# Imidazolinone Herbicide Systems for Peanut (*Arachis hypogaea* L.)

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**ABSTRACT**

Field studies conducted in 1990 and 1991 at five locations in Georgia and one location in Virginia in 1991 evaluated imazethapyr [2-[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1*H*-imidazol-2-yl]-5-ethyl-3-pyridinecarboxylic acid] and AC 263,222 [(±)-2[4,5-dihydro-4-methyl-4-(1-methylethyl)-5-oxo-1*H*-imidazol-2-yl]-5-methyl-3-pyridinecarboxylic acid] for weed control, peanut tolerance, and yield. Imazethapyr and AC 263,222 applied early postemergence (EPOST) controlled smallflower morningglory [*Jacquemontia tamnifolia* (L.) Griseb], *Ipomoea* morningglory species, prickly sida (*Sida spinosa* L.), and coffee senna (*Cassia occidentalis* L.) greater than 90%. Imazethapyr did not control Florida beggarweed [*Desmodium tortuosum* (SW.) DC.] or sicklepod (*Cassia obtusifolia* L.) adequately, with control generally less than 40%. AC 263,222 controlled Florida beggarweed greater than 92% when applied EPOST and from 54 to 100% when applied postemergence (POST). Imazethapyr applied preplant incorporated (PPI) controlled bristly starbur (*Acanthospermum hispidium* DC.) 89% and imazethapyr and AC 263,222 applied EPOST controlled at least 96%. Imazethapyr controlled yellow nutsedge (*Cyperus esculentus* L.) 83% when applied PPI and 93% as an EPOST application. AC 263,222 controlled yellow nutsedge at least 90%. Peanut yields were higher with AC 263,222 than with imazethapyr. Imazethapyr systems that included alachlor (2-chloro-*N*-(2,6-diethylphenyl)-N-(methoxymethyl)acetamide), lactofen ([(±)2-ethoxy-1-methyl-2-oxoethyl 5-[2-chloro-4-(trifluoromethyl)phenoxy]-2-nitrobenzoate] + 2,4-DB [4-(2,4-dichlorophenoxy)butanoic acid], paraquat [1,1'-dimethyl-4,4'-bipyridinium ion] + 2,4-DB, pyridate [O-(6-chloro-3-phenyl-4-pyridazinyl)-S-octyl carbonothioate] + 2,4-DB, metolachlor [2-chloro-*N*-(2-ethyl-6-methylphenyl)-*N*-(2-methoxy-1-methylethyl)acetamide], or 2,4-DB provided yields equivalent to AC 263,222.

Key Words: Bristly starbur (*Acanthospermum hispidum* DC.), coffee senna (*Cassia occidentalis* L.), Florida beggarweed [Desmodium tortuosum (SW.) DC.], *Ipomoea* morningglories, prickly sida (*Sida spinosa* L.), sicklepod (*Cassia obtusifolia* L.), smallflower morningglory [*Jacquemontia tamnifolia* (L.) Griseb], yellow nutsedge (*Cyperus esculentus* L.).

Imazethapyr, an imidazolinone herbicide, was registered for use in peanut in spring 1991. Imazethapyr was the first herbicide in peanut to provide broad spectrum residual annual broadleaf weed and perennial sedge control (1, 2, 6, 11, 12, 17, 19, 20).

In Virginia, imazethapyr controlled eclipta (*Eclipta prostrata* L.), *Ipomoea* morningglory species, prickly sida, and spurred anoda [*Anoda cristata* (L.) Schlecht.] (19, 20).

Imazethapyr does not control Florida beggarweed and sicklepod (10, 11, 17, 22), the two most common and troublesome annual broadleaf weeds in southeastern peanut production (3). Other herbicides registered in peanut for Florida beggarweed and/or sicklepod control include paraquat, pyridate, and 2,4-DB (4, 8, 11, 22, 23).

AC 263,222 also an imidazolinone, is under development for use in peanut and soybean (*Glycine max* L.) (7, 13, 14, 17, 21). AC 263,222 in soybean research controlled sicklepod and *Ipomoea* morningglory species (7, 24, 25). The objectives of this research were 1) to evaluate imazethapyr alone and in a systems approach for weed control, peanut tolerance, and peanut yield, and 2) to evaluate AC 263,222 for weed control, peanut tolerance, and peanut yield, and 3) to compare AC 263,222 with imazethapyr for weed management in peanut.

