants and spraying was done on 7 June 2002 on 6- to 12-leaf pecans. One plant was covered and the other plant was sprayed in order to differentiate foliar from soil uptake of clomazone. Plants were observed after the first week and every two weeks thereafter in 2001 and every week in 2002 to evaluate bleaching and overall phytotoxicity.

**RESULTS:** Slight bleaching (whitening of leaf veins) and some leaf necrosis were observed (maximum of 8%) from 1X rate of each clomazone formulation in 2001. In 2002 with more rainfall following treatment, bleaching symptoms from both formulations of clomazone were initially higher (25% from 3 ME formulation and 30% from 4 EC formulation) 1 week following treatment. Plants recovered later in the season. In both years both formulations caused similar injury symptoms. When sprayed with the tank mix of propanil and clomazone at a 1X rate, necrosis of leaves (maximum of 62%) was observed. Minor bleaching occurred with little or no injury at the 0.1X and 0.01X rates of both formulations applied alone or in a tank-mix with propanil. The untreated plots as well as the protected plants had no visual symptoms of clomazone injury from uptake, soil volatility, or drift. New leaf development was not affected by any treatment.

### Herbicide Evaluation in Watermelon (*Citrullus linatus*) and Effects of Herbicide Carryover to Overwinter Spinach and Mustard Greens, Kibler, 2001 (Table 10).

Watermelons (cv. Crimson Sweet) were planted on 25 April 2001 in plots measuring 3.6 by 9.1 m, with each plot containing one row of watermelon plants spaced 1-m apart. PRE treatments were applied 26 April (air 31°C; soil 32°C, moist; RH 45%) and sprinkler irrigated on 27 April to activate the PRE herbicides. POST treatments were applied on 1 June (air 28°C; soil 27°C, moist, RH 60%) to 2- to 3-leaf watermelon plants. Crop injury and weed control were rated 2, 3, and 4 weeks after the initial treatment and plots were harvested weekly for three weeks beginning on 10 July. Weeds present included Palmer amaranth (AMAPA), goosegrass (ELEIN), and eclipta (ECLAL).

In the fall of 2001, overwinter spinach and mustard greens were planted into the preexisting watermelon plots to determine the carryover potential of clomazone, ethalfluralin, and halosulfuron. Spinach (cv. F-380) and mustard (cv. All Top) were planted 30 October 2001 in plots measuring 1.5 by 3.0 m for each species, with each plot containing six rows of both spinach and greens spaced 23-cm apart. Ratings were taken throughout the growing season to evaluate injury of spinach and mustard.

**RESULTS:** Clomazone applied PRE at 0.17 or 0.34 kg/ha was very safe for use in watermelons and provided excellent ELEIN and ECLAL control, but did not effectively control AMAPA (Table 10). Ethalfluralin applied PRE at 1.26 kg/ha provided excellent early season control of AMAPA, but control greatly declined to 69% by 4 WAT. Ethalfluralin was not effective for control of ELEIN or ECLAL. Clomazone at 0.17 kg/ha + ethalfluralin at 0.63 kg/ha did cause some early stunting. Control of ELEIN and ECLAL was excellent throughout the season, but AMAPA control declined to 65% by the end of the growing season. Adding halosulfuron at 0.018 kg/ha PRE to the clomazone + ethalfluralin combination provided excellent weed control of all species throughout the growing season, but also increased stunting to 11% by the end of the growing season. Increasing the rate of halosulfuron to 0.027 kg/ha applied PRE with clomazone + ethalfluralin did not increase weed control, but did result in increased injury (21% at 4 WAT). Halosulfuron applied at 0.036 kg/ha PRE in combination with clomazone + ethalfluralin again added no benefit of increased weed control, but did result in 18%

injury at 4 WAT. Halosulfuron applied POST at 0.018 kg/ha following a PRE treatment of clomazone at 0.17 kg/ha + ethalfluralin at 0.63 kg/ha caused 8% stunting by 4 weeks after initial treatment, which was less than injury from the PRE application of halosulfuron at the same rate, but provided less control of AMAPA (85% at 4 weeks after initial treatment). Increasing the rate of halosulfuron to 0.027 kg/ha POST following clomazone + ethalfluralin provided similar results as observed from halosulfuron applied at 0.018 kg/ha. Increasing the rate of halosulfuron POST to 0.036 kg/ha following the PRE treatment of clomazone + ethalfluralin caused 14% stunting, and slightly increased AMAPA control to 92%.

Greatest yields were observed from combinations of halosulfuron applied PRE in combination with clomazone + ethalfluralin. As halosulfuron rate increased from 0.018 to 0.036 kg/ha, yield increased from 14.1 to 16.3 MT/ha. Although some injury was observed from these treatments, yields were greater due to the increased AMAPA control. POST applications of halosulfuron following clomazone + ethalfluralin resulted in less yields than PRE applications due to lower pigweed control coupled with late season injury. As rate of halosulfuron increased from 0.018 to 0.036 kg/ha, yield decreased from 11.2 to 9.0 MT/ha. Ethalfluralin alone yielded 7.0 MT/ha and clomazone + ethalfluralin yielded 7.9 MT/ha, which was greater than the clomazone alone due to increased AMAPA control.

Spinach and greens are often planted following watermelon crops, thus there has been concern of carryover from herbicides used in watermelons into fall or overwinter spinach and greens. Spinach injury was not significant following any of the watermelon treatments. More injury was observed on greens, up to 23%, than spinach early, but most of the greens had recovered by the end of the growing season, with injury ranging up to 8%. Overall, injury was minimal and did not seem to greatly affect either the spinach or mustard greens.

#### **Preemergence Herbicide Evaluation in Snap Beans, Lowell, 2001 (Table 11).**

Snap beans (cv. KSI 960) were planted 9 May 2001 in plots measuring 3 by 5 m with four rows spaced 75 cm apart. PRE treatments were applied on 10 May 2001 (air 21°C; soil 26°C, moist; RH 100%). Weed control and crop injury evaluations were made 2, 4, and 6 wk after planting and yield data were taken at 8 wk after

planting. Weeds present at this location included common lambsquarters (CHEAL) and Italian ryegrass (LOLMU) which was present prior to seedbed preparation and continued to grow in the snapbean crop.

**RESULTS:** Flumiclorac PRE caused serious stand losses and stunting of the snapbeans. Both dimethenamid-P and clomazone alone and in mixtures with fomesafen and lactofen caused noticeable early stunting, but the crop recovered and final yields were good. S-metolachlor mixed with lactofen also caused this noticeable early stunting, but with good recovery in crop yield. S-metolachlor alone or with fomesafen, and flufenacet alone gave outstanding control of the weeds and caused no crop injury. Fomesafen and lactofen alone did not control the Italian ryegrass and were not as effective on common lambsquarters as other treatments.

#### **Postemergence Herbicide Evaluation in Snap Beans, Newtonia, Mo., 2001 (Table 12).**

Snap beans (cv. Hercules) were planted 16 August 2001 in plots measuring 1.5 by 5 m with two rows spaced 75 cm apart. POST treatments were applied 4 September 2001 when the snap beans were in the two trifoliate stage (air 38°C; soil 31°C, moist; RH 80%). Weed control and crop injury evaluations were made at 1 and 4 wk after treatment (3 and 6 wk after emergence). Yield data were taken at 8 wk after planting. Weeds present included common lambsquarters (CHEAL, 8 cm tall at application) and giant foxtail (SETFA, 10 cm at application).

**RESULTS:** Flufenpyr was the only treatment causing serious snap bean injury. A number of treatments including fomesafen, fluazifop, acifluorfen, imazethapyr + fomesafen, imazamox + fomesafen, and halosulfuron + fomesafen caused some mild foliar burn symptoms from which the snap beans quickly recovered. The 0.56 kg/ha rate of acifluorfen cause more persistent stunting, but yield was not reduced. Broad spectrum weed control was obtained from the fomesafen + fluazifop mixture, as well as imazethapyr or imazamox alone or in combination with bentazon and fomesafen. Yield differences between treatments were not significant, but were improved as compared to the untreated check.

### Herbicide Evaluation in Southern Peas (*Vigna unguiculata* L.) and Effects of Herbicide Carryover to Overwinter Spinach and Mustard, Kibler, 2001 (Table 13).

Southern peas (cv. Early Scarlet) were planted 15 June 2001 in plots 1.6 by 5.5 m. Plots consisted of two rows spaced 0.75-m apart. PRE treatments were applied the same day as planting (air 33°C; soil 33°C, moist; RH 45%). POST treatments were applied 10 July 2001 (air 27°C; soil 26°C, moist; RH 65%) to V3 southern pea plants. Crop injury and weed control was rated throughout the growing season and plots were harvested on 5 September 2001. Weeds present included goosegrass (ELEIN), Palmer amaranth (AMAPA), red sprangletop (LEFFI), and hophornbeam copperleaf (ACCOS).

In the fall of 2001, overwinter spinach and mustard greens were planted into the preexisting southern pea plots to determine the carryover potential of these herbicides. Spinach (cv. F-380) and mustard (cv. All Top) were planted 30 October 2001 in plots measuring 1.5 by 3.0 m for each species, with each plot containing six rows of both spinach and greens spaced 23-cm apart. Ratings were taken throughout the growing season to evaluate injury to spinach and mustard.

**RESULTS:** Little southern pea response was seen from the various herbicides (Table 13). Sulfentrazone applied PRE at 0.45 kg/ha, caused up to 19% injury; acifluorfen applied at 0.56 kg/ha POST, caused up to 14% injury; and flufenpyr applied at 0.39 kg/ha POST, caused 10% injury. Overall, good control of ELEIN and LEFFI was observed from the PRE treatments. Halosulfuron applied PRE alone at 0.029 and 0.036 kg/ha and sulfentrazone applied at 0.22 kg/ha PRE alone did not effectively control ELEIN (59 to 61% control) and LEFFI (53 to 74% control). POST treatments that did not follow a PRE were overall less effective controlling ELEIN and LEFFI than the PRE treatments. Imazamox applied at 0.039 kg/ha was the most effective POST treatment for control of ELEIN, 89%, and LEFFI, 83%. Addition of bentazon at 0.84 kg/ha to imazamox reduced control of both ELEIN and LEFFI, which indicates some antagonism may be occurring. Flufenpyr applied POST did not effectively control ELEIN or LEFFI. Clomazone applied PRE at 0.56 kg/ha plus flumioxazin applied PRE at 0.036 kg/ha, sulfentrazone applied PRE at 0.45 kg/ha, clomazone applied PRE at 0.56 kg/ha plus

sulfentrazone applied PRE at 0.28 kg/ha, pendimethalin applied PRE at 0.56 kg/ha plus imazethapyr applied PRE at 0.07 kg/ha, and pendimethalin applied PRE at 0.56 kg/ha followed by acifluorfen POST at 0.56 kg/ha were treatments that provided adequate season long control of AMAPA. All other treatments resulted in control less than 90% by the end of the growing season. Clomazone applied PRE at 0.56 kg/ha plus flumioxazin applied PRE at 0.036 kg/ha, sulfentrazone applied PRE at 0.22 and 0.45 kg/ha, clomazone applied PRE at 0.56 kg/ha plus sulfentrazone applied PRE at 0.28 kg/ha, pendimethalin applied PRE at 0.56 kg/ha plus imazethapyr applied PRE at 0.07 kg/ha, and pendimethalin applied PRE at 0.56 kg/ha followed by acifluorfen POST at 0.28 and 0.56 kg/ha were treatments that provided adequate season long control of ACCOS. All other treatments resulted in control less than 90% by the end of the growing season.

Although weed control differences were observed, few differences existed in yields between treatments. S-metolachlor applied at 1.12 kg/ha PRE, halosulfuron applied at 0.029 kg/ha PRE, imazamox applied at 0.04 kg/ha POST, and imazamox applied at 0.04 kg/ha plus bentazon applied at 0.84 kg/ha POST gave yields significantly lower than the best yielding treatment. Furthermore, these treatments did not yield higher than the untreated check. No injury was detected in these plots, therefore, low yields are attributed to lack of weed control.

Spinach and mustard greens are often planted following southern pea, and there have been concerns of carryover from herbicides used in southern peas. A few herbicides showed potential to carryover and damage spinach and greens crops. Flufenacet applied at 0.33 and 0.67 kg/ha PRE to southern peas caused 21 to 24% injury early to spinach but was reduced to 9 to 11% by the end of the growing season. Sulfentrazone applied at 0.22 and 0.45 kg/ha PRE and sulfentrazone applied at 0.28 kg/ha plus clomazone applied at 0.56 kg/ha PRE caused 61 to 74% injury to spinach early, but declined to 29 to 35% by the end of the growing season. Pendimethalin at 0.56 kg/ha plus imazethapyr at 0.07 kg/ha PRE caused 70% injury to the spinach early and 39% by the end of the growing season. The southern pea herbicides seemed to have less of an effect on greens. By the end of the growing season, pendimethalin at 0.56 kg/ha plus imazethapyr PRE at 0.07 kg/ha was the only treatment that caused substantial injury (28%) to greens.

### **Herbicide Evaluation in Over-Wintered Spinach, Kibler, 2001-2002 (Table 14).**

Spinach (cv. F-380) was planted on 18 October 2001 in plots measuring 1.3 by 5 m with each plot containing six rows spaced 23 cm apart. PRE treatments were applied 18 October 2001 (air 18°C, soil 17°C, moist; RH 95%). POST treatments were applied 23 November 2001 (air 9°C; soil 7°C, moist). There was significant spinach stand loss due to soil-borne diseases causing variability, poor stands, and no yields were taken. Weeds present at time of POST application at Kibler included henbit (LAMAM, 5 cm), pineappleweed (MATMT, 2 cm), and cutleaf eveningprimrose (OEOLA, 2 cm). Spinach injury based on reduced growth and stands and weed control ratings were taken once in the fall on 23 November 2001, and twice the following spring on 1 February 2002 and 21 March 2002.

**RESULTS:** Due to seedling disease problems it was difficult to evaluate damage to the spinach from the herbicide treatments. However, there was no observable damage from S-metolachlor, fluroxypyr, clopyralid, or clethodim. Dimethenamid-P, thiobencarb, flufenacet, quinclorac, and low rates of linuron or clomazone all may have caused some early stunting, but by spring, the spinach had recovered and injury rating dropped below 30%. Severe injury was observed from the high rate of linuron, CGA-362622, and napropamide.

### **Herbicide Evaluation in Winter Squash (*Cucurbita maxima* Duch.), Fayetteville, 2001 (Table 15).**

Winter squash (var. Super Butternut) was planted on 10 May 2001, into plots measuring 3 by 9.1 m, with each plot containing one row of winter squash spaced 0.3-m apart. PRE treatments were applied immediately after planting (air 25°C; soil 27°C, moist; RH 80%). POST treatments were applied to 2- to 3-leaf plants on 8 June 2001 (air 32°C; soil 34°C, moist; RH 58%). Crop injury and weed control was rated 2, 4, 6, and 10 weeks after emergence and plots were harvested 12 August 2001. Weed present included Palmer amaranth (AMAPA), fall panicum (PANDI), Venice mallow (HIBTR), and yellow nutsedge (CYPES).

**RESULTS:** No injury was noted with clomazone applied PRE at 0.33 kg/ha, ethalfluralin applied PRE at 1.26 kg/ha, or the combination of clomazone applied PRE at 0.17 kg/ha + ethalfluralin applied PRE at 0.63

kg/ha (Table 12). Clomazone provided excellent control of PANDI, but did not provide sufficient control of the other weed species. Ethalfluralin provided greater than 90% control of PANDI and AMAPA, but control of HIBTR and CYPES was poor. Halosulfuron applied PRE in combination with clomazone + ethalfluralin caused some injury but increased weed control. Halosulfuron applied PRE at 0.018 to 0.036 with clomazone + ethalfluralin caused early injury ranging from 26 to 53%, but plants recovered by the end of the season with injury ranging from 5 to 15%. Control of PANDI and AMAPA was 100% with all rates of halosulfuron in combination with clomazone + ethalfluralin. Control of HIBTR ranged from 88 to 93% and control of CYPES ranged from 80 to 86% with halosulfuron applied PRE in combination with clomazone + ethalfluralin. POST applications of halosulfuron caused much less injury than PRE applications and resulted in greater weed control. All weed control ratings were greater than 90% when halosulfuron was applied POST following PRE applications of clomazone + ethalfluralin with the exception of halosulfuron applied POST at 0.018 kg/ha following clomazone + ethalfluralin, which provided 80% control of CYPES by the end of the growing season.

Yield ranged from 4.0 to 4.6 MT/ha when plots were treated with clomazone at 0.33 kg/ha PRE, ethalfluralin at 1.26 kg/ha PRE, and the combination of clomazone at 0.17 kg/ha + ethalfluralin at 0.63 PRE. Halosulfuron applied PRE in combination with clomazone + ethalfluralin at 1.26 kg/ha reduced yield, ranging from 1.6 to 2.4 MT/ha, which was probably due to extensive injury caused early in the growing season. Although plants seemed to recover from PRE applications of halosulfuron, plant growth was delayed. POST treatments of halosulfuron following the PRE application of clomazone + ethalfluralin were among the highest yielding treatments. Halosulfuron applied at 0.036 kg/ha POST following clomazone + ethalfluralin tended to reduce yields compared to lower rates of halosulfuron POST. Halosulfuron appears to complement the existing weed control options, but must be used carefully due to squash sensitivity.

### **Herbicide Evaluation in Sweet Potatoes (*Ipomoea batatas* L.), Newtonia, Mo., 2001 (Table 16)**

Sweet potato slips (cv. Beauregard) were transplanted on 16 May 2001 into plots 2 by 4 m. Each plot

contained two bedded rows spaced 1-m apart and plant spacing within each row was 0.3 m. POST-transplant (PRE to weeds) treatments were applied 18 May (air 27°; soil 29°, wet; RH 95%). LATE POST-transplant treatments were applied on 20 June (25°; soil 27°, moist; RH 68%) to sweet potato plants with 0.25-m runners. Crop injury and weed control were rated 2, 4, 6, 8, and 12 weeks after the initial treatments and plots were harvested on 20 September 2001. Weeds present included common lambsquarters (CHEAL), goosegrass (ELEIN), and velvetleaf (ABUTH).

