Eclipta (*Eclipta prostrata* L.) Control in Peanuts (*Arachis hypogaea* L.)[1]

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ABSTRACT

Field experiments were conducted from 1991 to 1993 to evaluate eclipta, *Eclipta prostrata* L., control and peanut, *Arachis hypogaea* L., response to herbicide treatments. Fomesafen {5-[2-chloro-4-(trifluoromethyl)phenoxy]-*N*-(methylsulfonyl)-2-nitrobenzamide} applied at cracking was the only preemergence-applied herbicide which provided season-long control (>84%). Herbicides applied postemergence were more effective when the eclipta was less than 5 cm in height. The most consistent early postemergence treatments were bromoxynil (3,5-dibromo-4-hydroxybenzonitrile), bentazon [3-(1-methylethyl)-(1*H*)-2,1,3-benzothiadiazin-4(3*H*)-one 2,2-dioxide], and bentazon + acifluorfen {5-[2-chloro-4-(trifluoromethyl)phenoxy]-2-nitrobenzoic acid} + 2,4-DB [4-(2,4-dichloro-phenoxy)butanoic acid]. Various other early postemergence followed by late postemergence sequential treatments also were equally effective. Minor peanut injury was observed at the early season rating from several herbicides; however, all injury had disappeared by the late season rating. Eclipta control did not consistently improve peanut pod yield.

Key Words: *Eclipta prostrata* L., eclipta, eclipta control, peanut injury, pod yield, sequential treatments.

Eclipta (*Eclipta prostrata* L.) is an annual herb and a member of the Asteracea family with distributions in North America primarily in the Southern U.S., lower Midwest, and along the East Coast (9). It has small, spatulate cotyledons as a seedling; but, as plants mature, stems are both prostrate and erect and become reddish brown to purplish in color. The stem nodes produce roots when they remain in contact with the soil.

Early infestations of eclipta are found in low-lying, moist areas of cultivated fields, waste areas, and roadsides (9). Once introduced into a cultivated field, eclipta can spread rapidly. In 1992, eclipta was reported to infest about 4000 ha of irrigated peanut (*Arachis hypogaea* L.) in Oklahoma (4). The same authors reported that it serves as a host for Sclerotinia blight, caused by the fungus *Sclerotinia minor* Jagger. Sclerotinia blight infests about 25% of Oklahoma peanut fields and can reduce yields 25 to 50% (3). Therefore, eclipta is important as a weed and as a host for peanut-infecting pathogens.

Eclipta is a troublesome weed in peanuts, rice (*Oryza sativa* L.), soybeans [*Glycine max* (L.) Merrill], and various ornamentals (2, 7, 8, 11). Smith (8) reported that threshold populations of eclipta must be controlled in rice by midseason to avoid yield reductions. Excellent eclipta control in container-grown ornamentals was reported with a preemergence application of chlorimuron {2-[[[[(4-chloro-6-methoxy-2-pyrimidinyl)amino]carbonyl]amino]sulfonyl]benzoic acid} at 0.035 and 0.07 kg ha^{-1} (2).

Many weed species that compete with peanuts require multiple herbicides and/or sequential applications for effective control and a resultant positive economic return (5, 10, 11, 12, 13, 14). However, little research has been reported on eclipta in peanuts. Wilcut *et al.* (11) conducted experiments with imazethapyr {(±)-2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1*H*-imidazol-2-yl]-5-ethyl-3-pyridinecarboxylic acid} in Virginia. Eclipta was controlled 95% when imazethapyr was applied preemergence at 0.105 kg ha^{-1}. However, imazethapyr use on peanuts in Oklahoma cannot exceed 0.071 kg ha^{-1} per year (Pursuit herbicide product label, 1993, American Cyanamid Co., Princeton, NJ). They further reported complete eclipta control with the standard treatment of pendimethalin [*N*-(1-ethylpropyl)-3,4-dimethyl-2,6-dinitrobenzenamine] preplant-incorporated followed by metolachlor {2-chloro-*N*-(2-ethyl-6-methylphenyl)-*N*-(2-methoxy-1-methylethyl)acetamide} preemergence, and acifluorfen + bentazon postemergence.