## Materials and Methods

Experiments were conducted at the Southwest Branch Station near Plains, GA in 1990 and 1991; producers' fields near Chula, GA in 1991 and Smithfield, VA in 1990; the Attapulgus Research Farm near Attapulgus, GA in 1991; and the Southeast Branch Station near Midville, GA in 1991. Soil type in Plains was a Greenville sandy clay loam (clayey, kaolinitic, thermic Rhodic Kandiudults), with 1.1% organic matter and pH of 6.0 and 6.1 in 1990 and 1991, respectively. In Attapulgus, Chula, and Midville the soil was a Dothan sandy loam (fine-loamy, siliceous, thermic Kandiudults) with 0.7 to 1.2% organic matter and soil pH was from 5.1 to 6.4. The soil at Smithfield, VA was a Eunola fine-loamy sand (siliceous, thermic, Aquic Hapludults) with 1.1% organic matter and soil pH was 6.0. These experimental sites are representative of major peanut producing areas in Georgia and Virginia.

The weeds infesting each experimental area were different and are listed in Table 1 along with the growth stage and density of weeds at the time of various herbicide applications. Florunner peanut was used at all Georgia locations except Attapulgus in 1991 where the cultivar used was Southern Runner. In Virginia the cultivar was NC 7. Peanut seed were planted 5 cm deep at 112 kg $ha^{-1}$ for Florunner, 168 kg $ha^{-1}$ for Southern Runner, and 133 kg $ha^{-1}$ for NC 7 in a well-prepared flat seedbed using conventional equipment. A higher seeding rate was used for Southern Runner because of poor germination and seedling growth characteristics of this cultivar[2]. All herbicides were applied either PPI, EPOST within one wk of crop emergence, or POST at 3 wk after crop emergence. All EPOST and POST applications included a nonionic surfactant[3] at 0.25% by vol of spray volume.

Twelve herbicide systems which consisted of combinations of PPI, EPOST, and POST-applied herbicides were evaluated. Pendimethalin at 1.12 kg ai $ha^{-1}$ was applied PPI to the entire experimental areas for control of annual grasses and small seeded annual broadleaf weeds (22). System one received only pendimethalin PPI. Since pendimethalin was applied to all plots it will not be mentioned in describing the following systems. Systems two and three were imazethapyr at 71 g ai $ha^{-1}$ (rate for all imazethapyr applications in the study) applied PPI and EPOST, respectively; systems four and five were imazethapyr applied EPOST tank mixed with metolachlor at 2.5 kg ai $ha^{-1}$ or alachlor at 3.0 kg ai $ha^{-1}$, respectively; systems six through nine were imazethapyr applied EPOST followed by (fb) (6) paraquat at 140 g ai $ha^{-1}$ plus 2,4-DB at 280 g ae $ha^{-1}$ applied POST (rate for 2,4-DB in this study), (7) pyridate at 1.05 kg ai $ha^{-1}$ + 2,4-DB applied POST, (8) lactofen at 280 g ai $ha^{-1}$ + 2,4-DB applied POST, or (9) 2,4-DB applied POST. Systems 10 and 11 were AC 263,222 applied EPOST or POST at 71 g $ha^{-1}$ (rate for AC 263,222 used in this study), and system 12 was AC 263,222 + 2,4-DB applied POST. Lactofen is a herbicide under development in peanut that has potential for control or suppression of common lambsquarters (*Chenopodium album* L.) and Florida beggarweed (9, 18, 22).

A randomized complete block design with three replicates was used. All

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[3]X-77 (a mixture of alkyaryl polyoxyethylene glycols, free fatty acids, and isopropanol). Valent U.S.A. Corp., P. O. Box 8025, Walnut Creek, CA 94596-8025.

herbicides were applied with a $CO_2$ backpack sprayer calibrated to deliver 187 L $ha^{-1}$ at 180 kPa. Weed control was visually estimated on a scale of 0% (no control) to 100% (complete control) based on population density and plant vigor. Peanut tolerance was visually estimated on a scale of 0% (no injury) to 100% (complete death). Peanut yields were harvested using conventional harvesting equipment (26). Peanut were not harvested at the Virginia location because of ASCS restrictions.