**RESULTS:** Clomazone applied POST-transplant at 0.56 kg/ha did not cause injury to sweet potatoes, but increasing the rate of clomazone to 1.12 POST transplant resulted in early season stunting (Table 10). Clomazone provided similar control of ELEIN and ABUTH regardless of rate, but increasing the rate of clomazone from 0.56 kg/ha to 1.12 kg/ha increased control of CHEAL from 59 to 89% by 12 WAT. Flufenacet is a new herbicide marketed by Bayer for use in corn, soybeans and wheat, but also has potential in many vegetable crops. Flufenacet was slightly injurious to sweet potatoes when applied POST transplant, but caused slightly more injury throughout the growing season when applied at 0.9 kg/ha compared to 0.45 kg/ha. Flufenacet applied at 0.45 kg/ha provided 85% control of ELEIN, 74% control of CHEAL, and 88% control of ABUTH, but increasing the rate of flufenacet resulted in increased control. The prepackaged combination of flufenacet/metribuzin applied 0.56 POST-transplant caused similar injury to that observed from flufenacet alone, and the addition of metribuzin appeared to improve control of CHEAL and ABUTH. Tank-mix combinations of clomazone + flufenacet and clomazone + flufenacet/metribuzin did not increase injury over flufenacet or flufenacet/metribuzin alone, but the addition of the clomazone improved control of all species to 100%. S-metolachlor applied at 0.75 and 1.5 kg/ha POST-transplant caused some early stunting, but no injury was noted by 12 WAT. Dimethenamid-P applied at 0.56 POST transplant caused some minor injury early, but increasing the rate to 1.12 kg/ha increased the level of injury to 20% by 2 WAT and declined to 8% by 12 WAT. S-metolachlor also provided better control of CHEAL and ABUTH than dimethenamid-P. Halosulfuron was also evaluated in programs with clomazone due to the lack of grass control provided by halosulfuron. Halosulfuron applied POST transplant at 0.036 kg/ha caused up to

28% injury 3 WAT but declined to 8% 12 WAT. Halosulfuron applied LATE POST transplant caused up to 40% injury and declined to 15% by 12 WAT. Although sweet potato injury was observed, weed control was excellent. Napropamide applied at 2.24 kg/ha POST transplant appeared to be safe, but ABUTH was the only weed effectively controlled. The standard program of clomazone applied at 0.56 kg/ha POST transplant followed by sethoxydim applied at 0.42 kg/ha LATE POST was similar to control from clomazone applied alone at 0.56 kg/ha.

Flufenacet applied alone or in combination with clomazone POST transplant resulted in the highest sweet potato yields, ranging from 40 to 47 MT/ha. Treatments containing flufenacet/metribuzin yielded less, probably due to injury observed from the addition of metribuzin. The excellent weed control and good sweet potato tolerance to S-metolachlor also resulted in very good yields, ranging from 39 MT/ha when S-metolachlor was applied at 0.75 kg/ha to 41 MT/ha when applied at 1.5 kg/ha. Yields from dimethenamid-P treatments were less than S-metolachlor due to less weed control and less crop safety. Clomazone alone or followed by sethoxydim resulted in low yields ranging from 31 to 37 kg/ha due to reduced weed control. The addition of halosulfuron POST transplant or LATE POST transplant to clomazone programs did improve weed control, but yields were reduced due to injury.

#### **Evaluation of S-Metolachlor and Dimethenamid-P in Table Beets (*Beta vulgaris* L.), Fayetteville, 2001 (Table 17).**

Table beets (cv. Detroit Dark Red) were planted on 2 April 2001 into plots measuring 2 by 4 m. Each plot contained two bedded rows spaced 1-m apart and two rows of table beets were planted on each row at a rate of 40 seed per m row. Treatments were applied at the 2- to 3-leaf stage on 25 April 2001 (air 18°C; soil 19°C, moist; RH 70%). Due to the presence of many weeds at application and the lack of postemergence control from the herbicides sprayed, row 1 was not weeded and row 2 was hand-weeded before application. Crop injury and weed control was rated 4, 6, and 8 weeks after treatments (WAT) and plots were harvested on 22 June 2001. Weeds present included common lambsquarters (CHEAL), cutleaf eveningprimrose (OEOLA), and henbit (LAMAM).

**RESULTS:** Control of all weed species in row 1 (unweeded) was poor when treated with dimethenamid-P at 0.74 kg/ha, but control of all species was greatly improved in row 2 (hand weeded before spraying) (Table 11). Control of OEOLA was still inadequate in row 2. Dimethenamid-P applied at 0.74 kg/ha at the 2- to 3- leaf stage did not cause injury to either row of the table beets. Increasing the rate of dimethenamid-P to 1.48 kg/ha caused some slight injury, 7% by 6 WAT. The increased rate improved weed control. Control of CHEAL was 87% in the non-weeded when treated with 1.48 kg/ha compared to 65% control when treated with 0.74 kg/ha. Control of OEOLA and LAMAM was also improved when rate of dimethenamid was increased, but overall, control was still inadequate in row 1. Control of all species in the weeded row was excellent when treated with dimethenamid-P at 1.48 kg/ha. Similar trends were observed when table beets were treated with S-metolachlor. Overall, S-metolachlor was slightly more injurious to table

beets and provided lower weed control than dimethenamid-P. Pyrazon, a herbicide currently labeled in table beets, was the best overall treatment. No injury was observed and weed control was excellent in both rows when applied at 4.1 kg/ha. Some injury was noted (10%) when cycloate was applied at 4.5 kg/ha. Control in the weeded row was excellent for all species but very poor in the unweeded row.

Pyrazon applied at 4.1 kg/ha, and cycloate applied at 4.5 kg/ha were superior treatments. Results indicate that dimethenamid-P and S-metolachlor do not have an adequate ability to control weeds that have emerged. Yields were much improved in the weeded row due to the lack of competition from emerged weeds. No differences were detected in yield between dimethenamid-P or S-metolachlor at any rate. Dimethenamid-P and S-metolachlor show potential for use in table beets, but it is important to apply these materials before weeds have emerged.

**Table 8. Evaluation of Clomazone Drift on Newly Established Native Pecans, Fayetteville, 2001.**

| Treatment               | Form. | Rate<br>(kg ai/ha) | Growth<br>stage | Pecan chlorosis<br>------(%)----- |       |       |       |       |        |    |
|-------------------------|-------|--------------------|-----------------|-----------------------------------|-------|-------|-------|-------|--------|----|
|                         |       |                    |                 | 1 WAT                             | 2 WAT | 4 WAT | 6 WAT | 8 WAT | 10 WAT |    |
| Untreated check         |       |                    |                 | 0                                 | 0     | 0     | 0     | 0     | 0      | 0  |
| Clomazone               | 3 ME  | 0.45               | 5- to 9-If      | 3                                 | 4     | 5     | 5     | 0     | 0      | 0  |
| Clomazone               | 3 ME  | 0.045              | 5- to 9-If      | 1                                 | 2     | 2     | 1     | 0     | 0      | 0  |
| Clomazone               | 3 ME  | 0.0045             | 5- to 9-If      | 1                                 | 1     | 1     | 1     | 0     | 0      | 0  |
| Clomazone               | 4 EC  | 0.45               | 5- to 9-If      | 3                                 | 5     | 8     | 6     | 0     | 0      | 0  |
| Clomazone               | 4 EC  | 0.045              | 5- to 9-If      | 1                                 | 3     | 4     | 4     | 0     | 0      | 0  |
| Clomazone               | 4 EC  | 0.0045             | 5- to 9-If      | 0                                 | 1     | 1     | 0     | 0     | 0      | 0  |
| Clomazone +<br>propanil | 3 ME  | 0.45               | 5- to 9-If      | 2                                 | 5     | 7     | 12    | 2     | 0      | 0  |
|                         | 4 EC  | 3.3                |                 |                                   |       |       |       |       |        |    |
| Clomazone +<br>propanil | 3 ME  | 0.045              | 5- to 9-If      | 2                                 | 4     | 4     | 4     | 0     | 0      | 0  |
|                         | 4 EC  | 0.33               |                 |                                   |       |       |       |       |        |    |
| Clomazone +<br>propanil | 3 ME  | 0.0045             | 5- to 9-If      | 3                                 | 3     | 3     | 2     | 0     | 0      | 0  |
|                         | 4 EC  | 0.033              |                 |                                   |       |       |       |       |        |    |
| LSD (P=.05)             |       |                    |                 | NS                                | 3     | 4     | 6     | 1     | 1      | NS |

continued

**Table 8. Continued.**

| Treatment               | Form. | Rate<br>(kg ai/ha) | Growth<br>stage | Pecan injury<br>------(%)----- |       |       |       |       |        |   |
|-------------------------|-------|--------------------|-----------------|--------------------------------|-------|-------|-------|-------|--------|---|
|                         |       |                    |                 | 1 WAT                          | 2 WAT | 4 WAT | 6 WAT | 8 WAT | 10 WAT |   |
| Untreated check         |       |                    |                 | 0                              | 0     | 0     | 0     | 0     | 0      | 0 |
| Clomazone               | 3 ME  | 0.45               | 5- to 9-If      | 2                              | 0     | 0     | 0     | 0     | 0      | 0 |
| Clomazone               | 3 ME  | 0.045              | 5- to 9-If      | 2                              | 0     | 0     | 0     | 0     | 0      | 0 |
| Clomazone               | 3 ME  | 0.0045             | 5- to 9-If      | 0                              | 0     | 0     | 0     | 0     | 0      | 0 |
| Clomazone               | 4 EC  | 0.45               | 5- to 9-If      | 3                              | 0     | 0     | 0     | 0     | 0      | 0 |
| Clomazone               | 4 EC  | 0.045              | 5- to 9-If      | 0                              | 0     | 0     | 0     | 0     | 0      | 0 |
| Clomazone               | 4 EC  | 0.0045             | 5- to 9-If      | 0                              | 0     | 0     | 0     | 0     | 0      | 0 |
| Clomazone +<br>propanil | 3 ME  | 0.45               | 5- to 9-If      | 39                             | 62    | 39    | 24    | 10    | 3      | 3 |
|                         | 4 EC  | 3.3                |                 |                                |       |       |       |       |        |   |
| Clomazone +<br>propanil | 3 ME  | 0.045              | 5- to 9-If      | 2                              | 4     | 5     | 3     | 0     | 0      | 0 |
|                         | 4 EC  | 0.33               |                 |                                |       |       |       |       |        |   |
| Clomazone +<br>propanil | 3 ME  | 0.0045             | 5- to 9-If      |                                | 2     | 3     | 2     | 0     | 0      | 0 |
|                         | 4 EC  | 0.033              |                 |                                |       |       |       |       |        |   |
| LSD (P=.05)             |       |                    |                 | 5                              | 5     | 6     | 4     | 1     | 1      | 1 |

**Table 9. Evaluation of Clomazone Drift on 2-Year-Old Native Pecans, Fayetteville, 2002.**

| Treatment               | Form.        | Rate<br>(kg ai/ha) | Growth<br>stage | Pecan chlorosis<br>(%) |       |       |       |       |       |       |    |
|-------------------------|--------------|--------------------|-----------------|------------------------|-------|-------|-------|-------|-------|-------|----|
|                         |              |                    |                 | 1 WAT                  | 2 WAT | 3 WAT | 4 WAT | 5 WAT | 6 WAT | 7 WAT |    |
| Untreated check         |              | 0                  |                 | 0                      | 0     | 0     | 0     | 0     | 0     | 0     | 0  |
| Clomazone               | 3 ME         | 0.45               | 6- to 12-If     | 2.5                    | 18    | 18    | 10    | 11    | 10    | 10    | 10 |
| Clomazone               | 3 ME         | 0.045              | 6- to 12-If     | 11                     | 8     | 6     | 8     | 5     | 5     | 5     | 5  |
| Clomazone               | 3 ME         | 0.0045             | 6- to 12-If     | 0                      | 1     | 0     | 1     | 0     | 0     | 0     | 0  |
| Clomazone               | 4 EC         | 0.45               | 6- to 12-If     | 30                     | 20    | 15    | 15    | 14    | 14    | 14    | 13 |
| Clomazone               | 4 EC         | 0.045              | 6- to 12-If     | 14                     | 11    | 14    | 10    | 8     | 8     | 8     | 8  |
| Clomazone               | 4 EC         | 0.0045             | 6- to 12-If     | 6                      | 4     | 3     | 3     | 4     | 3     | 3     | 3  |
| Clomazone +<br>propanil | 3 ME<br>4 EC | 0.45<br>3.3        | 6- to 12-If     | 20                     | 15    | 13    | 10    | 8     | 9     | 9     | 9  |
| Clomazone +<br>propanil | 3 ME<br>4 EC | 0.045<br>0.33      | 6- to 12-If     | 10                     | 12    | 11    | 6     | 6     | 5     | 5     | 5  |
| Clomazone +<br>propanil | 3 ME<br>4 EC | 0.0045<br>0.033    | 6- to 12-If     | 5                      | 9     | 6     | 6     | 6     | 4     | 4     | 4  |
| LSD (P=0.05)            |              |                    |                 | 11                     | 8     | 7     | 6     | 7     | 6     | 6     | 6  |

continued

**Table 9. Continued.**

| Treatment               | Form.        | Rate<br>(kg ai/ha) | Growth<br>stage | Pecan injury<br>(%) |       |       |       |       |       |       |   |
|-------------------------|--------------|--------------------|-----------------|---------------------|-------|-------|-------|-------|-------|-------|---|
|                         |              |                    |                 | 1 WAT               | 2 WAT | 3 WAT | 4 WAT | 5 WAT | 6 WAT | 7 WAT |   |
| Untreated check         |              | 0                  |                 | 0                   | 0     | 0     | 0     | 0     | 0     | 0     | 0 |
| Clomazone               | 3 ME         | 0.45               | 6- to 12-If     | 6                   | 6     | 5     | 5     | 4     | 3     | 3     | 3 |
| Clomazone               | 3 ME         | 0.045              | 6- to 12-If     | 3                   | 2     | 2     | 2     | 3     | 3     | 3     | 3 |
| Clomazone               | 3 ME         | 0.0045             | 6- to 12-If     | 3                   | 1     | 1     | 1     | 0     | 0     | 0     | 0 |
| Clomazone               | 4 EC         | 0.45               | 6- to 12-If     | 4                   | 8     | 6     | 6     | 6     | 4     | 4     | 4 |
| Clomazone               | 4 EC         | 0.045              | 6- to 12-If     | 1                   | 3     | 4     | 4     | 3     | 3     | 3     | 3 |
| Clomazone               | 4 EC         | 0.0045             | 6- to 12-If     | 2                   | 2     | 1     | 2     | 1     | 1     | 1     | 1 |
| Clomazone +<br>propanil | 3 ME<br>4 EC | 0.45<br>3.3        | 6- to 12-If     | 2.5                 | 28    | 33    | 28    | 2.5   | 15    | 9     | 9 |
| Clomazone +<br>propanil | 3 ME<br>4 EC | 0.045<br>0.33      | 6- to 12-If     | 8                   | 10    | 10    | 8     | 13    | 8     | 8     | 8 |
| Clomazone +<br>propanil | 3 ME<br>4 EC | 0.0045<br>0.033    | 6- to 12-If     | 5                   | 3     | 3     | 3     | 3     | 3     | 3     | 4 |
| LSD (P=0.05)            |              |                    |                 | 7                   | 5     | 6     | 5     | 9     | 4     | 4     | 5 |