In Georgia, eclipta was controlled with a prepackage mixture of acifluorfen and bentazon, while in North Carolina alachlor [2-chloro-*N*-(2,6-diethylphenyl)-*N*-(methoxymethyl)acetamide] and metolachlor suppressed early season eclipta germination (1).

In Oklahoma, under a semi-arid climate, eclipta has been more difficult to control than in other geographic regions. Therefore, determining effective herbicides for eclipta control would be beneficial to peanut producers in this region. The objectives of this research were to evaluate eclipta control and peanut response to various herbicides, rates, and application timings.

Materials and Methods

Nine field experiments were conducted from 1991 to 1993 on irrigated, farmer-cooperator land with natural eclipta infestations. Fertilization, supplemental irrigation, insecticides, fungicides, and other production practices were applied during the growing season based upon each farmer's decision and need. Soil information for these experiments is listed in Table 1.

Experimental areas were treated with herbicide(s) and hand-hoed, if necessary, to control other weed species. Pendimethalin (0.56 kg ha^{-1}) was applied preplant incorporated (PPI) followed by (fb) (followed by "fb" represents a sequential treatment) metolachlor (0.56 kg ha^{-1}) applied preemergence (PRE) in Experiments 1 and 2. Trifluralin [2,6-dinitro-*N*,*N*-dipropyl-4-(trifluoromethyl)benzenamine] (0.28 kg ha^{-1}) was applied PPI in Experiments 3 and 4 while

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Table 1. Soil information and nearest city for each experiment (1991-1993)[a].

Expt. no.	Nearest city	Year	Soil type	Sand	Silt	Clay	OM	pH
				-------	-------	%	-------	-------
1	Hendrix	1991	Sandy loam	56	37	7	0.5	5.8
2	Hendrix	1991	Sandy loam	56	37	7	0.5	5.8
3	Caney	1991	Loamy sand	77	18	5	0.4	6.5
4	Caney	1991	Loamy sand	77	18	5	0.4	6.5
5	Caney	1992	Loamy sand	84	13	3	0.1	7.1
6	Caney	1992	Loamy sand	84	13	3	0.1	7.1
7	Rush Springs	1992	Loamy sand	78	17	5	0.2	7.0
8	Rush Springs	1993	Loamy sand	81	10	9	0.4	5.2
9	Marlow	1993	Loamy sand	81	13	6	0.3	6.0

[a]Soil information was determined by Ward Laboratories, Inc., 4007 Cherry Avenue, Kearney, NE 68848 from a composite soil sample taken in each field.

trifluralin (0.56 kg ha^{-1}) was applied PPI in Experiments 5 and 6. Pendimethalin at (0.56 kg ha^{-1}) + imazethapyr (0.04 kg ha^{-1}) was applied PPI in Experiment 7, and pendimethalin (0.84 kg ha^{-1}) was applied PPI in Experiments 8 and 9.

Planting date, peanut cultivar, seeding rate, PPI, PRE, at cracking (AC), early postemergence (EP), and late postemergence (LP) treatment information and harvest date for all experiments are listed in Table 2. Experimental designs for all experiments, except Experiment 7, were randomized complete block designs with four replications. Experiment 7 employed four replications but was a split-plot design with EP treatments being the main plots (four rows) and the split-plot (two rows) being a LP treatment identical to the respective EP treatment. Plot or main-plot size for all experiments were 9 m in length with row widths of four 91-cm rows in Experiments 1, 2, 5, 6, 7; four 76-cm rows in Experiments 3 and 4; four 97-cm rows in Experiment 8; and two 91-cm rows in Experiment 9.

Individual herbicide treatments were applied with a tractor-mounted compressed-air sprayer with a water carrier volume of 141 L ha^{-1}. All POST treatments, except 2,4-DB applied alone, were applied with either a nonionic surfactant (Triton AG-98 Spray Adjuvant, 80% alkylaryl polyoxyethylene glycols, Rohm and Haas Co., Philadelphia, PA) at 0.25% v/v or Dash (a proprietary surfactant blend from BASF Corp., Parsippany, NJ) at 1.2 L ha^{-1}. Visual eclipta control and peanut injury ratings were taken throughout the growing season; however, only an early and late season rating will be presented. These ratings were made on a 0 to 100 scale based on the untreated check in each replication. Days after treatment (DAT) for early and late season rating information are listed in Table 3. Individual herbicide treatments, rates, and application timings for each experiment are listed in Tables 4-7.

Peanuts were dug with a Lilliston two-row digger (Lilliston Corp., Albany, GA) and left to cure for approximately 5 d before combining. A Lilliston 1500 peanut combine modified for small plot use was used to collect peanut pod yields from the center two rows in Experiments 1-6 and 8. Each of the two-row subplots were harvested in Experiment 7 and no peanut pod yields were taken from Experiment 9.

Ratings were subjected to arcsine square-root transformations (8). Data were subjected to analysis of variance

Table 2. Treatment information for all experiments (1991-1993).

	Experiment no.								
	1	2	3	4	5	6	7	8	9
Information[a]	1991				1992			1993	
Planting (date)	5/27	5/27	5/31	5/31	6/19	6/19	5/6	5/21	5/28
Peanut cultivar	Spanco	Spanco	Florunner	Florunner	Spanco	Spanco	Okrun	Okrun	Okrun
Seeding rate (kg ha^{-1})	78	78	90	90	90	90	75	90	90
PPI (date)	-	-	-	-	6/19	-	-	-	-
PRE (date)	-	-	-	-	6/19	-	-	-	-
AC (date)	5/31	-	-	-	6/24	-	-	-	-
DAP	4	-	-	-	5	-	-	-	-
Eclipta size (cm)	-	-	-	-	1-5	-	-	-	-
Peanut size (cm)	Cracking	-	-	-	Cracking	-	-	-	-
EP (date)	6/13	6/13	6/14	6/19	7/6	7/6	6/13	6/30	7/1
DAP	17	17	14	19	17	17	38	40	34
Eclipta size (cm)	1-2	1-2	1-2	2-4	1-10	1-10	1-5	1-8	1-5
Peanut size (cm)	7-10	7-10	7-10	5-10	10	10	6	15-20	10-15
LP (date)	-	6/26	6/19	6/26	-	7/22	7/21	7/16	7/16
DAP	-	30	19	26	-	33	76	56	49
Eclipta size (cm)	-	2-10	2-4	2-7	-	5-25	5-25	5-25	5-25
Peanut size (cm)	-	10-23	5-10	5-10	-	20	25	20-25	20-25
Harvest (date)	10/15	10/15	11/12	11/12	10/12	10/12	10/13	10/22	-
DAP	141	141	165	165	115	115	160	154	-
Peanuts graded	No	No	Yes	Yes	No	No	No	Yes	-

[a]Abbreviations are PPI=preplant incorporated, PRE=preemergence, AC=at cracking, DAP=days after planting, EP=early postemergence, and LP=late postemergence.

Table 3. Days after treatment (DAT) for early and late season eclipta control ratings (1991-1993).

	Experiment no.								
	1	2	3	4	5	6	7	8	9
Information[a]	1991				1992			1993	
Early season									
Rating (date)	6/26	6/26	7/10	7/10	7/22	7/22	6/26	7/16	7/16
PPI (DAT)	-	-	-	-	33	-	-	-	-
PRE (DAT)	-	-	-	-	33	-	-	-	-
AC (DAT)	26	-	-	-	28	-	-	-	-
EP (DAT)	13	13	26	21	16	16	13	16	15
Early season									
Rating (date)	-	7/10	7/10	7/10	-	8/10	8/13	7/29	7/29
LP (DAT)	-	14	21	14	-	19	23	13	13
Late season									
Rating (date)	8/6	8/6	8/6	8/6	9/15	9/15	9/16	8/27	8/27
PPI (DAT)	-	-	-	-	88	-	-	-	-
PRE (DAT)	-	-	-	-	88	-	-	-	-
AC (DAT)	67	-	-	-	83	-	-	-	-
EP (DAT)	54	54	53	48	71	71	95	57	57
LP (DAT)	-	41	48	41	-	55	57	42	42

[a]Abbreviations are PPI = preplant incorporated, PRE = preemergence, AC = at cracking, EP = early postemergence, and LP = late postemergence.

with means separated by a protected LSD at the 5% probability level. Nontransformed means are presented with statistical interpretation based on transformed data. EP treatments which were identical in at least three experiments were analyzed in subsets and discussed as eclipta control over experiments. Identical treatments not found in at least three experiments were omitted from analysis and discussion.