**Table 10. Herbicide Evaluation in Watermelons and Carryover Effect to Fall Greens, Kibler, 2001.**

| Treatment                                     | Form.                 | Rate<br>(kg ai/ha)    | Growth<br>stage | Watermelon injury |       |       |       | Palmer amaranth control |       |       |       | Goosegrass control |       |       |       |     |     |
|---|-----------------------|-----------------------|-----------------|-------------------|-------|-------|-------|-------------------------|-------|-------|-------|--------------------|-------|-------|-------|-----|-----|
|   |                       |                       |                 | 2 WAT             | 3 WAT | 4 WAT | 4 WAT | 2 WAT                   | 3 WAT | 4 WAT | 4 WAT | 2 WAT              | 3 WAT | 4 WAT | 4 WAT |     |     |
| Untreated check                               |                       |                       |                 | 0                 | 0     | 0     | 0     | 0                       | 0     | 0     | 0     | 0                  | 0     | 0     | 0     | 0   | 0   |
| Clomazone                                     | 3 ME                  | 0.17                  | PRE             | 2                 | 0     | 0     | 0     | 49                      | 13    | 10    | 100   | 100                | 100   | 100   | 100   | 100 | 100 |
| Clomazone                                     | 3 ME                  | 0.34                  | PRE             | 6                 | 1     | 0     | 0     | 84                      | 44    | 15    | 100   | 100                | 100   | 100   | 100   | 100 | 100 |
| Ethalfuralin                                  | 3 EC                  | 1.26                  | PRE             | 0                 | 0     | 0     | 0     | 100                     | 84    | 69    | 50    | 29                 | 0     | 0     | 0     | 0   | 0   |
| Clomazone +<br>ethalfuralin                   | 3 ME<br>3 EC          | 0.17<br>0.63          | PRE             | 10                | 4     | 3     | 3     | 98                      | 80    | 65    | 100   | 100                | 100   | 100   | 100   | 100 | 100 |
| Clomazone +<br>ethalfuralin +<br>halosulfuron | 3 ME<br>3 EC<br>75 EF | 0.17<br>0.63<br>0.027 | PRE             | 21                | 19    | 11    | 11    | 100                     | 97    | 93    | 100   | 100                | 100   | 100   | 100   | 100 | 99  |
| Clomazone +<br>ethalfuralin +<br>halosulfuron | 3 ME<br>3 EC<br>75 DF | 0.17<br>0.63<br>0.027 | PRE             | 34                | 26    | 21    | 21    | 100                     | 98    | 96    | 100   | 100                | 100   | 100   | 100   | 100 | 99  |
| Clomazone +<br>ethalfuralin +<br>halosulfuron | 3 ME<br>3 EC<br>75 DF | 0.17<br>0.63<br>0.036 | PRE             | 50                | 34    | 18    | 18    | 100                     | 100   | 98    | 100   | 100                | 100   | 100   | 100   | 100 | 99  |
| Clomazone +<br>ethalfuralin fb                | 3 ME<br>3 EC          | 0.17<br>0.63          | PRE             | 3                 | 0     | 7     | 7     | 99                      | 88    | 85    | 100   | 100                | 100   | 100   | 100   | 100 | 100 |
| halosulfuron + NIS <sup>1</sup>               | 75 DF                 | 0.016                 | POST            |                   |       |       |       |                         |       |       |       |                    |       |       |       |     |     |
| Clomazone +<br>ethalfuralin fb                | 3 ME<br>3 EC          | 0.17<br>0.63          | PRE             | 5                 | 0     | 12    | 12    | 100                     | 88    | 86    | 100   | 100                | 100   | 100   | 100   | 100 | 99  |
| halosulfuron + NIS <sup>1</sup>               | 75 DF                 | 0.024                 | POST            |                   |       |       |       |                         |       |       |       |                    |       |       |       |     |     |
| Clomazone +<br>ethalfuralin fb                | 3 ME<br>3 EC          | 0.17<br>0.63          | PRE             | 5                 | 0     | 15    | 15    | 100                     | 89    | 92    | 100   | 100                | 100   | 100   | 100   | 100 | 99  |
| halosulfuron + NIS <sup>1</sup>               | 75 DF                 | 0.032                 | POST            |                   |       |       |       |                         |       |       |       |                    |       |       |       |     |     |
| LSD (P=0.05)                                  |                       |                       |                 | 7                 | 6     | 5     | 5     | 5                       | 8     | 6     | 3     | 3                  | 3     | 3     | 3     | 3   | 4   |

continued

Table 10. Continued.

| Treatment  | Form. | Rate<br>(kg ai/ha) | Growth<br>stage | Eclipta control |                  | Watermelon |         | Spinach injury |         | Mustard <sup>2</sup> injury |   |
|--|-------|--------------------|-----------------|-----------------|------------------|------------|---------|----------------|---------|-----------------------------|---|
|  |       |                    |                 | 2 WAT<br>(%)    | yield<br>(MT/ha) | 11/15/01   | 3/21/02 | 11/15/01       | 3/21/02 |                             |   |
| Untreated check  |       |                    |                 |                 |                  |            |         |                |         |                             |   |
| Clomazone  | 3 ME  | 0.17               | PRE             | 0               | 0.2              | 5          | 2       | 5              | 2       | 5                           | 2 |
| Clomazone  | 3 ME  | 0.34               | PRE             | 100             | 0.2              | 0          | 0       | 5              | 0       | 5                           | 0 |
| Ethalfuralin   | 3 EC  | 1.26               | PRE             | 0               | 0.7              | 7          | 3       | 23             | 3       | 8                           | 8 |
| Clomazone +<br>ethalfuralin                                      | 3 ME  | 0.17               | PRE             | 100             | 7.0              | 2          | 3       | 6              | 3       | 0                           | 0 |
| Clomazone +<br>ethalfuralin                                      | 3 EC  | 0.63               | PRE             | 100             | 7.9              | 10         | 4       | 8              | 4       | 2                           | 2 |
| Clomazone +<br>ethalfuralin +<br>halosulfuron                    | 3 ME  | 0.17               | PRE             | 99              | 14.1             | 0          | 0       | 0              | 0       | 0                           | 0 |
| Clomazone +<br>ethalfuralin +<br>halosulfuron                    | 3 EC  | 0.63               |                 |                 |                  |            |         |                |         |                             |   |
| Clomazone +<br>ethalfuralin +<br>halosulfuron                    | 75 EF | 0.027              |                 |                 |                  |            |         |                |         |                             |   |
| Clomazone +<br>ethalfuralin +<br>halosulfuron                    | 3 ME  | 0.17               | PRE             | 100             | 15.9             | 5          | 2       | 13             | 2       | 4                           | 4 |
| Clomazone +<br>ethalfuralin +<br>halosulfuron                    | 3 EC  | 0.63               |                 |                 |                  |            |         |                |         |                             |   |
| Clomazone +<br>ethalfuralin +<br>halosulfuron                    | 75 DF | 0.027              |                 |                 |                  |            |         |                |         |                             |   |
| Clomazone +<br>ethalfuralin +<br>halosulfuron                    | 3 ME  | 0.17               | PRE             | 100             | 16.3             | 5          | 2       | 15             | 2       | 5                           | 5 |
| Clomazone +<br>ethalfuralin +<br>halosulfuron                    | 3 EC  | 0.63               |                 |                 |                  |            |         |                |         |                             |   |
| Clomazone +<br>ethalfuralin +<br>halosulfuron                    | 75 DF | 0.036              |                 |                 |                  |            |         |                |         |                             |   |
| Clomazone +<br>ethalfuralin +<br>halosulfuron                    | 3 ME  | 0.17               | PRE             | 100             | 11.2             | 0          | 0       | 15             | 0       | 5                           | 5 |
| Clomazone +<br>ethalfuralin +<br>halosulfuron                    | 3 EC  | 0.63               |                 |                 |                  |            |         |                |         |                             |   |
| Clomazone +<br>ethalfuralin +<br>halosulfuron + NIS <sup>1</sup> | 75 DF | 0.016              | POST            |                 |                  |            |         |                |         |                             |   |
| Clomazone +<br>ethalfuralin +<br>halosulfuron                    | 3 ME  | 0.17               | PRE             | 100             | 9.4              | 7          | 2       | 17             | 2       | 4                           | 4 |
| Clomazone +<br>ethalfuralin +<br>halosulfuron                    | 3 EC  | 0.63               |                 |                 |                  |            |         |                |         |                             |   |
| Clomazone +<br>ethalfuralin +<br>halosulfuron + NIS <sup>1</sup> | 75 DF | 0.024              | POST            |                 |                  |            |         |                |         |                             |   |
| Clomazone +<br>ethalfuralin +<br>halosulfuron                    | 3 ME  | 0.17               | PRE             | 100             | 9.0              | 5          | 2       | 16             | 2       | 5                           | 5 |
| Clomazone +<br>ethalfuralin +<br>halosulfuron                    | 3 EC  | 0.63               |                 |                 |                  |            |         |                |         |                             |   |
| Clomazone +<br>ethalfuralin +<br>halosulfuron + NIS <sup>1</sup> | 75 DF | 0.032              | POST            |                 |                  |            |         |                |         |                             |   |
| LSD (P=0.05)   |       |                    |                 | 3               | 4.2              | 6          | 3       | 9              | 3       | 5                           | 5 |

<sup>1</sup> NIS was applied at 0.25% volume to volume of water.

<sup>2</sup> Fall-planted follow crop.

Table 11. Preemergence Herbicide Evaluation in Snap Beans, Lowell, Ark., 2001.

| Treatment                     | Form.          | Rate<br>(kg ai/ha) | Growth<br>stage | Snap bean injury |       | Common<br>lambsquarters control |       | Italian ryegrass<br>control |       | Snap bean<br>yield<br>8 WAE<br>(MT/ha) |
|-------------------------------|----------------|--------------------|-----------------|------------------|-------|---------------------------------|-------|-----------------------------|-------|--|
|                               |                |                    |                 | 2 WAE            | 4 WAE | 6 WAE                           | 4 WAE | 6 WAE                       | 4 WAE |  |
| Untreated check               |                |                    |                 | 0                | 0     | 0                               | 0     | 0                           | 0     | 9.5                                    |
| S-metolachlor                 | 7.62 EC        | 1.4                | PRE             | 9                | 6     | 5                               | 84    | 100                         | 100   | 12.4                                   |
| Dimethenamid-P                | 6 EC           | 0.56               | PRE             | 18               | 13    | 5                               | 91    | 100                         | 100   | 12.4                                   |
| Dimethenamid-P                | 6 EC           | 1.12               | PRE             | 14               | 10    | 8                               | 98    | 100                         | 100   | 14.2                                   |
| Clomazone                     | 3 ME           | 1.12               | PRE             | 14               | 13    | 7                               | 99    | 99                          | 100   | 14.1                                   |
| Flufenacet                    | 60 WG          | 0.33               | PRE             | 6                | 5     | 5                               | 84    | 99                          | 93    | 14.3                                   |
| Flufenacet                    | 60 WG          | 0.67               | PRE             | 3                | 3     | 3                               | 98    | 100                         | 100   | 15.1                                   |
| Fomesafen                     | 2 L            | 0.22               | PRE             | 5                | 4     | 2                               | 85    | 80                          | 8     | 14.3                                   |
| Lactofen                      | 2 E            | 0.22               | PRE             | 5                | 4     | 2                               | 89    | 69                          | 28    | 14.0                                   |
| S-metolachlor +<br>fomesafen  | 7.62 EC<br>2 L | 0.75<br>0.22       | PRE             | 5                | 5     | 3                               | 96    | 100                         | 100   | 17.2                                   |
| S-metolachlor +<br>lactofen   | 7.62 EC<br>2 E | 0.75<br>0.22       | PRE             | 18               | 9     | 8                               | 98    | 96                          | 100   | 13.5                                   |
| Dimethenamid-P +<br>fomesafen | 6 EC<br>2 L    | 0.56<br>0.22       | PRE             | 20               | 15    | 10                              | 98    | 98                          | 100   | 14.7                                   |
| Dimethenamid-P +<br>lactofen  | 6 EC<br>2 E    | 0.56<br>0.22       | PRE             | 30               | 16    | 6                               | 100   | 95                          | 100   | 14.2                                   |
| Clomazone +<br>fomesafen      | 3 ME<br>2 L    | 0.56<br>0.22       | PRE             | 13               | 8     | 5                               | 96    | 96                          | 98    | 14.0                                   |
| Clomazone +<br>lactofen       | 3 ME<br>2 E    | 0.56<br>0.22       | PRE             | 15               | 11    | 6                               | 100   | 99                          | 100   | 13.4                                   |
| Clomazone +<br>flumiclorac    | 3 ME<br>51 WDG | 0.56<br>0.036      | PRE             | 74               | 50    | 41                              | 99    | 98                          | 100   | 8.4                                    |
| LSD (P=0.05)                  |                |                    |                 | 10               | 7     | 6                               | 8     | 9                           | 5     | 4                                      |

**Table 12. Postemergence Herbicide Evaluation in Snap Beans, Newtonia, MO, 2001.**

| Treatment                      | Form.         | Rate<br>(kg ai/ha) | Growth<br>stage | Snap bean injury |       | Common<br>lambsquarters control |       |       | Giant foxtail<br>control |       | Snap bean<br>yield |       |
|--------------------------------|---------------|--------------------|-----------------|------------------|-------|---------------------------------|-------|-------|--------------------------|-------|--------------------|-------|
|                                |               |                    |                 | 3 WAE            | 6 WAE | 3 WAE                           | 6 WAE | 3 WAE | 6 WAE                    | 3 WAE | 6 WAE              | 8 WAE |
| Untreated check                |               |                    |                 | 0                | 0     | 0                               | 0     | 0     | 0                        | 0     | 0                  | 4.2   |
| Fomesafen                      | 2 L           | 0.22               | V3              | 0                | 0     | 91                              | 90    | 29    | 18                       | 9.4   | 9.4                |       |
| Fomesafen + bentazon           | 2 L<br>4 EC   | 0.22<br>0.84       | V3              | 0                | 0     | 94                              | 95    | 70    | 64                       | 7.3   | 7.3                |       |
| Fomesafen: fluazifop           | 1.41 WC       | 0.39               | V3              | 9                | 3     | 94                              | 93    | 96    | 94                       | 6.2   | 6.2                |       |
| Acifluorfen                    | 2 AS          | 0.28               | V3              | 9                | 4     | 94                              | 93    | 21    | 5                        | 5.1   | 5.1                |       |
| Acifluorfen                    | 2 AS          | 0.56               | V3              | 19               | 13    | 97                              | 95    | 41    | 20                       | 6.4   | 6.4                |       |
| Acifluorfen + safener          | 2 AS          | 0.28               | V3              | 8                | 3     | 90                              | 88    | 21    | 10                       | 5.0   | 5.0                |       |
| Acifluorfen + safener          | 2 AS          | 0.56               | V3              | 16               | 10    | 95                              | 95    | 35    | 19                       | 6.7   | 6.7                |       |
| Imazethapyr + NIS <sup>1</sup> | 2 AS          | 0.07               | V3              | 0                | 0     | 81                              | 74    | 94    | 95                       | 6.1   | 6.1                |       |
| Imazethapyr + bentazon + NIS   | 2 AS<br>4 EC  | 0.07<br>0.84       | V3              | 0                | 0     | 89                              | 88    | 91    | 89                       | 8.7   | 8.7                |       |
| Imazethapyr + fomesafen + NIS  | 2 AS<br>2 L   | 0.07<br>0.22       | V3              | 11               | 6     | 94                              | 93    | 79    | 70                       | 5.3   | 5.3                |       |
| Imazamox + NIS                 | 1 AS          | 0.04               | V3              | 0                | 0     | 81                              | 78    | 93    | 94                       | 7.5   | 7.5                |       |
| Imazamox + bentazon + NIS      | 1 AS<br>4 EC  | 0.04<br>0.84       | V3              | 0                | 0     | 91                              | 88    | 90    | 86                       | 6.8   | 6.8                |       |
| Imazamox + fomesafen + NIS     | 1 AS<br>2 L   | 0.04<br>0.22       | V3              | 8                | 1     | 94                              | 93    | 90    | 89                       | 6.2   | 6.2                |       |
| Halosulfuron + NIS             | 75 DF         | 0.04               | V3              | 0                | 0     | 29                              | 35    | 0     | 0                        | 6.6   | 6.6                |       |
| Halosulfuron + bentazon + NIS  | 75 DF<br>4 EC | 0.04<br>0.84       | V3              | 0                | 0     | 74                              | 73    | 23    | 4                        | 5.1   | 5.1                |       |
| Halosulfuron + fomesafen + NIS | 75 DF<br>2 L  | 0.04<br>0.22       | V3              | 8                | 3     | 89                              | 88    | 19    | 4                        | 7.1   | 7.1                |       |
| Cloransulam + COC <sup>2</sup> | 84 DF         | 0.018              | V3              | 6                | 3     | 20                              | 6     | 19    | 5                        | 6.1   | 6.1                |       |
| Flufenpyr + COC                | 57.6 WDG      | 0.2                | V3              | 49               | 31    | 91                              | 93    | 69    | 60                       | 6.4   | 6.4                |       |
| Flufenpyr + COC                | 57.6 WDG      | 0.4                | V3              | 58               | 44    | 95                              | 94    | 85    | 86                       | 5.2   | 5.2                |       |
| Flumiclorac + NIS              | 0.86 EC       | 0.03               | V3              | 5                | 3     | 76                              | 70    | 9     | 0                        | 6.3   | 6.3                |       |
| LSD (P=0.05)                   |               |                    |                 | 5                | 4     | 6                               | 6     | 6     | 6                        |       |                    | 1.0   |

<sup>1</sup> NIS was applied at 0.25% volume to volume of water.

<sup>2</sup> COC was applied at 1% volume to volume of water.