Results and Discussion

Eclipta Control

Herbicides Applied PRE and/or AC. At the early season rating, control by the following treatments was greater than 83%: V-53482 {2-[7-fluoro-4-(2-propynyl)-2*H*-1,4-benzoxazine-3-one-6-yl]-4,5,6,7-tetrahydro-2*H*-isoindole-1,3-dione} applied PRE, metolachlor combinations applied PRE and AC, AC-263,222 [(±)-2-(4-isopropyl-4-methyl-5-oxo-2-imidazolin-2yl)-5-methylnicotinic acid] and fomesafen applied AC, and all sequential treatments with an EP application (Table 4). By the late season rating, control was greater than 84% from fomesafen applied AC and all AC fb EP sequential treatments (Experiment 1).

Herbicides Applied EP to Eclipta Less than 5 cm Tall. Many EP treatments provided greater than 90% control at the early season rating (Table 5). When early

Table 4. Visual eclipta control and peanut pod yield from preplant incorporated (PPI), preemergence (PRE), at cracking (AC), and sequential applications with early postemergence (EP) treatments (Experiments 1 and 5).

			Visual control rating[a]				Peanut pod yield	
			Early season		Late season			
			Experiment no.					
Treatment[b]	Rate	Applic. timing	1	5	1	5	1	5
	kg ha^{-1}		--- % ---				--- kg ha^{-1} ---	
Vernolate	3.36	PPI	-	30	-	3	-	1792
MON-13211/MON-13211 + Lactofen	0.34/0.22 + 0.22	PPI/EP	-	88	-	0	-	1738
Vernolate/Acifluorfen	3.36/0.56	PPI/EP	-	93	-	71	-	2046
Oxyfluorfen	0.45	PRE	-	53	-	0	-	1932
V-53482	0.07	PRE	-	92	-	31	-	2165
V-53482	0.11	PRE	-	94	-	65	-	1992
Metolachlor + AC-263,222	1.68 + 0.07	PRE	-	91	-	5	-	1460
Metolachlor + Imazethapyr	1.68 + 0.07	PRE	-	88	-	3	-	1627
Metolachlor + AC-263,222/AC-263,222	1.68 + 0.036/0.036	PRE/EP	-	97	-	48	-	1491
Metolachlor + Imazethapyr/Imazethapyr	1.68 + 0.036/0.036	PRE/EP	-	85	-	3	-	1598
AC-263,222	0.07	AC	70	90	70	24	1036	1670
Fomesafen	0.42	AC	100	-	100	-	1042	-
Imazethapyr	0.07	AC	5	61	0	0	970	1720
Lactofen	0.22	AC	64	-	48	-	1371	-
Oxyfluorfen	0.22	AC	5	70	3	0	891	1690
Oxyfluorfen	0.34	AC	10	64	19	0	887	1747
Metolachlor + AC-263,222	1.68 + 0.07	AC	-	92	-	20	-	1269
Metolachlor + Imazethapyr	1.68 + 0.07	AC	-	84	-	0	-	1484
Imazethapyr/Lactofen	0.07/0.22	AC/EP	100	91	100	18	1165	1768
Oxyfluorfen/Imazethapyr	0.22/0.07	AC/EP	95	91	85	15	1344	1742
Paraquat/Imazethapyr	0.1/0.07	AC/EP	87	-	87	-	1230	-
Untreated check	-	-	0	0	0	0	779	1824
LSD (0.05)			11	7	17	15	NS	NS

[a]See Table 3 for days after treatment (DAT) for each application timing, experiment, and rating date.

[b]AC and EP treatments were applied with 0.25% v/v nonionic surfactant.

Table 5. Visual eclipta control and peanut pod yield from early postemergence (EP) treatments applied to eclipta 5 cm tall or less and late postemergence (LP) treatments applied to eclipta 25 cm tall or less (Experiments 2-4 and 9).

			Visual control rating[a]										Peanut pod yield		
			Early season						Late season						
		Applic.	Experiment no.												
Treatment[b]	Rate	timing	2	2	3	4	9	9	2	3	4	9	2	3	4
	kg ha^{-1}		%										kg ha^{-1}		
2,4-DB	0.45	EP	78	-	-	91	7	-	70	-	87	23	997	-	1945
AC-263,222	0.07	EP	100	-	100	100	58	-	99	100	100	73	1226	1994	1722
Acifluorfen	0.56	EP	100	-	-	99	57	-	100	-	100	68	1244	-	1857
Bentazon	1.12	EP	-	-	-	-	83	-	-	-	-	73	-	-	-
Bromoxynil	0.21	EP	-	-	-	-	92	-	-	-	-	99	-	-	-
Bromoxynil	0.28	EP	-	-	-	-	96	-	-	-	-	96	-	-	-
Bromoxynil	0.43	EP	-	-	-	-	98	-	-	-	-	99	-	-	-
Chlorimuron	0.005	EP	97	-	-	100	88	-	100	-	100	93	1030	-	1571
Fomesafen	0.28	EP	100	-	-	100	-	-	100	-	100	-	1351	-	2609
Fomesafen	0.42	EP	100	-	100	100	-	-	100	100	100	-	1102	1824	1909
Imazethapyr	0.07	EP	85	-	91	91	10	-	69	88	84	30	1163	1661	1778
Lactofen	0.22	EP	100	-	100	98	92	-	100	100	98	93	1085	1987	1881
Oxyfluorfen	0.22	EP	-	-	98	-	-	-	-	97	-	-	-	2226	-
Oxyfluorfen	0.34	EP	-	-	100	-	-	-	-	98	-	-	-	1917	-
Paraquat	0.1	EP	95	-	-	99	-	-	95	-	100	-	1156	-	1914
Paraquat	0.14	EP	-	-	-	-	77	-	-	-	-	57	-	-	-
Pyridate	1.57	EP	100	-	-	100	92	-	100	-	100	73	1106	-	2652
AC-263,222+2,4-DB	0.07+0.45	EP	-	-	-	-	80	-	-	-	-	58	-	-	-
Acifluorfen+2,4-DB	0.56+0.22	EP	-	-	-	-	68	-	-	-	-	20	-	-	-
Bentazon+2,4-DB	0.56+0.22	EP	-	-	-	-	87	-	-	-	-	95	-	-	-
Bromoxynil+2,4-DB	0.28+0.22	EP	-	-	-	-	98	-	-	-	-	99	-	-	-
Chlorimuron+2,4-DB	0.005+0.45	EP	-	-	-	-	85	-	-	-	-	93	-	-	-
Imazethapyr+2,4-DB	0.07+0.45	EP	99	-	-	95	58	-	97	-	71	43	1177	-	2059
Lactofen+2,4-DB	0.22+0.22	EP	-	-	-	-	92	-	-	-	-	88	-	-	-
Pyridate+2,4-DB	1.57+0.22	EP	-	-	-	-	95	-	-	-	-	93	-	-	-
Bentazon+Acifluorfen	1.12+0.56	EP	-	-	-	-	93	-	-	-	-	93	-	-	-
Bentazon+Acifluorfen+2,4-DB	0.84+0.56+0.22	EP	-	-	-	-	96	-	-	-	-	93	-	-	-
Bentazon+Paraquat	0.56+0.14	EP	-	-	-	-	91	-	-	-	-	89	-	-	-
Acifluorfen/Bromoxynil	0.56/0.28	EP/LP	-	-	-	-	-	99	-	-	-	99	-	-	-
Bromoxynil/Acifluorfen	0.28/0.56	EP/LP	-	-	-	-	-	96	-	-	-	93	-	-	-
Fomesafen/Imazethapyr	0.28/0.07	EP/LP	-	100	-	100	-	-	100	-	100	-	1333	-	1713
Imazethapyr/2,4-DB	0.07/0.45	EP/LP	-	91	-	97	-	-	89	-	99	-	1250	-	2283
Imazethapyr/Fomesafen	0.07/0.28	EP/LP	-	98	-	97	-	-	99	-	97	-	1353	-	2027
Imazethapyr/Lactofen	0.07/0.22	EP/LP	-	99	100	90	-	-	98	100	88	-	1365	2461	1817
Imazethapyr/Paraquat	0.07/0.1	EP/LP	-	98	-	95	-	-	97	-	87	-	1625	-	1677
Imazethapyr/Pyridate	0.07/1.57	EP/LP	-	100	-	100	-	-	100	-	100	-	1371	-	2412
Oxyfluorfen/Imazethapyr	0.22/0.07	EP/LP	-	-	100	-	-	-	-	100	-	-	-	2431	-
Paraquat/Imazethapyr	0.1/0.07	EP/LP	-	100	100	100	-	-	99	100	100	-	1280	2190	1613
Chlorimuron	0.005	LP	-	74	- 98	-	-	74	-	100	-	100	5	-	2346
Chlorimuron+2,4-DB	0.005+0.45	LP	-	92	- 96	-	-	99	-	100		-	958	-	1864
Untreated check	-	-	0	0	0	0	0	0	0	0	0	0	779	1506	1506
LSD (0.05)			7	7	1	2	11	13	5	2	5	20	NS	NS	NS