Table 13. Herbicide Evaluation in Southern Peas, Kibler, 2001.

| Treatment                      | Form.   | Rate<br>(kg ai/ha) | Growth<br>stage | Southern pea injury |       |       | Goosegrass control |       |       | Red sprangletop control |       |       |    |    |    |
|--------------------------------|---------|--------------------|-----------------|---------------------|-------|-------|--------------------|-------|-------|-------------------------|-------|-------|----|----|----|
|                                |         |                    |                 | 2 WAE               | 4 WAE | 7 WAE | 2 WAE              | 4 WAE | 7 WAE | 2 WAE                   | 4 WAE | 7 WAE |    |    |    |
| Untreated check                |         |                    |                 | 0                   | 0     | 0     | 0                  | 0     | 0     | 0                       | 0     | 0     | 0  | 0  | 0  |
| S-metolachlor                  | 7.62 EC | 1.12               | PRE             | 0                   | 0     | 0     | 100                | 99    | 93    | 100                     | 100   | 99    | 99 | 96 | 96 |
| Halosulfuron                   | 75 DF   | 0.029              | PRE             | 0                   | 0     | 0     | 50                 | 60    | 60    | 71                      | 65    | 65    | 53 | 53 | 53 |
| Halosulfuron                   | 75 DF   | 0.036              | PRE             | 0                   | 0     | 0     | 85                 | 70    | 59    | 85                      | 84    | 84    | 74 | 74 | 74 |
| Clomazone                      | 3 ME    | 0.56               | PRE             | 0                   | 0     | 0     | 100                | 100   | 95    | 100                     | 100   | 100   | 96 | 96 | 96 |
| Clomazone +<br>halosulfuron    | 3 ME    | 0.56               | PRE             | 0                   | 0     | 0     | 100                | 100   | 98    | 100                     | 100   | 100   | 98 | 98 | 98 |
| Clomazone +<br>flumioxazin     | 75 DF   | 0.029              | PRE             | 0                   | 0     | 0     | 100                | 100   | 99    | 100                     | 100   | 100   | 99 | 99 | 99 |
| Clomazone +<br>flumioxazin     | 3 ME    | 0.56               | PRE             | 0                   | 0     | 0     | 100                | 100   | 99    | 100                     | 100   | 100   | 99 | 99 | 99 |
| Dimethenamid-P                 | 51 WDG  | 0.036              | PRE             | 0                   | 0     | 0     | 95                 | 95    | 95    | 98                      | 98    | 98    | 96 | 96 | 96 |
| Flufenacet                     | 6 EC    | 0.56               | PRE             | 0                   | 0     | 0     | 99                 | 98    | 96    | 100                     | 99    | 99    | 96 | 96 | 96 |
| Flufenacet                     | 60 WG   | 0.33               | PRE             | 0                   | 0     | 0     | 96                 | 96    | 93    | 100                     | 100   | 100   | 95 | 95 | 95 |
| Flufenacet                     | 60 WG   | 0.67               | PRE             | 0                   | 0     | 0     | 84                 | 84    | 61    | 89                      | 80    | 80    | 60 | 60 | 60 |
| Sulfentrazone                  | 75 DF   | 0.22               | PRE             | 0                   | 0     | 0     | 98                 | 96    | 93    | 95                      | 95    | 95    | 91 | 91 | 91 |
| Sulfentrazone                  | 75 DF   | 0.45               | PRE             | 13                  | 19    | 14    | 98                 | 96    | 99    | 100                     | 100   | 100   | 99 | 99 | 99 |
| Clomazone +<br>sulfentrazone   | 3 ME    | 0.56               | PRE             | 0                   | 0     | 0     | 100                | 100   | 99    | 100                     | 100   | 100   | 99 | 99 | 99 |
| Clomazone +<br>sulfentrazone   | 75 DF   | 0.28               | PRE             | 0                   | 0     | 0     | 99                 | 98    | 94    | 100                     | 100   | 100   | 94 | 94 | 94 |
| Pendimethalin +<br>imazethapyr | 3.3 EC  | 0.84               | PRE             | 0                   | 0     | 0     | 99                 | 98    | 94    | 100                     | 100   | 100   | 99 | 99 | 99 |
| Pendimethalin fb               | 2 AS    | 0.07               | PRE             | 0                   | 5     | 0     | 100                | 99    | 95    | 100                     | 99    | 99    | 95 | 95 | 95 |
| Pendimethalin fb               | 3.3 EC  | 0.56               | POST            | 0                   | 5     | 0     | 100                | 99    | 95    | 100                     | 99    | 99    | 95 | 95 | 95 |
| Pendimethalin fb               | 2 L     | 0.28               | POST            | 0                   | 14    | 6     | 95                 | 95    | 94    | 100                     | 100   | 100   | 98 | 98 | 98 |
| Pendimethalin fb               | 3.3 EC  | 0.56               | PRE             | 0                   | 14    | 6     | 95                 | 95    | 94    | 100                     | 100   | 100   | 98 | 98 | 98 |
| Pendimethalin fb               | 2L      | 0.56               | POST            | 0                   | 14    | 6     | 95                 | 95    | 94    | 100                     | 100   | 100   | 98 | 98 | 98 |
| Pendimethalin fb               | 2L      | 0.56               | POST            | 0                   | 14    | 6     | 95                 | 95    | 94    | 100                     | 100   | 100   | 98 | 98 | 98 |
| Imazamox + NIS <sup>1</sup>    | 1 AS    | 0.04               | POST            | 0                   | 0     | 0     | 0                  | 91    | 89    | 0                       | 93    | 93    | 83 | 83 | 83 |
| Imazamox +<br>bentazon + NIS   | 1 AS    | 0.04               | POST            | 0                   | 0     | 0     | 0                  | 85    | 79    | 0                       | 85    | 85    | 63 | 63 | 63 |
| Imazamox +<br>bentazon + NIS   | 4 SL    | 0.84               | POST            | 0                   | 0     | 0     | 0                  | 85    | 79    | 0                       | 85    | 85    | 63 | 63 | 63 |
| Flufenpyr + NIS                | 58 WDG  | 0.18               | POST            | 0                   | 5     | 0     | 0                  | 75    | 70    | 0                       | 75    | 75    | 40 | 40 | 40 |
| Flufenpyr + NIS                | 58 WDG  | 0.36               | POST            | 0                   | 10    | 5     | 0                  | 63    | 68    | 0                       | 63    | 63    | 26 | 26 | 26 |
| LSD (P=.05)                    |         |                    |                 | 1                   | 2     | 2     | 4                  | 6     | 5     | 4                       | 4     | 5     | 6  | 6  | 6  |

continued

Table 13. Continued.

| Treatment                      | Form.   | Rate<br>(kg ai/ha) | Growth<br>stage | Palmer amaranth control |       |       | Hophornbeam copperleaf control |       |       |
|--------------------------------|---------|--------------------|-----------------|-------------------------|-------|-------|--------------------------------|-------|-------|
|                                |         |                    |                 | 2 WAE                   | 4 WAE | 7 WAE | 2 WAE                          | 4 WAE | 7 WAE |
| Untreated check                |         |                    |                 | 0                       | 0     | 0     | 0                              | 0     | 0     |
| S-metolachlor                  | 7.62 EC | 1.12               | PRE             | 85                      | 79    | 73    | 61                             | 56    | 53    |
| Halosulfuron                   | 75 DF   | 0.029              | PRE             | 89                      | 83    | 79    | 88                             | 88    | 83    |
| Halosulfuron                   | 75 DF   | 0.036              | PRE             | 85                      | 79    | 74    | 64                             | 73    | 78    |
| Clomazone                      | 3 ME    | 0.56               | PRE             | 81                      | 76    | 68    | 74                             | 65    | 50    |
| Clomazone +<br>halosulfuron    | 3 ME    | 0.56               | PRE             | 94                      | 90    | 86    | 61                             | 51    | 46    |
| Clomazone +<br>flumioxazin     | 75 DF   | 0.029              | PRE             |                         |       |       |                                |       |       |
| Clomazone +<br>flumioxazin     | 3 ME    | 0.56               | PRE             | 100                     | 100   | 100   | 99                             | 100   | 100   |
| Dimethenamid-P                 | 51 WDG  | 0.036              | PRE             |                         |       |       |                                |       |       |
| Dimethenamid-P                 | 6 EC    | 0.56               | PRE             | 90                      | 88    | 88    | 61                             | 69    | 59    |
| Flufenacet                     | 60 WG   | 0.33               | PRE             | 94                      | 84    | 79    | 78                             | 79    | 83    |
| Flufenacet                     | 60 WG   | 0.67               | PRE             | 81                      | 60    | 45    | 75                             | 85    | 89    |
| Sulfentrazone                  | 75 DF   | 0.22               | PRE             | 88                      | 84    | 84    | 98                             | 94    | 93    |
| Sulfentrazone                  | 75 DF   | 0.45               | PRE             | 100                     | 100   | 99    | 100                            | 100   | 99    |
| Clomazone +<br>sulfentrazone   | 3 ME    | 0.56               | PRE             | 100                     | 99    | 99    | 100                            | 100   | 99    |
| Clomazone +<br>sulfentrazone   | 75 DF   | 0.28               | PRE             |                         |       |       |                                |       |       |
| Pendimethalin +<br>imazethapyr | 3.3 EC  | 0.84               | PRE             | 100                     | 96    | 94    | 70                             | 60    | 53    |
| Pendimethalin fb               | 2 AS    | 0.07               | PRE             |                         |       |       |                                |       |       |
| Pendimethalin fb               | 3.3 EC  | 0.56               | PRE             | 86                      | 84    | 83    | 59                             | 90    | 91    |
| acifluorfen                    | 2 L     | 0.28               | POST            |                         |       |       |                                |       |       |
| Pendimethalin fb               | 3.3 EC  | 0.56               | PRE             | 93                      | 90    | 94    | 59                             | 88    | 96    |
| acifluorfen                    | 2 L     | 0.56               | POST            |                         |       |       |                                |       |       |
| Imazamox + NIS <sup>1</sup>    | 1 AS    | 0.04               | POST            | 0                       | 54    | 40    | 0                              | 75    | 76    |
| Imazamox +<br>bentazon + NIS   | 1 AS    | 0.04               | POST            | 0                       | 66    | 79    | 0                              | 61    | 74    |
| bentazon + NIS                 | 4 SL    | 0.84               | POST            |                         |       |       |                                |       |       |
| Flufenpyr + NIS                | 58 WDG  | 0.18               | POST            | 0                       | 86    | 89    | 0                              | 95    | 90    |
| Flufenpyr + NIS                | 58 WDG  | 0.36               | POST            | 0                       | 81    | 85    | 0                              | 98    | 91    |
| LSD (P=.05)                    |         |                    |                 | 5                       | 7     | 7     | 6                              | 7     | 7     |

continued

Table 13. Continued.

| Treatment                      | Form.   | Rate<br>(kg ai/ha) | Growth<br>stage | Southern pea<br>yield<br>(MT/ha) | Spinach injury  |         | Mustard <sup>2</sup> injury |         |
|--------------------------------|---------|--------------------|-----------------|----------------------------------|-----------------|---------|-----------------------------|---------|
|                                |         |                    |                 |                                  | 11/15/01        | 3/21/02 | 11/15/01                    | 3/21/02 |
|                                |         |                    |                 |                                  | ----- (%) ----- |         |                             |         |
| Untreated check                |         |                    |                 |                                  | 0               | 0       | 0                           | 0       |
| S-metolachlor                  | 7.62 EC | 1.12               | PRE             | 1.2                              | 0               | 0       | 0                           | 0       |
| Halosulfuron                   | 75 DF   | 0.029              | PRE             | 1.5                              | 0               | 0       | 3                           | 1       |
| Halosulfuron                   | 75 DF   | 0.036              | PRE             | 1.4                              | 6               | 1       | 15                          | 5       |
| Clomazone                      | 3 ME    | 0.56               | PRE             | 1.8                              | 10              | 3       | 10                          | 5       |
| Clomazone +<br>halosulfuron    | 3 ME    | 0.56               | PRE             | 1.9                              | 5               | 1       | 3                           | 0       |
| Clomazone +<br>flumioxazin     | 75 DF   | 0.029              | PRE             | 2.1                              | 10              | 3       | 1                           | 0       |
| Dimethenamid-P                 | 3 ME    | 0.56               | PRE             | 2.1                              | 13              | 6       | 10                          | 3       |
| Flufenacet                     | 51 WDG  | 0.036              | PRE             | 1.8                              | 11              | 4       | 3                           | 0       |
| Flufenacet                     | 60 WG   | 0.33               | PRE             | 2.1                              | 24              | 11      | 14                          | 5       |
| Sulfentrazone                  | 60 WG   | 0.67               | PRE             | 1.6                              | 21              | 9       | 9                           | 3       |
| Sulfentrazone                  | 75 DF   | 0.22               | PRE             | 2.2                              | 64              | 29      | 13                          | 3       |
| Clomazone +<br>sulfentrazone   | 75 DF   | 0.45               | PRE             | 2.0                              | 74              | 35      | 18                          | 6       |
| Pendimethalin +<br>imazethapyr | 3 ME    | 0.56               | PRE             | 1.9                              | 61              | 33      | 15                          | 6       |
| Pendimethalin fb               | 75 DF   | 0.28               | PRE             | 2.2                              | 70              | 39      | 53                          | 28      |
| Pendimethalin fb               | 3.3 EC  | 0.84               | PRE             | 2.0                              | 13              | 4       | 1                           | 0       |
| Pendimethalin fb               | 2 L     | 0.28               | POST            | 2.3                              | 8               | 3       | 9                           | 1       |
| Pendimethalin fb               | 3.3 EC  | 0.56               | PRE             | 2.3                              | 8               | 3       | 9                           | 1       |
| Imazamox + NIS <sup>1</sup>    | 2L      | 0.56               | POST            | 1.6                              | 13              | 4       | 16                          | 6       |
| Imazamox +<br>bentazon + NIS   | 1 AS    | 0.04               | POST            | 1.5                              | 10              | 3       | 10                          | 1       |
| Flufenpyr + NIS                | 1 AS    | 0.04               | POST            | 2.0                              | 8               | 1       | 6                           | 1       |
| Flufenpyr + NIS                | 4 SL    | 0.84               | POST            | 1.8                              | 4               | 1       | 4                           | 1       |
| LSD (P=.05)                    | 58 WDG  | 0.18               | POST            | 0.5                              | 14              | 7       | 10                          | 6       |
|                                | 58 WDG  | 0.36               | POST            |                                  |                 |         |                             |         |

<sup>1</sup> NIS was applied at 0.25% volume per volume of water.<sup>2</sup> Fall-planted follow crop.

**Table 14. Herbicide Evaluation in Over-Wintered Spinach, Kibler, 2001-2002.**

| Treatment                        | Form.   | Rate<br>(kg ai/ha) | Growth<br>stage | Spinach injury |    |    | Henbit<br>control |    |     | Pineappleweed<br>control |     |     | Cutleaf<br>eveningprimrose<br>control |     |   |
|----------------------------------|---------|--------------------|-----------------|----------------|----|----|-------------------|----|-----|--------------------------|-----|-----|---------------------------------------|-----|---|
|                                  |         |                    |                 | 11             | 2  | 3  | 2                 | 3  | 2   | 3                        | 2   | 3   | 2                                     | 3   |   |
| Untreated check                  |         |                    |                 | 0              | 0  | 0  | 0                 | 0  | 0   | 0                        | 0   | 0   | 0                                     | 0   | 0 |
| Linuron                          | 50 DF   | 0.075              | PRE             | 59             | 46 | 31 | 0                 | 0  | 78  | 58                       | 55  | 39  | 55                                    | 39  |   |
| Linuron                          | 50 DF   | 0.15               | PRE             | 80             | 63 | 51 | 0                 | 0  | 93  | 85                       | 55  | 44  | 55                                    | 44  |   |
| S-metolachlor                    | 7.62 EC | 0.56               | PRE             | 16             | 8  | 4  | 94                | 90 | 71  | 59                       | 68  | 38  | 68                                    | 38  |   |
| Dimethenamid-P                   | 6 EC    | 0.25               | PRE             | 40             | 28 | 15 | 96                | 95 | 81  | 74                       | 90  | 83  | 90                                    | 83  |   |
| Dimethenamid-P                   | 6 EC    | 0.5                | PRE             | 55             | 44 | 31 | 98                | 99 | 98  | 91                       | 89  | 89  | 89                                    | 89  |   |
| Thiobencarb                      | 8 EC    | 1.5                | PRE             | 31             | 24 | 10 | 75                | 50 | 0   | 0                        | 33  | 8   | 33                                    | 8   |   |
| Thiobencarb                      | 8 EC    | 3.0                | PRE             | 53             | 43 | 26 | 73                | 54 | 0   | 0                        | 44  | 25  | 44                                    | 25  |   |
| Flufenacet                       | 60 WG   | 0.3                | PRE             | 55             | 34 | 14 | 96                | 93 | 98  | 91                       | 100 | 98  | 100                                   | 98  |   |
| Quinclorac                       | 75 DF   | 0.125              | PRE             | 55             | 36 | 25 | 53                | 23 | 19  | 9                        | 53  | 39  | 53                                    | 39  |   |
| Clomazone                        | 3 ME    | 0.05               | PRE             | 46             | 35 | 23 | 100               | 95 | 81  | 70                       | 54  | 35  | 54                                    | 35  |   |
| Clomazone                        | 3 ME    | 0.1                | PRE             | 83             | 75 | 53 | 100               | 95 | 100 | 94                       | 90  | 85  | 100                                   | 98  |   |
| CGA-362622                       | 75 DF   | 0.0046             | PRE             | 100            | 91 | 83 | 100               | 94 | 90  | 85                       | 100 | 98  | 100                                   | 98  |   |
| CGA-362622                       | 75 DF   | 0.007              | PRE             | 100            | 93 | 88 | 100               | 99 | 94  | 89                       | 100 | 100 | 100                                   | 100 |   |
| Napropamide                      | 75 WP   | 4.0                | PRE             | 98             | 94 | 89 | 94                | 88 | 16  | 4                        | 74  | 55  | 74                                    | 55  |   |
| Napropamide                      | 75 WP   | 8.0                | PRE             | 100            | 96 | 93 | 99                | 91 | 15  | 4                        | 21  | 4   | 21                                    | 4   |   |
| Fluroxypyr                       | 1.5 EC  | 0.024              | POST            | 23             | 16 | 8  | 26                | 0  | 13  | 0                        | 18  | 5   | 18                                    | 5   |   |
| Fluroxypyr                       | 1.5 EC  | 0.048              | POST            | 33             | 20 | 10 | 53                | 35 | 18  | 0                        | 56  | 38  | 56                                    | 38  |   |
| S-metolachlor fb<br>phenmedipham | 7.62 EC | 0.56               | PRE             | 11             | 9  | 4  | 100               | 99 | 95  | 90                       | 99  | 96  | 99                                    | 96  |   |
| S-metolachlor +<br>linuron       | 1.3 EC  | 0.4                | POST            | 54             | 43 | 28 | 100               | 99 | 93  | 85                       | 91  | 86  | 91                                    | 86  |   |
| S-metolachlor +<br>linuron       | 7.62 EC | 0.56               | PRE             | 81             | 73 | 60 | 100               | 96 | 96  | 91                       | 95  | 89  | 95                                    | 89  |   |
| S-metolachlor fb<br>cloprralid   | 50 DF   | 0.075              | PRE             | 13             | 9  | 3  | 100               | 96 | 99  | 95                       | 98  | 93  | 99                                    | 93  |   |
| S-metolachlor fb<br>cloprralid   | 3 EC    | 0.08               | POST            | 13             | 8  | 1  | 100               | 98 | 96  | 91                       | 95  | 86  | 96                                    | 86  |   |
| S-metolachlor fb<br>cletodim     | 7.62 EC | 0.56               | PRE             | 11             | 8  | 3  | 100               | 96 | 98  | 93                       | 95  | 88  | 98                                    | 88  |   |
| S-metolachlor fb<br>cletodim     | 2 EC    | 0.03               | POST            | 11             | 8  | 3  | 100               | 96 | 98  | 93                       | 95  | 88  | 98                                    | 88  |   |
| S-metolachlor fb<br>cletodim     | 7.62 EC | 0.56               | PRE             | 11             | 8  | 3  | 100               | 96 | 98  | 93                       | 95  | 88  | 98                                    | 88  |   |
| S-metolachlor fb<br>cletodim     | 2 EC    | 0.06               | POST            | 11             | 8  | 3  | 100               | 96 | 98  | 93                       | 95  | 88  | 98                                    | 88  |   |
| LSD (P=0.05)                     |         |                    |                 | 7              | 9  | 10 | 8                 | 9  | 6   | 7                        | 10  | 10  | 6                                     | 7   |   |