[a]See Table 3 for days after treatment (DAT) for each application timing, experiment, and rating date. Early season ratings at Experiments 2 and 9 have two columns; first column is for EP treatments alone and second column is for EP followed by LP and LP treatments alone.

[b]EP and LP treatments were applied with 0.25% v/v nonionic surfactant. Exceptions were 2,4-DB alone (no additives applied); bentazon alone and bentazon + 2,4-DB received Dash at 1.2 L ha^{-1}.

season ratings on EP treatments were greater than 90% control, late season ratings were greater than 83% control, except imazethapyr + 2,4-DB in Experiment 4 and pyridate [*O*-(6-chloro-3-phenyl-4-pyridazinyl) *S*-octyl carbonothioate] in Experiment 9. EP applications of chlorimuron, bentazon + 2,4-DB and chlorimuron + 2,4-DB (Experiment 9) also provided greater than 90% control by the late season rating.

All EP fb LP sequential treatments provided at least 90% early season control and 86% late season control (Table 5). LP treatments of chlorimuron (Experiment 4) and chlorimuron + 2,4-DB (Experiments 2 and 4) provided greater than 91% control at both rating dates (Table 5).

Herbicides Applied EP to Eclipta Less than 10 cm Tall. EP treatments providing greater than 84% control at the early season rating in Experiment 6 were still providing greater than 85% control at the late season rating except the low bromoxynil rate (Table 6). In Experiment 8, similar results were obtained from early season ratings with bentazon, lactofen + 2,4-DB, bentazon + acifluorfen + 2,4-DB, and with bentazon, AC-263,222 + 2,4-DB, and bentazon + acifluorfen + 2,4-DB at the late season rating.

All EP fb LP sequential treatments were greater than 79% control at the early season rating (Table 6). By the late season rating, control exceeded 80% from all EP fb LP sequential treatments, except for bromoxynil fb acifluorfen in Experiment 8 which provided 65% control. In Experiment 6, early season control from chlorimuron + 2,4-DB applied LP was 92% but decreased to 48% control by late season (Table 6).

Herbicides Applied EP Either Alone or Repeated LP. A significant EP by EP fb LP treatment interaction was observed; therefore, these treatments were analyzed and presented separately. EP treatments of 2,4-DB, imazethapyr, and imazethapyr + 2,4-DB were the only treatments that did not provide at least 80% control 13 DAT (Table 7). However, by 95 DAT, only bromoxynil, lactofen, chlorimuron + 2,4-DB, lactofen + 2,4-DB, and bentazon + acifluorfen + 2,4-DB applied EP provided a minimum of 80% control.

Bromoxynil and bentazon + acifluorfen + 2,4-DB provided greater than 94% control season-long; therefore,

Table 6. Visual eclipta control and peanut pod yield from early postemergence (EP) treatments applied to eclipta 10 cm tall or less and late postemergence (LP) treatments applied to eclipta 25 cm tall or less (Experiments 6 and 8).