Table 15. Herbicide Evaluation in Winter Squash, Fayetteville, 2001.

| Treatment                                     | Form.         | Rate<br>(kg ai/ha) | Growth<br>stage | Squash injury |       |       |        | Yellow nutsedge control |       |       |        |    |    |
|---|---------------|--------------------|-----------------|---------------|-------|-------|--------|-------------------------|-------|-------|--------|----|----|
|   |               |                    |                 | 2 WAE         | 4 WAE | 6 WAE | 10 WAE | 2 WAE                   | 4 WAE | 6 WAE | 10 WAE |    |    |
| Untreated check                               |               |                    |                 | 0             | 0     | 0     | 0      | 0                       | 0     | 0     | 0      | 0  | 0  |
| Clomazone                                     | 3 ME          | 0.34               | PRE             | 0             | 0     | 0     | 0      | 0                       | 0     | 0     | 0      | 0  | 0  |
| Ethalfuralin                                  | 3 EC          | 1.25               | PRE             | 0             | 0     | 0     | 0      | 23                      | 19    | 15    | 10     | 10 | 10 |
| Clomazone +<br>ethalfuralin                   | 3 ME<br>3 EC  | 0.17<br>0.63       | PRE             | 0             | 0     | 0     | 0      | 26                      | 20    | 15    | 13     | 13 | 13 |
| Clomazone +<br>ethalfuralin +<br>halosulfuron | 3 ME<br>3 EC  | 0.17<br>0.63       | PRE             | 26            | 14    | 10    | 5      | 91                      | 89    | 85    | 80     | 80 | 80 |
| Clomazone +<br>ethalfuralin +<br>halosulfuron | 75 DF<br>3 ME | 0.018<br>0.17      | PRE             | 44            | 28    | 16    | 11     | 95                      | 93    | 88    | 84     | 84 | 84 |
| Clomazone +<br>ethalfuralin +<br>halosulfuron | 3 EC<br>75 DF | 0.63<br>0.027      | PRE             | 53            | 16    | 26    | 15     | 97                      | 94    | 91    | 86     | 86 | 86 |
| Clomazone +<br>ethalfuralin +<br>halosulfuron | 3 ME<br>3 EC  | 0.17<br>0.63       | PRE             | 0             | 8     | 5     | 3      | 23                      | 88    | 83    | 80     | 80 | 80 |
| Clomazone +<br>ethalfuralin fb                | 3 ME<br>3 EC  | 0.17<br>0.63       | POST            | 0             | 9     | 6     | 3      | 26                      | 91    | 96    | 96     | 96 | 96 |
| Clomazone +<br>ethalfuralin fb                | 75 DF<br>3 ME | 0.016<br>0.63      | POST            | 0             | 9     | 6     | 3      | 24                      | 86    | 95    | 95     | 95 | 95 |
| Clomazone +<br>ethalfuralin fb                | 3 ME<br>3 EC  | 0.17<br>0.63       | POST            | 7             | 6     | 6     | 4      | 4                       | 5     | 5     | 4      | 4  | 4  |
| LSD (P=0.05)                                  |               |                    |                 |               |       |       |        |                         |       |       |        |    |    |

continued

Table 15. Continued.

| Treatment  | Form.                 | Rate<br>(kg ai/ha)    | Growth<br>stage | Fall panicum control |       |       | Palmer amaranth control |       |       |       |        |
|--|-----------------------|-----------------------|-----------------|----------------------|-------|-------|-------------------------|-------|-------|-------|--------|
|  |                       |                       |                 | 2 WAE                | 4 WAE | 6 WAE | 10 WAE                  | 2 WAE | 4 WAE | 6 WAE | 10 WAE |
| Untreated check  |                       |                       |                 | 0                    | 0     | 0     | 0                       | 0     | 0     | 0     | 0      |
| Clomazone  | 3 ME                  | 0.34                  | PRE             | 100                  | 100   | 100   | 100                     | 33    | 36    | 34    | 34     |
| Ethalfuralin   | 3 EC                  | 1.25                  | PRE             | 100                  | 90    | 90    | 90                      | 100   | 91    | 93    | 93     |
| Clomazone +<br>ethalfuralin                                      | 3 ME<br>3 EC          | 0.17<br>0.63          | PRE             | 100                  | 100   | 100   | 100                     | 100   | 100   | 100   | 100    |
| Clomazone +<br>ethalfuralin +<br>halosulfuron                    | 3 ME<br>3 EC          | 0.17<br>0.63          | PRE             | 100                  | 100   | 100   | 100                     | 100   | 100   | 100   | 100    |
| Clomazone +<br>ethalfuralin +<br>halosulfuron                    | 75 DF<br>3 ME<br>3 EC | 0.018<br>0.17<br>0.63 | PRE             | 100                  | 100   | 100   | 100                     | 100   | 100   | 100   | 100    |
| Clomazone +<br>ethalfuralin +<br>halosulfuron                    | 75 DF<br>3 ME<br>3 EC | 0.027<br>0.17<br>0.63 | PRE             | 100                  | 100   | 100   | 100                     | 100   | 100   | 100   | 100    |
| Clomazone +<br>ethalfuralin +<br>halosulfuron                    | 75 DF<br>3 ME<br>3 EC | 0.036<br>0.17<br>0.63 | PRE             | 100                  | 100   | 100   | 100                     | 100   | 100   | 100   | 100    |
| Clomazone +<br>ethalfuralin +<br>halosulfuron + NIS <sup>1</sup> | 75 DF<br>3 ME<br>3 EC | 0.016<br>0.17<br>0.63 | POST            | 100                  | 100   | 100   | 100                     | 100   | 100   | 100   | 100    |
| Clomazone +<br>ethalfuralin +<br>halosulfuron + NIS              | 75 DF<br>3 ME<br>3 EC | 0.024<br>0.17<br>0.63 | POST            | 100                  | 100   | 100   | 100                     | 100   | 100   | 100   | 100    |
| Clomazone +<br>ethalfuralin +<br>halosulfuron + NIS              | 75 DF<br>3 ME<br>3 EC | 0.032<br>0.17<br>0.63 | POST            | 100                  | 100   | 100   | 100                     | 100   | 100   | 100   | 100    |
| LSD (P=0.05)   |                       |                       |                 | 3                    | 3     | 3     | 3                       | 2     | 4     | 2     | 2      |

(%)

continued

Table 15. Continued.

| Treatment                                     | Form.                 | Rate<br>(kg ai/ha)    | Growth<br>stage | Venice mallow control<br>(%) |       |       |        |        | Squash yield<br>(MT/ha) |  |
|---|-----------------------|-----------------------|-----------------|------------------------------|-------|-------|--------|--------|-------------------------|--|
|   |                       |                       |                 | 2 WAE                        | 4 WAE | 6 WAE | 10 WAE | 12 WAE | 12 WAE                  |  |
| Untreated check                               |                       |                       |                 | 0                            | 0     | 0     | 0      | 0      | 1.4                     |  |
| Clomazone                                     | 3 ME                  | 0.34                  | PRE             | 90                           | 80    | 75    | 69     | 69     | 4.6                     |  |
| Ethalfuralin                                  | 3 EC                  | 1.25                  | PRE             | 74                           | 60    | 46    | 38     | 38     | 4.0                     |  |
| Clomazone +<br>ethalfuralin                   | 3 ME<br>3 EC          | 0.17<br>0.63          | PRE             | 88                           | 85    | 80    | 73     | 73     | 3.6                     |  |
| Clomazone +<br>ethalfuralin +<br>halosulfuron | 3 ME<br>3 EC<br>75 DF | 0.17<br>0.63<br>0.018 | PRE             | 99                           | 99    | 94    | 89     | 89     | 1.6                     |  |
| Clomazone +<br>ethalfuralin +<br>halosulfuron | 3 ME<br>3 EC<br>75 DF | 0.17<br>0.63<br>0.027 | PRE             | 100                          | 100   | 98    | 93     | 93     | 1.9                     |  |
| Clomazone +<br>ethalfuralin +<br>halosulfuron | 3 ME<br>3 EC<br>75 DF | 0.17<br>0.63<br>0.036 | PRE             | 100                          | 99    | 95    | 88     | 88     | 2.4                     |  |
| Clomazone +<br>ethalfuralin fb                | 3 ME<br>3 EC          | 0.17<br>0.63          | PRE             | 95                           | 98    | 96    | 90     | 90     | 6.4                     |  |
| halosulfuron + NIS <sup>1</sup>               | 75 DF                 | 0.016                 | POST            |                              |       |       |        |        |                         |  |
| Clomazone +<br>ethalfuralin fb                | 3 ME<br>3 EC          | 0.17<br>0.63          | PRE             | 99                           | 99    | 100   | 100    | 100    | 8.7                     |  |
| halosulfuron + NIS                            | 75 DF                 | 0.024                 | POST            |                              |       |       |        |        |                         |  |
| Clomazone +<br>ethalfuralin fb                | 3 ME<br>3 EC          | 0.17<br>0.63          | PRE             | 98                           | 99    | 100   | 100    | 100    | 4.7                     |  |
| halosulfuron + NIS                            | 75 DF                 | 0.032                 | POST            |                              |       |       |        |        |                         |  |
| LSD (P=,05)                                   |                       |                       |                 | 6                            | 6     | 5     | 4      | 4      | 0.8                     |  |

<sup>1</sup> NIS was applied at 0.25% volume per volume of water.

**Table 16. Herbicide Evaluation in Sweet Potatoes, Newtonia, MO, 2001.**

| Treatment                                    | Form.          | Rate<br>(kg ai/ha) | Growth<br>stage       | Sweet potato injury |       |       |       | Goosegrass control |       |       |       |       |        |     |
|--|----------------|--------------------|-----------------------|---------------------|-------|-------|-------|--------------------|-------|-------|-------|-------|--------|-----|
|  |                |                    |                       | 2 WAT               | 4 WAT | 6 WAT | 8 WAT | 12 WAT             | 2 WAT | 4 WAT | 6 WAT | 8 WAT | 12 WAT |     |
| Untreated check                              |                |                    |                       | 0                   | 0     | 0     | 0     | 0                  | 0     | 0     | 0     | 0     | 0      | 0   |
| Clomazone                                    | 3 ME           | 0.56               | POST tr. <sup>1</sup> | 4                   | 4     | 0     | 0     | 0                  | 0     | 100   | 100   | 98    | 98     | 90  |
| Clomazone                                    | 3 ME           | 1.12               | POST tr.              | 11                  | 10    | 5     | 1     | 0                  | 0     | 100   | 100   | 100   | 94     | 90  |
| S-metolachlor                                | 7.62 EC        | 0.75               | POST tr.              | 8                   | 5     | 0     | 0     | 0                  | 0     | 100   | 100   | 100   | 96     | 93  |
| S-metolachlor                                | 7.62 EC        | 1.5                | POST tr.              | 13                  | 8     | 0     | 1     | 0                  | 0     | 100   | 100   | 100   | 100    | 100 |
| Dimethenamid-P                               | 6 EC           | 0.56               | POST tr.              | 6                   | 6     | 3     | 0     | 0                  | 0     | 100   | 100   | 100   | 99     | 98  |
| Dimethenamid-P                               | 6 EC           | 1.12               | POST tr.              | 16                  | 20    | 15    | 8     | 8                  | 8     | 100   | 100   | 100   | 100    | 100 |
| Flufenacet                                   | 60 WG          | 0.45               | POST tr.              | 10                  | 10    | 8     | 3     | 0                  | 0     | 100   | 99    | 100   | 93     | 85  |
| Flufenacet                                   | 60 WG          | 0.9                | POST tr.              | 14                  | 13    | 13    | 8     | 5                  | 5     | 100   | 100   | 100   | 99     | 94  |
| Flufenacet + metribuzin                      | 68 WG          | 0.56               | POST tr.              | 13                  | 13    | 13    | 10    | 8                  | 8     | 100   | 100   | 100   | 95     | 88  |
| Napropamide                                  | 50 DF          | 2.24               | POST tr.              | 6                   | 3     | 0     | 0     | 0                  | 0     | 93    | 88    | 83    | 79     | 78  |
| Clomazone +<br>flufenacet                    | 3 ME<br>60 WG  | 0.56<br>0.45       | POST tr.              | 11                  | 10    | 6     | 5     | 1                  | 1     | 100   | 100   | 100   | 100    | 100 |
| Clomazone +<br>flufenacet + metribuzin       | 3 ME<br>68 WG  | 0.56<br>0.56       | POST tr.              | 23                  | 23    | 26    | 20    | 10                 | 10    | 100   | 100   | 100   | 100    | 100 |
| Clomazone +<br>hallosulfuron                 | 3 ME<br>75 DF  | 0.56<br>0.036      | POST tr.              | 23                  | 25    | 28    | 18    | 8                  | 8     | 100   | 100   | 100   | 100    | 100 |
| Clomazone fb                                 | 3 ME           | 0.56               | POST tr.              | 5                   | 4     | 40    | 23    | 15                 | 15    | 100   | 100   | 100   | 100    | 100 |
| halosulfuron + NIS <sup>2</sup>              | 75 DF          | 0.036              | LATE POST tr.         |                     |       |       |       |                    |       |       |       |       |        |     |
| Clomazone +<br>sethoxydim + COC <sup>3</sup> | 3 ME<br>1.5 EC | 0.56<br>0.42       | LATE POST tr.         | 0                   | 0     | 0     | 0     | 0                  | 0     | 100   | 100   | 100   | 100    | 100 |
| LSD (P=0.05)                                 |                |                    |                       | 4                   | 4     | 4     | 3     | 3                  | 3     | 1     | 2     | 2     | 5      | 4   |

continued

Table 16. Continued.

| Treatment  | Form.          | Rate<br>(kg ai/ha) | Growth<br>stage       | Common lambsquarters control<br>(%) |       |       |       |        |       | Velvetleaf control |       |       |        |     |     | Sweet<br>potato<br>yield<br>(MT/ha) |      |
|--|----------------|--------------------|-----------------------|-------------------------------------|-------|-------|-------|--------|-------|--------------------|-------|-------|--------|-----|-----|-------------------------------------|------|
|  |                |                    |                       | 2 WAT                               | 4 WAT | 6 WAT | 8 WAT | 12 WAT | 2 WAT | 4 WAT              | 6 WAT | 8 WAT | 12 WAT |     |     |                                     |      |
| Untreated check                                    |                |                    |                       | 0                                   | 0     | 0     | 0     | 0      | 0     | 0                  | 0     | 0     | 0      | 0   | 0   | 0                                   | 25.9 |
| Clomazone  | 3 ME           | 0.56               | POST tr. <sup>1</sup> | 100                                 | 98    | 88    | 75    | 59     | 100   | 100                | 100   | 100   | 100    | 100 | 100 | 100                                 | 31.0 |
| Clomazone  | 3 ME           | 1.12               | POST tr.              | 100                                 | 100   | 99    | 94    | 89     | 100   | 100                | 100   | 100   | 100    | 100 | 100 | 100                                 | 37.4 |
| S-metolachlor                                      | 7.62 EC        | 0.75               | POST tr.              | 99                                  | 99    | 3     | 88    | 84     | 100   | 100                | 100   | 100   | 100    | 100 | 100 | 100                                 | 39.2 |
| S-metolachlor                                      | 7.62 EC        | 1.5                | POST tr.              | 100                                 | 100   | 95    | 90    | 88     | 100   | 100                | 99    | 99    | 99     | 98  | 98  | 98                                  | 41.1 |
| Dimethenamid-P                                     | 6 EC           | 0.56               | POST tr.              | 100                                 | 93    | 85    | 79    | 75     | 99    | 98                 | 93    | 85    | 75     | 75  | 75  | 75                                  | 34.4 |
| Dimethenamid-P                                     | 6 EC           | 1.12               | POST tr.              | 99                                  | 95    | 90    | 85    | 81     | 98    | 98                 | 90    | 88    | 80     | 80  | 80  | 80                                  | 37.5 |
| Flufenacet   | 60 WG          | 0.45               | POST tr.              | 99                                  | 93    | 86    | 78    | 74     | 100   | 100                | 95    | 91    | 88     | 88  | 88  | 88                                  | 46.6 |
| Flufenacet   | 60 WG          | 0.9                | POST tr.              | 100                                 | 94    | 90    | 83    | 76     | 100   | 100                | 100   | 100   | 100    | 100 | 100 | 100                                 | 40.4 |
| Flufenacet +<br>metribuzin                         | 68 WG          | 0.56               | POST tr.              | 100                                 | 100   | 100   | 99    | 99     | 100   | 100                | 100   | 100   | 100    | 100 | 100 | 100                                 | 38.0 |
| Napropamide  | 50 DF          | 2.24               | POST tr.              | 100                                 | 95    | 91    | 86    | 85     | 100   | 99                 | 100   | 100   | 100    | 100 | 100 | 100                                 | 36.6 |
| Clomazone +<br>flufenacet                          | 3 ME<br>60 WG  | 0.56<br>0.45       | POST tr.              | 100                                 | 100   | 100   | 100   | 100    | 100   | 100                | 100   | 100   | 100    | 100 | 100 | 100                                 | 41.4 |
| Clomazone +<br>flufenacet +<br>metribuzin          | 3 ME<br>68 WG  | 0.56<br>0.56       | POST tr.              | 100                                 | 100   | 100   | 100   | 100    | 100   | 100                | 100   | 98    | 98     | 98  | 98  | 98                                  | 35.1 |
| Clomazone +<br>halosulfuron                        | 3 ME<br>75 DF  | 0.56<br>0.036      | POST tr.              | 100                                 | 100   | 100   | 100   | 100    | 100   | 100                | 100   | 100   | 100    | 100 | 100 | 100                                 | 35.5 |
| Clomazone fb<br>halosulfuron +<br>NIS <sup>2</sup> | 3 ME<br>75 DF  | 0.56<br>0.036      | POST tr.<br>LPOST tr. | 100                                 | 100   | 100   | 100   | 100    | 100   | 100                | 100   | 100   | 100    | 100 | 100 | 100                                 | 35.8 |
| Clomazone +<br>sethoxydim +<br>COC <sup>3</sup>    | 3 ME<br>1.5 EC | 0.56<br>0.42       | LPOST tr.             | 95                                  | 85    | 100   | 70    | 60     | 100   | 100                | 100   | 100   | 100    | 100 | 100 | 100                                 | 32.9 |
| LSD (P=,05)  |                |                    |                       | 2                                   | 4     | 5     | 6     | 6      | 2     | 3                  | 3     | 3     | 3      | 3   | 4   | 4                                   | 6.8  |

<sup>1</sup> POST tr. = POST transplant, applied 2 days after transplanting sweet potato; LPOST tr. = late POST transplant, applied 35 days after transplanting sweet potato.