			Visual control rating[a]						Peanut pod yield	
			Early season				Late season			
		Applic.	Experiment no.							
Treatment[b]	Rate	timing	6	6	8	8	6	8	6	8
	kg ha^{-1}		--------------			%		--------------	-----kg ha^{-1}-----	
2,4-DB	0.45	EP	68	-	0	-	29	0	1816	3960
AC-263,222	0.07	EP	88	-	48	-	10	15	1831	4105
Acifluorfen	0.56	EP	85	-	15	-	30	0	1944	3531
Bentazon	1.12	EP	99	-	98	-	95	94	2136	4555
Bromoxynil	0.21	EP	98	-	44	-	75	45	1224	4931
Bromoxynil	0.28	EP	99	-	56	-	91	65	2192	5224
Bromoxynil	0.43	EP	-	-	71	-	-	70	-	4922
Chlorimuron	0.005	EP	89	-	40	-	54	0	1466	3422
Imazethapyr	0.07	EP	44	-	0	-	0	0	2025	2271
Lactofen	0.22	EP	75	-	60	-	15	41	1819	4927
Paraquat	0.14	EP	-	-	32	-	-	18	-	3733
Pyridate	1.57	EP	97	-	40	-	89	31	2013	4096
AC-263,222 + 2,4-DB	0.07 + 0.45	EP	-	-	75	-	-	89	-	5788
Acifluorfen + 2,4-DB	0.56 + 0.22	EP	97	-	66	-	86	28	1813	4489
Bentazon + 2,4-DB	0.56 + 0.22	EP	-	-	69	-	-	75	-	5044
Bromoxynil + 2,4-DB	0.28 + 0.22	EP	-	-	78	-	-	70	-	4393
Chlorimuron + 2,4-DB	0.005 + 0.45	EP	-	-	62	-	-	65	-	4915
Imazethapyr + 2,4-DB	0.07 + 0.45	EP	86	-	30	-	63	24	1876	4118
Lactofen + 2,4-DB	0.22 + 0.22	EP	-	-	85	-	-	65	-	5281
Pyridate + 2,4-DB	1.57 + 0.22	EP	-	-	61	-	-	59	-	5128
Bentazon + Acifluorfen 2:1	0.84	EP	98	-	-	-	94	-	2106	-
Bentazon + Acifluorfen	1.12 + 0.56	EP	-	-	76	-	-	64	-	5522
Bentazon + Acifluorfen + 2,4-DB	0.84 + 0.56 + 0.22	EP	99	-	88	-	-	9388	1846	4436
Bentazon + Paraquat	0.56 + 0.14	EP	-	-	32	-	-	15	-	4367
AC-263,222/Lactofen	0.07/0.22	EP/LP	-	99	-	-	100	-	1724	-
AC-263,222/Pyridate	0.07/1.57	EP/LP	-	99	-	-	100	-	1900	-
AC-263,222/2,4-DB	0.07/0.45	EP/LP	-	95	-	-	81	-	2016	-
Acifluorfen/Bromoxynil	0.56/0.28	EP/LP	-	-	-	92	-	90	-	3885
Bromoxynil/Acifluorfen	0.28/0.56	EP/LP	-	-	-	80	-	65	-	5172
Chlorimuron	0.005	LP	-	33	-	-	8	-	1412	-
Chlorimuron + 2,4-DB	0.005 + 0.45	LP	-	92	-	-	48	-	1667	-
Untreated check	-	-	0	0	0	0	0	0	1824	3890
LSD (0.05)			2	10	13	20	14	26	487	1333

[a]See Table 3 for days after treatment (DAT) for each application timing, experiment, and rating date. Early season ratings have two columns; first column is for EP treatments alone and second column is for EP followed by LP and LP treatments alone.

[b]EP and LP treatments were applied with 0.25% v/v non-ionic surfactant. Exceptions were 2,4-DB alone (no additives applied); bentazon alone and bentazon + 2,4-DB received Dash at 1.2 L ha^{-1}.

Table 7. Eclipta control and crop yield from early postemergence (EP) treatments and EP followed by late postemergence (LP) treatments (Experiment 7).

EP treatment[a]	Rate	Visual control rating 13 DAT	95 DAT	Peanut pod yield 160 DAP	LP treatment[a]	Visual control rating 23 DAT	57 DAT	Peanut pod yield 160 DAP
	kg ha^{-1}	--------- % ---------		kg ha^{-1}		---------- % ----------		kg ha^{-1}
2,4-DB	0.45	60	0	1783	Same	38	8	1702
AC-263,222	0.036	83	0	2255	Same	21	8	2163
Acifluorfen	0.56	89	0	2061	Same	68	43	2048
Bromoxynil	0.28	100	98	3095	None	100	98	2928
Chlorimuron	0.005	97	35	2966	Same	96	91	2697
Imazethapyr	0.036	46	0	2174	Same	0	0	1726
Lactofen	0.22	99	89	3345	Same	99	98	3354
Pyridate	1.57	96	59	3190	Same	96	85	3064
AC-263,222 + 2,4-DB	0.036 + 0.45	88	3	2228	Same	91	89	2736
Acifluorfen + 2,4-DB	0.56 + 0.22	96	50	2667	Same	94	90	2745
Chlorimuron + 2,4-DB	0.005 + 0.45	95	85	3161	Same	100	100	2835
Imazethapyr + 2,4-DB	0.036 + 0.45	75	0	2210	Same	45	29	2124
Lactofen + 2,4-DB	0.22 + 0.22	99	81	3071	Same	99	97	2727
Bentazon + Acifluorfen + 2,4-DB	0.84 + 0.56 + 0.22	100	95	3516	None	100	95	3274
Untreated check	-	0	0	2012	Same	0	0	2019
LSD (0.05)		4	9	606		4	8	598

[a]EP and LP treatments were applied with 0.25% v/v non-ionic surfactant, except 2,4-DB applied alone. LP treatments with 'Same' were identical to the respective EP treatments; LP treatments with 'None' did not receive a LP treatment but were visually rated and harvested.

these two treatments did not require a repeat treatment (LP application). All other treatments received a LP treatment which was identical to the respective EP treatment. EP fb LP treatments 23 DAT gave greater than 90% control, except 2,4-DB, AC-263,222, acifluorfen, imazethapyr, and imazethapyr + 2,4-DB (Table 7). EP fb LP treatments providing greater than 90% control 23 DAT still had greater than 84% control 57 DAT.

Eclipta Control Over Experiments

EP treatments (appearing in a minimum of three experiments) which consistently provided greater than 80% control at the early season rating were AC-263,222, acifluorfen + 2,4-DB, bentazon, bentazon + acifluorfen + 2,4-DB, bromoxynil, chlorimuron, chlorimuron + 2,4-DB, imazethapyr + 2,4-DB, lactofen, lactofen + 2,4-DB, and pyridate (data not shown). However, by the late season rating, only bentazon, bentazon + acifluorfen + 2,4-DB, and bromoxynil at 0.28 kg ha^{-1} provided 80% control or greater. These were the three most consistent EP treatments.

Peanut Response

Peanut Injury. Injury (leaf yellowing) from herbicides did not exceed 10% at the early season rating (data not shown). By the late season rating, no injury was observed.

Peanut Yield. Peanut pod yields were not significantly greater than the untreated check for any herbicide treatment in Experiments 1-6 (Tables 4-6). However, when herbicide(s) were applied, peanut pod yields were numerically higher than the untreated check in Experiments 1-4 (Tables 4 and 5). In Experiment 7, EP treatments providing greater than 94% control 13 DAT increased peanut pod yields over the untreated check (Table 7). Similarly, EP fb LP treatments providing greater than 90% control 23 DAT (greater than 84% control 57 DAT) increased peanut pod yields over the untreated check. In Experiment 8, peanut pod yields were higher than the untreated check with the medium bromoxynil rate, AC-263,222 + 2,4-DB lactofen + 2,4-DB, and bentazon + acifluorfen applied EP (Table 6).

Peanut Grades. No significant differences were detected between any treatments (data not shown). Therefore, full season eclipta interference did not reduce peanut grades in these experiments.

Summary and Conclusions

Fomesafen was the only PRE-applied herbicide that controlled eclipta for the entire season. The most consistent EP treatments were bromoxynil at higher rates, bentazon, and bentazon + acifluorfen + 2,4-DB. EP fb LP sequential treatments were effective for POST-applied herbicides for season long eclipta control especially when EP treatments were applied to eclipta 5 cm tall or less.

Statistical differences in peanut pod yields were seldom encountered. Peanut pod yields were usually only numerically higher when herbicide(s) were applied compared to the untreated check. Since eclipta serves as a host for Sclerotinia blight, a major benefit from eclipta control may lie in reducing the chance of spreading this disease in peanut fields.

Based on these data, current recommendations in this area should rely initially on eclipta size. After eclipta has emerged, any delay in herbicide application timing will likely result in decreased effectiveness. Eclipta can be controlled, but it may require continuous efforts throughout the growing season.

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