<sup>2</sup> NIS was applied at 0.25% volume per volume of water.

<sup>3</sup> COC was applied at 1% volume per volume of water.

**Table 17. Evaluation of S-metolachlor and Dimethenamid-P in Table Beet, Fayetteville, 2001.**

| Treatment                                       | Form.   | Rate<br>(kg ai/ha) | Growth<br>stage | Table beets injury |       |       | Common lambsquarters<br>control |       |       | Cutleaf eveningprimrose<br>control |       |       | Henbit<br>control | Table<br>beet<br>yield<br>(MT/ha) |
|---|---------|--------------------|-----------------|--------------------|-------|-------|---------------------------------|-------|-------|------------------------------------|-------|-------|-------------------|-----------------------------------|
|   |         |                    |                 | 2 WAT              | 4 WAT | 6 WAT | 2 WAT                           | 4 WAT | 6 WAT | 2 WAT                              | 4 WAT | 6 WAT |                   |                                   |
| Untreated check                                 |         |                    |                 | 0                  | 0     | 0     | 0                               | 0     | 0     | 0                                  | 0     | 0     | 0                 | 3.1                               |
| Dimethenamid-P                                  | 6 EC    | 0.74               | 2-1f            | 5                  | 5     | 0     | 85                              | 77    | 65    | 53                                 | 23    | 10    | 42                | 4.1                               |
| Dimethenamid-P                                  | 6 EC    | 1.48               | 2-1f            | 13                 | 10    | 7     | 90                              | 87    | 87    | 47                                 | 18    | 17    | 58                | 5.6                               |
| S-metolachlor                                   | 7.62 EC | 0.75               | 2-1f            | 8                  | 8     | 5     | 95                              | 75    | 57    | 27                                 | 10    | 10    | 27                | 4.5                               |
| S-metolachlor                                   | 7.62 EC | 1.5                | 2-1f            | 13                 | 12    | 12    | 80                              | 57    | 42    | 53                                 | 22    | 12    | 47                | 5.2                               |
| Pyrazon   | 67.7 DF | 4.1                | 2-1f            | 0                  | 0     | 0     | 97                              | 95    | 93    | 95                                 | 95    | 100   | 93                | 10.7                              |
| Cycloate  | 6 EC    | 4.5                | 2-1f            | 12                 | 10    | 10    | 88                              | 57    | 25    | 68                                 | 27    | 10    | 50                | 5.6                               |
| LSD (P=05)                                      |         |                    |                 | 6                  | 4     | 3     | 10                              | 11    | 15    | 12                                 | 6     | 8     | 12                | 2.5                               |
| <b>ROW 1 - weeds present at application</b>     |         |                    |                 |                    |       |       |                                 |       |       |                                    |       |       |                   |                                   |
| Untreated check                                 |         |                    |                 | 0                  | 0     | 0     | 95                              | 90    | 88    | 93                                 | 93    | 90    | 95                | 8.0                               |
| Dimethenamid-P                                  | 6 EC    | 0.74               | 2-1f            | 5                  | 5     | 0     | 97                              | 95    | 93    | 83                                 | 77    | 73    | 93                | 11.3                              |
| Dimethenamid-P                                  | 6 EC    | 1.48               | 2-1f            | 13                 | 10    | 7     | 100                             | 100   | 100   | 100                                | 98    | 97    | 97                | 12.2                              |
| S-metolachlor                                   | 7.62 EC | 0.75               | 2-1f            | 8                  | 8     | 5     | 98                              | 97    | 98    | 97                                 | 77    | 67    | 92                | 10.5                              |
| S-metolachlor                                   | 7.62 EC | 1.5                | 2-1f            | 13                 | 12    | 12    | 100                             | 98    | 98    | 98                                 | 82    | 67    | 97                | 10.9                              |
| Pyrazon   | 67.7 DF | 4.1                | 2-1f            | 0                  | 0     | 0     | 97                              | 100   | 100   | 100                                | 100   | 100   | 100               | 16.7                              |
| Cycloate  | 6 EC    | 4.5                | 2-1f            | 12                 | 10    | 10    | 100                             | 100   | 98    | 93                                 | 90    | 87    | 95                | 14.1                              |
| LSD (P=05)                                      |         |                    |                 | 8                  | 4     | 3     | 4                               | 5     | 6     | 7                                  | 11    | 15    | 5                 | 3.6                               |
| <b>ROW 2 - hand-weeded prior to application</b> |         |                    |                 |                    |       |       |                                 |       |       |                                    |       |       |                   |                                   |

## SPECIFIC METHODS AND RESULTS, 2002

### Evaluation of Herbicides for Ornamental Gourd, Fayetteville, 2002 (Table 18).

Ornamental gourd (var. Apple Gourd) were hand-planted 1 ft apart in a single row spaced 6.7 ft apart for each plot on 16 July 2002. PRE treatments were applied immediately after planting (air 83°F; soil 85°F, moisture adequate; RH 58%). POST treatments were applied to 2- to 3-leaf gourd plants on 12 August 2002 (air 76°F; soil 73°F, moisture adequate; RH 78%). Weeds present included: yellow nutsedge - 4 to 5 in, 10/sq ft; goosegrass - 2 to 3 in, 5/sq ft; and johnsongrass - 5 to 6 in, 10/sq ft.

**RESULTS:** Gourd was tolerant to the 2.5 pt/acre of Strategy PRE, but the 2 X rate caused slight (21%) early injury, from which they rapidly recovered. Sandea at 0.33 oz/acre PRE caused 21 to 30% early stunting of gourd with recovery to 11% at 8 wk after planting and 0.67 oz/acre PRE caused 41 to 45% stunting with recovery to 20% stunting at 8 wk after planting. The sequential treatment with Sandea at 0.33 oz/acre early POST maintained the stunting at 30% throughout the 8 wk period after planting. The higher rate of Sandea applied sequentially PRE followed by POST severely stunted the gourd (65%). Basagran applied POST caused some slight symptoms (11% at 1 pt/acre and 14% at 1 qt/acre). Strategy at 2.5 pt/acre was very effective in goosegrass control. Sandea was very effective in yellow nutsedge control with the low rate PRE giving 76% control after 8 wk and the high rate applied sequentially PRE followed by POST giving 100% control. Select controlled the johnsongrass early, but a repeat treatment would have been needed to maintain control. The experiment was eventually lost to the heavy johnsongrass infestation and was not harvested.

### Herbicide Evaluation in Snap Beans, Fayetteville, 2002 (Table 19).

Snap beans (cv. Hercules) were planted 25 April 2002, in conventionally tilled plots measuring 6.67 by 17 ft with two rows spaced 40 in apart. PRE treatments were applied the same day following planting (air 48°F; soil 46°F, moist; RH 52%). Weed control and crop injury evaluations were made at 3, 5, and 7 wk after planting, and yields were taken approximately 8 wk after plant-

ing. Weeds present at this location included common lambsquarters (CHEAL), yellow nutsedge (CYPES), carpetweed (MOLVE), Palmer amaranth (AMAPA), eclipta (ECLAL), and goosegrass (ELEIN).

**RESULTS:** There seemed to be good tolerance of snap beans to several of the experimental herbicides: dimethenamid-P, PRE; fomesafen, PRE; imazethapyr, PRE; halosulfuron, PRE and POST; acifluorfen (Ultra Blazer), POST; imazamox POST; imazamox + bentazon, POST; imazamox + fomesafen, POST; halosulfuron + bentazon, POST; halosulfuron + fomesafen, POST; flucicloric, POST; and chloransulam, POST. Acifluorfen (Blazer), POST; flufenpyr, POST; and carfentrazone caused excessive injury. Halosulfuron was outstanding on yellow nutsedge, but dimethenamid-P, imazethapyr, bentazon, imazamox, chloransulam, flufenpyr, and S-metolachlor were also good. Dimethenamid-P treatments, clomazone + pendimethalin, and chloransulam gave lower yields than standard treatments. Good yields resulted, where injury was low, and weed control was excellent with S-metolachlor, PRE; imazethapyr, PRE; S-metolachlor + halosulfuron, PRE; imazamox + fomesafen, POST; halosulfuron, POST; halosulfuron + bentazon, POST; halosulfuron + fomesafen, POST; and S-metolachlor, PRE fb imazamox, halosulfuron, or fomesafen POST.

### Evaluation of Herbicide Programs in Southern Peas, Kibler, 2002 (Table 20).

Southern peas (cv. Early Scarlet) were planted 16 June 2002 in plots 1.6 by 5.5 m. Plots consisted of two rows spaced 0.75-m apart. PRE treatments were applied 19 July (air 75°F; soil 72°F, moist; RH 68%). POST treatments were applied 10 June 2002 (air 83°F; soil 81°F, moist; RH 56%) to V4 southern pea plants. Crop injury and weed control was rated throughout the growing season and plots were harvested on 29 August 2002. Weeds present included goosegrass (ELEIN), Palmer amaranth (AMAPA), and carpetweed (MOLVE).

**RESULTS:** Some herbicides caused serious injury to the southernpea (Table 16). Sulfentrazone applied PRE at 0.2 lb/acre caused up to 36%, sulfentrazone at 0.4 lb/acre caused up to 76% injury. Mild symptoms, 5 to 11% injury were noticed from halosulfuron PRE, metolachlor PRE, First Rate POST, and flufenpyr POST. All treatments, except imazamox alone POST (63 to 65%), imazamox mixed with bentazon POST (79%),

and flufenpyr POST (81%) gave excellent control of Palmer amaranth (96 to 100% control). All treatments except halosulfuron, imazamox, and flufenpyr gave >90% control of goosegrass. High yielding treatments included metolachlor PRE, Outlook PRE, clomazone + flumioxazin PRE, flufenacet PRE, and pendimethalin PRE fb acifluorfen (Ultra Blazer) POST.

### **Herbicide Evaluation in Fall Greens, Kibler, 2002 (Table 21).**

Collard (cv. Champion), kale (cv. Premier), mustard (cv. Southern Giant Curled), and turnip (cv. All Top) greens were planted 3 September 2002 in four rows on 5 ft beds, spaced 7 in apart, each row with one of the four crops. Plots were 20 ft long. PRE treatments were applied 4 September (air 86°F; soil 84°F, moist; RH 48%) and POST treatments were applied 25 September (air 82°F; soil 81°F, moist; RH 56%) when the greens were all 2 to 6 in. tall.

**RESULTS:** The major interest in this test was to determine the tolerances of the southern greens to the various herbicide treatments. Trifluralin and DCPA are the current standard herbicides for all of these crops and these treatments were used to compare the crop injury ratings and crop yield from the experimental treatments. Trifluralin fb DCPA was also well tolerated by the various greens. All four greens crops were generally tolerant to sulfentrazone at 0.075 lb/acre PRE, thiobencarb at 1.5 to 3 lb/acre PRE, S-metolachlor at 0.5 lb/acre PRE, and pendimethalin at 0.25 PRE fb clopyralid at 0.1 to 0.2 lb/acre POST. There was insufficient tolerance by the various greens to sulfentrazone at 0.15 lb/acre PRE, pendimethalin at 0.5 and 1 lb/acre PRE, S-metolachlor at 1 lb/acre PRE, and dimethenamid-P at 0.5 and 1 lb/acre PRE. The crops treated with pendimethalin at 0.25 lb/acre were not injured early, but the addition of oxyfluorfen at 0.125 and 0.25 lb/acre POST caused some mild injury to collard, mustard and turnip, but kale seemed more tolerant.

### **Evaluation of S-Metolachlor and Dimethenamid-P in Table Beets, Fayetteville, 2002 (Table 22).**

Table beets (cv. Detroit Dark Red) were planted on 1 April 2002 into plots measuring 2 by 4 m. Each

plot contained three rows spaced 30-cm apart at a rate of 40 seed per m row. Treatments were applied at the 2- to 3-leaf stage on 30 April 2002 (air 17°C; soil 17°C, moist; RH 70%). Crop injury and weed control was rated 2, 3, and 6 weeks after treatments (WAT) and plots were harvested on 1 July 2002. Weeds present included common lambsquarters (CHEAL), cutleaf eveningprimrose (OEOLA), and yellow nutsedge (CYPES).

**RESULTS:** Pyrazon, the industry standard, gave excellent control of all weeds and beet yields were the highest. There was slight retardation in beet growth from the higher rate of dimethenamid-P and S-metolachlor, but beet yields were not reduced compared to lower rates. Dimethenamid-P and S-metolachlor gave fair control of common lambsquarters, especially at the higher rate, but very poor control of cutleaf eveningprimrose.

### **Herbicide Evaluation in Grapes, Fayetteville, 2002 (Table 23).**

Three-year-old Concord grapes were used to evaluate promising herbicides. Plots were 30 ft long with a 4 ft treated swath of the 12 ft row spacing. There were 3 grape plants per plot with 4 replications. All treatments were initially applied in a mixture of paraquat at 0.9 lb/acre on 29 April. The repeat POST treatments were applied 15 May.

**RESULTS:** There were no observable responses of the grape vines to any treatment indicating excellent tolerance. Crabgrass control was excellent from all treatments through 5 wk, then some treatments began to break lose efficiency. Azafenidin at 0.5 to 1 lb/acre applied in April, and azafenidin at 0.375 lb/acre repeated in April and May were the most persistent treatments. The 1 lb/acre treatment was also very effective on bermudagrass throughout the growing season. The untreated check and the low rate of flumioxazin, 0.5 lb/acre, were the only treatments with significantly lower yields than the other treated plots. Inexplicably, flumioxazin at 0.375 lb/acre repeated, gave significantly greater yields than any other treatments.



**Table 18. Herbicide Evaluation in Ornamental Gourds, Fayetteville, 2002.**

| Treatment                            | Form.  | Rate         | Growth stage | Gourd injury |       |       | Yellow nutsedge control |       |       |
|--------------------------------------|--------|--------------|--------------|--------------|-------|-------|-------------------------|-------|-------|
|                                      |        |              |              | 2 WAE        | 4 WAE | 6 WAE | 2 WAE                   | 4 WAE | 6 WAE |
| Untreated check                      |        |              |              | 0            | 0     | 0     | 0                       | 0     | 0     |
| Strategy <sup>1</sup>                | 2.1 EC | 2.5 pt/acre  | PRE          | 8            | 1     | 0     | 0                       | 0     | 0     |
| Strategy                             | 2.1 EC | 5 pt/acre    | PRE          | 21           | 6     | 1     | 0                       | 0     | 0     |
| Strategy fb                          | 2.1 EC | 2.5 pt/acre  | PRE          | 6            | 0     | 0     | 0                       | 0     | 0     |
| Select + COC <sup>2</sup>            | 2 EC   | 1 qt/acre    | POST         |              |       |       |                         |       |       |
| Strategy + Sandea                    | 2.1 EC | 2.5 pt/acre  | PRE          | 30           | 19    | 11    | 89                      | 80    | 76    |
| Strategy + Sandea                    | 75 DF  | 0.33 oz/acre |              |              |       |       |                         |       |       |
| Strategy + Sandea                    | 2.1 EC | 2.5 pt/acre  | PRE          | 45           | 29    | 20    | 95                      | 91    | 89    |
| Strategy + Sandea fb                 | 75 DF  | 0.67 oz/acre |              |              |       |       |                         |       |       |
| Strategy + Sandea + NIS <sup>3</sup> | 2.1 EC | 2.5 pt/acre  | PRE          | 21           | 33    | 28    | 91                      | 96    | 94    |
| Strategy + Sandea fb                 | 75 DF  | 0.33 oz/acre |              |              |       |       |                         |       |       |
| Strategy + Sandea + NIS              | 75 DF  | 0.33 oz/acre | POST         |              |       |       |                         |       |       |
| Strategy fb                          | 2.1 EC | .25 pt/acre  | PRE          | 41           | 68    | 65    | 96                      | 100   | 100   |
| Strategy fb                          | 75 DF  | 0.67 oz/acre |              |              |       |       |                         |       |       |
| Strategy fb                          | 75 DF  | 0.67 oz/acre | POST         |              |       |       |                         |       |       |
| Basagran + COC                       | 2.1 EC | 2.5 pt/acre  | PRE          | 6            | 11    | 3     | 0                       | 64    | 51    |
| Strategy fb                          | 4 SL   | 1 pt/acre    | POST         |              |       |       |                         |       |       |
| Strategy fb                          | 2.1 EC | 2.5 pt/acre  | PRE          | 6            | 14    | 8     | 0                       | 80    | 61    |
| Basagran + COC                       | 4 SL   | 1 qt/acre    | POST         |              |       |       |                         |       |       |
| LSD (P=.05)                          |        |              |              | 5            | 4     | 4     | 2                       | 4     | 4     |

continued

Table 18. Continued.

| Treatment                            | Form.  | Rate         | Growth stage | Goosegrass control |       |       | Johnsongrass control |       |       |
|--------------------------------------|--------|--------------|--------------|--------------------|-------|-------|----------------------|-------|-------|
|                                      |        |              |              | 2 WAE              | 4 WAE | 6 WAE | 2 WAE                | 4 WAE | 6 WAE |
| Untreated check                      |        |              |              | 0                  | 0     | 0     | 0                    | 0     | 0     |
| Strategy                             | 2.1 EC | 2.5 pt/acre  | PRE          | 94                 | 84    | 80    | 94                   | 66    | 20    |
| Strategy                             | 2.1 EC | 5 pt/acre    | PRE          | 96                 | 93    | 84    | 94                   | 66    | 21    |
| Strategy fb                          | 2.1 EC | 2.5 pt/acre  | PRE          | 93                 | 96    | 93    | 96                   | 91    | 76    |
| Select + COC <sup>2</sup>            | 2 EC   | 1 qt/acre    | POST         |                    |       |       |                      |       |       |
| Strategy + Sandea                    | 2.1 EC | 2.5 pt/acre  | PRE          | 94                 | 83    | 71    | 95                   | 59    | 16    |
| Strategy + Sandea                    | 75 DF  | 0.33 oz/acre |              |                    |       |       |                      |       |       |
| Strategy + Sandea                    | 2.1 EC | 2.5 pt/acre  | PRE          | 94                 | 83    | 70    | 96                   | 69    | 13    |
| Strategy + Sandea fb                 | 75 DF  | 0.67 oz/acre |              |                    |       |       |                      |       |       |
| Strategy + Sandea + NIS <sup>3</sup> | 2.1 EC | 2.5 pt/acre  | PRE          | 93                 | 84    | 73    | 96                   | 66    | 20    |
| Strategy + Sandea fb                 | 75 DF  | 0.33 oz/acre |              |                    |       |       |                      |       |       |
| Strategy + Sandea + NIS              | 75 DF  | 0.33 oz/acre | POST         |                    |       |       |                      |       |       |
| Strategy + Sandea fb                 | 2.1 EC | .25 pt/acre  | PRE          | 94                 | 85    | 70    | 95                   | 61    | 15    |
| Strategy + Sandea + NIS              | 75 DF  | 0.67 oz/acre |              |                    |       |       |                      |       |       |
| Strategy fb                          | 2.1 EC | 2.5 pt/acre  | POST         | 93                 | 83    | 71    | 98                   | 61    | 15    |
| Basagran + COC                       | 4 SL   | 1 pt/acre    | POST         |                    |       |       |                      |       |       |
| Strategy fb                          | 2.1 EC | 2.5 pt/acre  | PRE          | 95                 | 84    | 73    | 93                   | 64    | 19    |
| Basagran + COC                       | 4 SL   | 1 qt/acre    | POST         |                    |       |       |                      |       |       |
| LSD (P=.05)                          |        |              |              | 4                  | 5     | 5     | 4                    | 12    | 9     |

<sup>1</sup> Strategy contains ethylfluralin 1.6 lb/gal + clomazone 0.5 lb/gal; Sandea contains halosulfuron, 75%; and Basagran contains bentazon, 4 lb/gal.

<sup>2</sup> COC was applied at 1% volume per volume of water.

<sup>3</sup> NIS was applied at 0.25% volume per volume of water.



Table 19. Continued.

| Treatment                                  | Form.            | Rate<br>(lb/acre) | Growth<br>stage | Snap bean injury |      |      | Yellow nutsedge control<br>----- (%) |      |      | Common lambsquarters<br>control |      |      | Carpetweed control |      |      |     |
|--|------------------|-------------------|-----------------|------------------|------|------|--------------------------------------|------|------|---------------------------------|------|------|--------------------|------|------|-----|
|  |                  |                   |                 | 5-14             | 5-29 | 6-13 | 5-14                                 | 5-29 | 6-13 | 5-14                            | 5-29 | 6-13 | 5-14               | 5-29 | 6-13 |     |
|  |                  |                   |                 | ----- (%)        |      |      |                                      |      |      |                                 |      |      |                    |      |      |     |
| Flumiclorac +<br>COC                       | 0.86 EC          | 0.027             | POST            | 0                | 6    | 4    | 0                                    | 40   | 30   | 88                              | 0    | 93   | 88                 | 0    | 29   | 28  |
| S-Metolachlor fb<br>carfentrazone +<br>NIS | 7.62 EC<br>2 EC  | 0.5<br>0.025      | PRE<br>POST     | 0                | 73   | 56   | 91                                   | 94   | 90   | 99                              | 100  | 100  | 100                | 98   | 99   | 95  |
| S-Metolachlor fb<br>halosulfuron +<br>NIS  | 7.62 EC<br>75 DF | 0.5<br>0.032      | PRE<br>POST     | 0                | 0    | 0    | 93                                   | 100  | 99   | 98                              | 100  | 100  | 100                | 98   | 98   | 95  |
| S-Metolachlor fb<br>imazamox + NIS<br>1 L  | 7.62 EC<br>1 L   | 0.5<br>0.036      | PRE<br>POST     | 0                | 0    | 0    | 91                                   | 97   | 96   | 99                              | 100  | 100  | 100                | 100  | 100  | 100 |
| S-Metolachlor fb<br>fomesafen + NIS<br>2 L | 7.62 EC<br>2 L   | 0.5<br>0.2        | PRE<br>POST     | 0                | 0    | 0    | 91                                   | 98   | 95   | 100                             | 100  | 100  | 100                | 100  | 100  | 100 |
| LSD (P=,05)                                |                  |                   |                 | 1                | 4    | 3    | 4                                    | 6    | 9    | 8                               | 0    | 5    | 8                  | 4    | 8    | 10  |

continued

Table 19. Continued.

| Treatment                       | Form.            | Rate<br>(lb/acre) | Growth<br>stage | Palmer amaranth<br>control |      |      | Eclipta control<br>----- (%) |      |      | Goosegrass control |      |      | Snap<br>bean<br>yield<br>(MT/ha) |
|---------------------------------|------------------|-------------------|-----------------|----------------------------|------|------|------------------------------|------|------|--------------------|------|------|----------------------------------|
|                                 |                  |                   |                 | 5-14                       | 5-29 | 6-13 | 5-14                         | 5-29 | 6-13 | 5-14               | 5-29 | 6-13 |                                  |
|                                 |                  |                   |                 | ----- (%)                  |      |      |                              |      |      |                    |      |      |                                  |
| Untreated check                 |                  |                   |                 | 0                          | 0    | 0    | 0                            | 0    | 0    | 0                  | 0    | 0    | 5.3                              |
| S-Metolachlor                   | 7.62 EC          | 0.5               | PRE             | 99                         | 96   | 95   | 95                           | 93   | 90   | 100                | 100  | 100  | 9.5                              |
| Dimethnaamid-P                  | 6 EC             | 0.5               | PRE             | 100                        | 94   | 94   | 100                          | 98   | 95   | 100                | 100  | 100  | 7.6                              |
| Dimethenamid-P                  | 6 EC             | 1.0               | PRE             | 99                         | 96   | 95   | 100                          | 100  | 99   | 100                | 100  | 100  | 7.9                              |
| Clomazone +<br>pendimethalin    | 3 ME<br>3.3 EC   | 0.25<br>0.5       | PRE             | 100                        | 94   | 94   | 100                          | 98   | 95   | 100                | 100  | 100  | 7.5                              |
| Fomesafen<br>2 L                | 2 L              | 0.25              | PRE             | 100                        | 99   | 96   | 94                           | 89   | 86   | 98                 | 94   | 91   | 8.9                              |
| Imazethapyr                     | 70 DF            | 0.036             | PRE             | 100                        | 100  | 100  | 100                          | 100  | 98   | 98                 | 93   | 93   | 9.7                              |
| Halosulfuron                    | 75 DF            | 0.032             | PRE             | 100                        | 100  | 100  | 100                          | 100  | 100  | 100                | 23   | 18   | 8.5                              |
| S-Metolachlor +<br>halosulfuron | 7.62 EC<br>75 DF | 0.5<br>0.032      | PRE             | 100                        | 100  | 100  | 93                           | 86   | 81   | 100                | 100  | 100  | 9.0                              |
| Fomesafen +<br>NIS <sup>1</sup> | 2 L              | 0.2               | POST            | 0                          | 97   | 98   | 0                            | 100  | 99   | 0                  | 79   | 73   | 7.8                              |

continued

Table 19. Continued.

| Treatment                                  | Form.         | Rate<br>(lb/acre) | Growth<br>stage | Palmer amaranth<br>control |     |      |     |      |     | Eclipta control<br>(%) |      |      | Goosegrass control |      |      | Snap<br>bean<br>yield<br>(MT/ha) |
|--|---------------|-------------------|-----------------|----------------------------|-----|------|-----|------|-----|------------------------|------|------|--------------------|------|------|----------------------------------|
|  |               |                   |                 | 5-14                       |     | 5-29 |     | 6-13 |     | 5-14                   | 5-29 | 6-13 | 5-14               | 5-29 | 6-13 |                                  |
|  |               |                   |                 | 0                          | 99  | 0    | 99  | 100  | 100 | 0                      | 96   | 94   | 0                  | 83   | 74   |                                  |
| Fomesafen +<br>bentazon + COC <sup>2</sup> | 2 L<br>4 EC   | 0.2<br>0.75       | POST            | 0                          | 99  | 100  | 100 | 0    | 96  | 94                     | 0    | 83   | 74                 | 8.6  |      |                                  |
| Acifluorfen + NIS                          | 2 EC          | 0.25              | POST            | 0                          | 97  | 96   | 96  | 0    | 59  | 50                     | 0    | 26   | 20                 | 8.2  |      |                                  |
| Acifluorfen + NIS                          | 2 EC          | 0.5               | POST            | 0                          | 91  | 95   | 95  | 0    | 71  | 61                     | 0    | 53   | 43                 | 6.8  |      |                                  |
| Imazamox + NIS                             | 1 L           | 0.036             | POST            | 0                          | 96  | 98   | 98  | 0    | 70  | 70                     | 0    | 89   | 94                 | 8.9  |      |                                  |
| Imazamox +<br>bentazon + NIS               | 1 L<br>4 EC   | 0.036<br>0.75     | POST            | 0                          | 100 | 100  | 100 | 0    | 83  | 76                     | 0    | 98   | 100                | 8.4  |      |                                  |
| Imazamox +<br>fomesafen + NIS              | 1 L<br>2 L    | 0.035<br>0.2      | POST            | 0                          | 100 | 100  | 100 | 0    | 95  | 91                     | 0    | 90   | 90                 | 10.0 |      |                                  |
| Halosulfuron + NIS                         | 75 DF         | 0.032             | POST            | 0                          | 95  | 94   | 94  | 0    | 100 | 98                     | 0    | 6    | 5                  | 9.6  |      |                                  |
| Halosulfuron +<br>bentazon + NIS           | 75 DF<br>4 EC | 0.032<br>0.75     | POST            | 0                          | 96  | 96   | 96  | 0    | 100 | 96                     | 0    | 8    | 10                 | 9.0  |      |                                  |
| Halosulfuron +<br>fomesafen + NIS          | 75 DF<br>2 L  | 0.032<br>0.2      | POST            | 0                          | 100 | 100  | 100 | 0    | 100 | 99                     | 0    | 81   | 84                 | 9.4  |      |                                  |
| Chloransulam +<br>COC                      | 84 DF         | 0.016             | POST            | 0                          | 86  | 83   | 83  | 0    | 91  | 91                     | 0    | 41   | 39                 | 6.5  |      |                                  |
| Flufenpyr +<br>COC                         | 57.6 WDG      | 0.18              | POST            | 0                          | 100 | 100  | 100 | 0    | 100 | 100                    | 0    | 83   | 75                 | 1.1  |      |                                  |
| Flufenpyr +<br>COC                         | 57.6 WDG      | 0.36              | POST            | 0                          | 100 | 100  | 100 | 0    | 100 | 100                    | 0    | 90   | 85                 | 0.8  |      |                                  |
| Flumiclorac +<br>COC                       | 0.86 EC       | 0.027             | POST            | 0                          | 31  | 23   | 23  | 0    | 33  | 31                     | 0    | 18   | 6                  | 5.6  |      |                                  |
| S-Metolachlor<br>carfentrazone +<br>NIS    | fb<br>2 EC    | 0.5<br>0.025      | PRE<br>POST     | 100                        | 100 | 100  | 100 | 100  | 100 | 99                     | 100  | 100  | 100                | 0.3  |      |                                  |
| S-Metolachlor<br>halosulfuron +<br>NIS     | fb<br>75 DF   | 0.5<br>0.032      | PRE<br>POST     | 100                        | 100 | 100  | 100 | 100  | 100 | 100                    | 100  | 100  | 100                | 9.4  |      |                                  |
| S-Metolachlor<br>imazamox + NIS            | fb<br>1 L     | 0.5<br>0.036      | PRE<br>POST     | 100                        | 100 | 100  | 100 | 100  | 100 | 100                    | 100  | 100  | 100                | 9.1  |      |                                  |
| S-Metolachlor<br>fomesafen + NIS           | fb<br>2 L     | 0.5<br>0.2        | PRE<br>POST     | 100                        | 100 | 100  | 100 | 100  | 100 | 100                    | 100  | 100  | 100                | 9.0  |      |                                  |
| LSD (P=0.05)                               |               |                   |                 | 1                          | 4   | 5    | 5   | 2    | 5   | 7                      | 3    | 8    | 10                 | 1.1  |      |                                  |

**Table 20. Evaluation of Herbicide Programs in Southern Peas, Kibler, Ark., 2002.**

| Treatment  | Form.            | Rate<br>(lb/acre) | Growth<br>stage | Southern pea<br>injury |     |      | Palmer amaranth<br>control |     |      | Goosegrass control |     |      | Southern pea<br>yield<br>(MT/ha) |
|--|------------------|-------------------|-----------------|------------------------|-----|------|----------------------------|-----|------|--------------------|-----|------|----------------------------------|
|  |                  |                   |                 | 7-10                   | 8-2 | 8-28 | 7-10                       | 8-2 | 8-28 | 7-10               | 8-2 | 8-28 |                                  |
| Untreated check  |                  |                   |                 | 0                      | 0   | 0    | 0                          | 0   | 0    | 0                  | 0   | 0    | 2.3                              |
| S-metolachlor  | 7.62 EC          | 0.5               | PRE             | 0                      | 0   | 0    | 100                        | 100 | 100  | 100                | 100 | 100  | 3.2                              |
| Dimethenamid-P   | 6 EC             | 0.5               | PRE             | 0                      | 0   | 0    | 99                         | 99  | 98   | 100                | 100 | 100  | 2.3                              |
| Dimethenamid-P   | 6 EC             | 1.0               | PRE             | 4                      | 03  | 1    | 100                        | 100 | 100  | 100                | 100 | 99   | 2.5                              |
| Halosulfuron   | 75 DF            | 0.024             | PRE             | 0                      | 0   | 0    | 99                         | 99  | 98   | 79                 | 70  | 61   | 2.5                              |
| Halosulfuron   | 75 DF            | 0.047             | PRE             | 5                      | 3   | 1    | 99                         | 98  | 98   | 83                 | 78  | 69   | 1.9                              |
| S-metolachlor +<br>halosulfuron                        | 7.62 EC<br>75 DF | 0.5<br>0.026      | PRE             | 5                      | 3   | 1    | 100                        | 99  | 99   | 100                | 100 | 100  | 2.6                              |
| S-metolachlor fb<br>halosulfuron +<br>NIS <sup>1</sup> | 7.62 EC<br>75 DF | 0.5<br>0.026      | PRE<br>POST     | 11                     | 10  | 9    | 100                        | 100 | 100  | 100                | 100 | 100  | 0.8                              |
| Clomazone +<br>flumioxazin                             | 3 ME<br>51 WDG   | 0.5<br>0.032      | PRE             | 0                      | 0   | 0    | 99                         | 98  | 96   | 100                | 100 | 100  | 2.7                              |
| Flufenacet   | 60 WG            | 0.3               | PRE             | 0                      | 0   | 0    | 99                         | 98  | 98   | 100                | 100 | 100  | 2.8                              |
| Flufenacet   | 60 WG            | 0.6               | PRE             | 0                      | 0   | 0    | 100                        | 99  | 99   | 100                | 100 | 100  | 3.0                              |
| Sulfentrazone  | 75 DF            | 0.2               | PRE             | 36                     | 31  | 21   | 100                        | 100 | 100  | 98                 | 98  | 95   | 1.9                              |
| Sulfentrazone  | 75 DF            | 0.4               | PRE             | 76                     | 66  | 61   | 100                        | 100 | 100  | 100                | 100 | 100  | 0.2                              |
| Clomazone +<br>sulfentrazone                           | 3 EC<br>75 DF    | 0.5<br>0.25       | PRE             | 48                     | 40  | 34   | 100                        | 100 | 100  | 100                | 100 | 100  | 1.0                              |
| Pendimethalin +<br>imazethapyr                         | 3.3 EC<br>2 EC   | 0.75<br>0.063     | PRE             | 0                      | 0   | 0    | 100                        | 100 | 100  | 100                | 100 | 100  | 2.9                              |
| Pendimethalin fb<br>acifluorfen                        | 3.3 EC<br>2 EC   | 0.5<br>0.25       | PRE<br>POST     | 0                      | 0   | 0    | 99                         | 99  | 98   | 93                 | 90  | 86   | 2.6                              |
| Pendimethalin fb<br>acifluorfen                        | 3.3 EC<br>2 EC   | 0.5<br>0.5        | PRE<br>POST     | 0                      | 0   | 0    | 100                        | 100 | 100  | 91                 | 90  | 85   | 2.3                              |
| S-metolachlor fb<br>chloransulam +<br>COC <sup>2</sup> | 7.62 EC<br>84 DF | 0.5<br>0.016      | PRE<br>POST     | 0                      | 10  | 9    | 100                        | 100 | 100  | 100                | 100 | 99   | 2.0                              |
| S-metolachlor fb<br>chloransulam +<br>COC              | 7.62 EC<br>84 DF | 0.5<br>0.032      | PRE<br>POST     | 0                      | 8   | 8    | 100                        | 100 | 100  | 100                | 100 | 100  | 2.3                              |
| Imazamox +<br>NIS                                      | 1 EC             | 0.036             | POST            | 0                      | 0   | 0    | 0                          | 63  | 51   | 0                  | 90  | 83   | 1.7                              |

continued

Table 20. Continued.

| Treatment                    | Form.        | Rate<br>(lb/acre) | Growth<br>stage | Southern pea<br>injury |     |      | Palmer amaranth<br>control |     |      | Goosegrass control |     | Southern pea<br>yield<br>(MT/ha) |      |
|------------------------------|--------------|-------------------|-----------------|------------------------|-----|------|----------------------------|-----|------|--------------------|-----|----------------------------------|------|
|                              |              |                   |                 | 7-10                   | 8-2 | 8-28 | 7-10                       | 8-2 | 8-28 | 7-10               | 8-2 |                                  | 8-28 |
| Imazamox +<br>NIS            | 1 EC         | 0.072             | POST            | 0                      | 0   | 0    | 0                          | 64  | 55   | 0                  | 93  | 90                               | 1.5  |
| Imazamox +<br>bentazon + NIS | 1 EC<br>4 EC | 0.036<br>0.75     | POST            | 0                      | 0   | 0    | 0                          | 79  | 71   | 21                 | 89  | 83                               | 2.0  |
| Flufenpyr + NIS              | 58 WDG       | 0.18              | POST            | 0                      | 5   | 0    | 0                          | 79  | 68   | 0                  | 80  | 66                               | 1.9  |
| Flufenpyr + NIS              | 58 WDG       | 0.36              | POST            | 0                      | 10  | 5    | 0                          | 81  | 65   | 20                 | 81  | 71                               | 1.7  |
| LSD (P=,05)                  |              |                   |                 | 3                      | 3   | 3    | 2                          | 10  | 11   | 17                 | 6   | 8                                | 0.7  |

**Table 21. Herbicide Evaluation in Fall Greens, Kibler, 2002.**

| Treatment               | Form.           | Rate<br>(lb/acre) | Growth<br>stage | Collard |       |       | Kale   |       |       | Mustard |       |       | Turnip |       |       |
|-------------------------|-----------------|-------------------|-----------------|---------|-------|-------|--------|-------|-------|---------|-------|-------|--------|-------|-------|
|                         |                 |                   |                 | Injury  |       | Yield | Injury |       | Yield | Injury  |       | Yield | Injury |       | Yield |
|                         |                 |                   |                 | 2 WAE   | 8 WAE | 8 WAE | 2 WAE  | 8 WAE | 8 WAE | 2 WAE   | 8 WAE | 8 WAE | 2 WAE  | 8 WAE | 8 WAE |
| Trifluralin             | 4 EC            | 0.5               | PPI             | 5       | 3     | 5.8   | 3      | 15    | 5.6   | 6       | 0     | 8.1   | 14     | 5     | 17.1  |
| Untreated check         |                 |                   |                 | 0       | 0     | 4.7   | 0      | 0     | 4.9   | 0       | 0     | 8.1   | 0      | 0     | 16.3  |
| DCPA                    | 75 DF           | 8.0               | PRE             | 28      | 18    | 3.2   | 12     | 12    | 6.3   | 22      | 8     | 8.6   | 38     | 12    | 15.7  |
| Sulfentrazone           | 75 DF           | 0.075             | PRE             | 33      | 25    | 3.6   | 10     | 9     | 6.7   | 19      | 0     | 10.2  | 43     | 26    | 13.6  |
| Sulfentrazone           | 75 DF           | 0.15              | PRE             | 70      | 65    | 1.8   | 50     | 14    | 5.5   | 48      | 5     | 10.7  | 63     | 35    | 12.0  |
| Pendimethalin           | 3.3 EC          | 0.5               | PRE             | 33      | 40    | 3.8   | 38     | 21    | 6.3   | 48      | 19    | 6.9   | 45     | 24    | 14.5  |
| Pendimethalin           | 3.3 EC          | 1.0               | PRE             | 98      | 86    | 0.2   | 83     | 68    | 1.9   | 88      | 91    | 0.9   | 54     | 26    | 13.0  |
| Pendimethalin +<br>DCPA | 3.3 EC<br>75 DF | 0.5<br>3.0        | PRE             | 58      | 45    | 2.8   | 74     | 59    | 2.5   | 85      | 96    | 0.3   | 71     | 60    | 8.0   |
| Thiobencarb             | 8 EC            | 1.5               | PRE             | 35      | 30    | 4.0   | 11     | 3     | 7.1   | 23      | 6     | 8.2   | 21     | 23    | 15.4  |
| Thiobencarb             | 8 EC            | 3.0               | PRE             | 21      | 26    | 4.5   | 16     | 0     | 8.1   | 27      | 10    | 7.7   | 33     | 62    | 7.4   |
| Trifluralin fb          | 4 EC            | 0.5               | PPI             | 26      | 5     | 4.8   | 0      | 4     | 5.9   | 11      | 40    | 4.7   | 8      | 5     | 17.5  |
| DCPA                    | 75 DF           | 4.0               | PRE             |         |       |       |        |       |       |         |       |       |        |       |       |
| S-metolachlor           | 7.62 EC         | 0.5               | PRE             | 18      | 15    | 4.7   | 8      | 13    | 7.8   | 24      | 10    | 7.7   | 24     | 28    | 13.1  |
| S-metolachlor           | 7.62 EC         | 1.0               | PRE             | 54      | 50    | 2.5   | 25     | 0     | 8.5   | 65      | 35    | 5.1   | 68     | 34    | 16.4  |
| Dimethenamid            | 6 EC            | 0.5               | PRE             | 46      | 44    | 3.1   | 28     | 3     | 8.3   | 73      | 41    | 4.9   | 73     | 41    | 11.1  |
| Dimethenamid            | 6 EC            | 1.0               | PRE             | 74      | 88    | 1.0   | 80     | 14    | 5.1   | 90      | 64    | 3.4   | 80     | 54    | 8.4   |
| Dimethenamid            | 6 EC            | 0.5               | POST            | 79      | 0     | 1.3   | 0      | 64    | 2.0   | 0       | 94    | 0.4   | 0      | 65    | 7.0   |
| Pendimethalin fb        | 3.3 EC          | 0.25              | PRE             | 6       | 15    | 5.8   | 9      | 9     | 6.0   | 11      | 5     | 8.5   | 6      | 8     | 18.2  |
| clopyralid              | 3 EC            | 0.1               | POST            |         |       |       |        |       |       |         |       |       |        |       |       |
| Pendimethalin fb        | 3.3 EC          | 0.25              | PRE             | 20      | 15    | 5.4   | 10     | 15    | 5.3   | 9       | 0     | 10.0  | 11     | 30    | 12.5  |
| clopyralid              | 3 EC            | 0.2               | POST            |         |       |       |        |       |       |         |       |       |        |       |       |
| Pendimethalin fb        | 3.3 EC          | 0.25              | PRE             | 40      | 28    | 3.5   | 9      | 19    | 4.8   | 34      | 56    | 3.9   | 31     | 41    | 11.4  |
| oxyfluorfen             | 2 EC            | 0.125             | POST            |         |       |       |        |       |       |         |       |       |        |       |       |
| Pendimethalin fb        | 3.3 EC          | 0.25              | PRE             | 36      | 7     | 3.1   | 6      | 28    | 4.3   | 7       | 52    | 3.4   | 8      | 52    | 8.8   |
| oxyfluorfen             | 2 EC            | 0.25              | POST            |         |       |       |        |       |       |         |       |       |        |       |       |
| LSD (P=.05)             |                 |                   |                 | 23      | 16    | 1.8   | 12     | 26    | 2.5   | 16      | 18    | 2.4   | 21     | 26    | 5.0   |



Table 22. Evaluation of S-metolachlor and Dimethenamid-P on Table Beets, Fayetteville, 2002.

| Treatment       | Form.   | Rate<br>(lb/acre) | Growth<br>stage | Table beet injury |       |       | Common lambsquarters<br>control |       |       | Cutleaf eveningprimrose<br>control |       |       | Yellow<br>nutsedge<br>control |       |       | Table<br>beet<br>yield |  |
|-----------------|---------|-------------------|-----------------|-------------------|-------|-------|---------------------------------|-------|-------|------------------------------------|-------|-------|-------------------------------|-------|-------|------------------------|--|
|                 |         |                   |                 | 2 WAT             | 5 WAT | 7 WAT | 2 WAT                           | 5 WAT | 7 WAT | 2 WAT                              | 5 WAT | 7 WAT | 8 WAT                         | 9 WAT | 9 WAT | 9 WAT                  |  |
| Untreated check |         |                   |                 | 0                 | 0     | 0     | 0                               | 0     | 0     | 0                                  | 0     | 0     | 0                             | 0     | 16    | 3.3                    |  |
| Dimethenamid-P  | 6 EC    | 0.66              | 2-If            | 0                 | 0     | 0     | 81                              | 71    | 64    | 38                                 | 23    | 10    | 11                            | 42    | 42    | 17.3                   |  |
| Dimethenamid-P  | 6 EC    | 1.32              | 2-If            | 13                | 10    | 6     | 91                              | 86    | 83    | 49                                 | 33    | 23    | 19                            | 40    | 40    | 21.4                   |  |
| S-Metolachlor   | 7.62 EC | 0.67              | 2-If            | 5                 | 3     | 0     | 81                              | 59    | 43    | 26                                 | 10    | 9     | 23                            | 48    | 48    | 16.0                   |  |
| S-Metolachlor   | 7.62 EC | 1.34              | 2-If            | 14                | 11    | 11    | 95                              | 78    | 64    | 45                                 | 23    | 13    | 38                            | 42    | 42    | 17.4                   |  |
| Pyrazon         | 67.6 DF | 3.65              | 2-If            | 0                 | 0     | 0     | 96                              | 95    | 93    | 95                                 | 95    | 99    | 86                            | 69    | 69    | 34.0                   |  |
| Cycloate        | 6 EC    | 4.0               | 2-If            | 11                | 10    | 9     | 71                              | 55    | 26    | 45                                 | 26    | 10    | 16                            | 44    | 44    | 16.2                   |  |
| LSD (P=.05)     |         |                   |                 | 3                 | 3     | 2     | 7                               | 8     | 8     | 6                                  | 3     | 3     | 3                             | 10    | 10    | 3.6                    |  |

**Table 23. Herbicide Evaluation in Grapes, Fayetteville, 2002.**

| Treatment              | Form.         | Rate<br>(lb/acre) | Growth<br>stage | Grape injury |        |        |        |        | Bermudagrass control |        |          |          |        |        |        |
|------------------------|---------------|-------------------|-----------------|--------------|--------|--------|--------|--------|----------------------|--------|----------|----------|--------|--------|--------|
|                        |               |                   |                 | 5-15         | 6-4    | 6-18   | 7-1    | 8-2    | 5-15                 | 6-4    | 6-18     | 7-1      | 8-2    |        |        |
| Untreated check        |               |                   |                 | 0            | 0      | 0      | 0      | 0      | 0                    | 0      | 0        | 0        | 0      | 0      | 0      |
| Flumioxazin            | 50 WP         | 0.5               | PRE             | 0            | 0      | 0      | 0      | 0      | 0                    | 0      | 38       | 34       | 26     | 21     | 18     |
| Flumioxazin            | 50 WP         | 1.0               | PRE             | 0            | 0      | 0      | 0      | 0      | 0                    | 0      | 79       | 73       | 66     | 61     | 58     |
| Flumioxazin fb         | 50 WP         | 0.25              | PRE             | 0            | 0      | 0      | 0      | 0      | 0                    | 0      | 31       | 35       | 30     | 19     | 10     |
| flumioxazin            | 50 WP         | 0.25              | POST            |              |        |        |        |        |                      |        |          |          |        |        |        |
| Flumioxazin fb         | 50 WP         | 0.375             | PRE             | 0            | 0      | 0      | 0      | 0      | 0                    | 0      | 64       | 69       | 60     | 46     | 28     |
| flumioxazin            | 50 WP         | 0.375             | POST            |              |        |        |        |        |                      |        |          |          |        |        |        |
| Azafenidin             | 80 DF         | 0.5               | PRE             | 0            | 0      | 0      | 0      | 0      | 0                    | 0      | 93       | 94       | 80     | 71     | 53     |
| Azafenidin             | 80 DF         | 1.0               | PRE             | 0            | 0      | 0      | 0      | 0      | 0                    | 0      | 91       | 100      | 100    | 97     | 96     |
| Azafemidin fb          | 80 DF         | 0.25              | PRE             | 0            | 0      | 0      | 0      | 0      | 0                    | 0      | 50       | 58       | 46     | 35     | 25     |
| azafenidin             | 80 DF         | 0.25              | POST            |              |        |        |        |        |                      |        |          |          |        |        |        |
| Azafenidin fb          | 80 DF         | 0.375             | PRE             | 0            | 0      | 0      | 0      | 0      | 0                    | 0      | 66       | 71       | 61     | 55     | 40     |
| azafenidin             | 80 DF         | 0.375             | POST            |              |        |        |        |        |                      |        |          |          |        |        |        |
| Sulfentrazone          | 75 DG         | 0.25              | PRE             | 0            | 0      | 0      | 0      | 0      | 0                    | 0      | 23       | 13       | 3      | 0      | 0      |
| Sulfentrazone          | 75 DF         | 0.375             | PRE             | 0            | 0      | 0      | 0      | 0      | 0                    | 0      | 38       | 23       | 13     | 1      | 0      |
| Simazine +<br>oryzalin | 90 DF<br>4 EC | 2.0<br>3.0        | PRE<br>PRE      | 0<br>0       | 0<br>0 | 0<br>0 | 0<br>0 | 0<br>0 | 0<br>0               | 0<br>0 | 20<br>20 | 11<br>11 | 0<br>0 | 0<br>0 | 0<br>0 |
| Clopyralid             | 3 EC          | 0.3               | POST            | 0            | 0      | 0      | 0      | 0      | 0                    | 0      | 0        | 18       | 10     | 0      | 0      |
| LSD (P=0.05)           |               |                   |                 | 0            | 0      | 0      | 0      | 0      | 0                    | 0      | 5        | 6        | 7      | 7      | 7      |

continued

Table 23. Continued.

| Treatment              | Form.         | Rate<br>(lb/acre) | Growth<br>stage | Large crabgrass control |         |         |          |          | Grape<br>yield |
|------------------------|---------------|-------------------|-----------------|-------------------------|---------|---------|----------|----------|----------------|
|                        |               |                   |                 | 5-15                    | 6-4     | 6-18    | 7-1      | 8-2      |                |
| Untreated check        |               |                   |                 | 0                       | 0       | 0       | 0        | 0        |                |
| Flumioxazin            | 50 WP         | 0.5               | PRE             | 100                     | 88      | 70      | 60       | 56       | 9.1            |
| Flumioxazin            | 50 WP         | 1.0               | PRE             | 100                     | 93      | 88      | 83       | 81       | 9.3            |
| Flumioxazin fb         | 50 WP         | 0.25              | PRE             | 100                     | 93      | 78      | 68       | 63       | 14.6           |
| flumioxazin            | 50 WP         | 0.25              | POST            |                         |         |         |          |          | 13.2           |
| Flumioxazin fb         | 50 WP         | 0.375             | PRE             | 100                     | 88      | 81      | 73       | 65       | 18.3           |
| flumioxazin            | 50 WP         | 0.375             | POST            |                         |         |         |          |          |                |
| Azafenidin             | 80 DF         | 0.5               | PRE             | 100                     | 100     | 98      | 97       | 91       | 12.1           |
| Azafenidin             | 80 DF         | 1.0               | PRE             | 100                     | 100     | 100     | 98       | 97       | 13.1           |
| Azafemidin fb          | 80 DF         | 0.25              | PRE             | 98                      | 96      | 91      | 91       | 86       | 13.2           |
| azafenidin             | 80 DF         | 0.25              | POST            |                         |         |         |          |          |                |
| Azafenidin fb          | 80 DF         | 0.375             | PRE             | 98                      | 96      | 95      | 91       | 91       | 14.9           |
| azafenidin             | 80 DF         | 0.375             | POST            |                         |         |         |          |          |                |
| Sulfentrazone          | 75 DG         | 0.25              | PRE             | 97                      | 95      | 88      | 78       | 69       | 14.5           |
| Sulfentrazone          | 75 DF         | 0.375             | PRE             | 98                      | 95      | 94      | 89       | 83       | 16.8           |
| Simazine +<br>oryzalin | 90 DF<br>4 EC | 2.0<br>3.0        | PRE<br>PRE      | 97<br>0                 | 95<br>2 | 91<br>3 | 84<br>79 | 73<br>60 | 14.2<br>11.1   |
| Clopyralid             | 3 EC          | 0.3               | POST            | 1                       | 2       | 3       | 4        | 5        | 2.5            |
| LSD (P=.05)            |               |                   |                 |                         |         |         |          |          |                |

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