All visual estimates of weed control data were arc sin transformed prior to analysis of variance but are expressed in their original form for clarity. Weed control ratings and crop yield were subjected to analysis of variance and means were compared with appropriate Fisher's Protected Least Significant Difference (LSD) Test at the 5% level of probability. Significant year by treatment interactions precluded pooling of weed control data for Florida beggarweed and sicklepod. Consequently, this data will be presented by location. All other data are combined for presentation.

# Results and Discussion

**Weed control,** *Annual grasses*. Pendimethalin provided excellent control of the annual grasses found in these tests which included Texas panicum (*Panicum texanum* Buckl.), large crabgrass (*Digitaria sanguinalis* (L.) Scop.),

**Table 1. Annual broadleaf weed species and yellow nutsedge growth stage and density at the time of herbicide application in Georgia and Virginia.**

| Location | Year | Broadleaf weed species and yellow nutsedge | Leaf growth stage or plant height | Density | Application timing |
|---|---|---|---|---|---|
| | | | # of leaves | No. $m^{-2}$ | |
| Attapulgus, GA | 1991 | Coffee senna | C-2L | 15 | EPOST |
| | | " " | C-6L | 10 | POST |
| | 1991 | *Ipomoea* spp. | Cot | 10 | EPOST |
| | | " " | C-vining | 15 | POST |
| | 1991 | Sicklepod | C-2L | 20 | EPOST |
| | | " | C-8L | 25 | POST |
| | 1991 | Smallflower morningglory | Cot | 55 | EPOST |
| | | " " | C-6L | 50 | POST |
| | 1991 | Yellow nutsedge | 5-10 cm | 25 | EPOST |
| | | " " | 25-36 cm | 40 | POST |
| Chula, GA | 1991 | Bristly starbur | C-2L | 20 | EPOST |
| | | " " | C-5L | 25 | POST |
| | 1991 | Florida beggarweed | C-2L | 200 | EPOST |
| | | " " | C-5L | 230 | POST |
| | 1991 | *Ipomoea* spp. | C-2L | 7 | EPOST |
| | | " " | C-5L | 5 | POST |
| | 1991 | Smallflower morningglory | C-2L | 10 | EPOST |
| | | " " | C-5L | 7 | POST |
| Midville, GA | 1991 | *Ipomoea* spp. | Cot | 8 | EPOST |
| | | " " | C-3L | 11 | POST |
| | 1991 | Prickly sida | Cot | 20 | EPOST |
| | | " " | C-4L | 25 | POST |
| | 1991 | Yellow nutsedge | 5-10 cm | 10 | EPOST |
| | | " " | 20-40 cm | 15 | POST |
| Plains, GA | 1990 | Florida beggarweed | C-2L | 15 | EPOST |
| | | " " | C-6L | 20 | POST |
| | 1990 | *Ipomoea* spp. | C-3L | 60 | EPOST |
| | | " " | Vining | 60 | POST |
| | 1990 | Prickly sida | C-2L | 30 | EPOST |
| | | " " | C-4L | 35 | POST |
| | 1990 | Sicklepod | C-2L | 60 | EPOST |
| | | " | C-8L | 50 | POST |
| | 1990 | Smallflower morningglory | C-1L | 30 | EPOST |
| | | " " | C-4L | 25 | POST |
| Plains, GA | 1991 | Florida beggarweed | C-2L | 20 | EPOST |
| | | " " | C-5L | 10 | POST |
| | 1991 | *Ipomoea* spp. | C-1L | 70 | EPOST |
| | | " " | C-4L | 70 | POST |
| | 1991 | Sicklepod | C-1L | 60 | EPOST |
| | | " | C-5L | 70 | POST |
| | 1991 | Smallflower morningglory | C-1L | 15 | EPOST |
| | | " " | C-5L | 10 | POST |
| Smithfield, VA | 1990 | Jimsonweed | 2L | 27 | EPOST |
| | | " | 5L | 25 | POST |
| | 1990 | *Ipomoea* spp. | C-2L | 36 | EPOST |
| | | " " | C-5L | 40 | POST |
| | 1990 | Yellow nutsedge | 7-10 cm | 35 | EPOST |
| | | " " | 25 cm | 25 | POST |

fall panicum *(Panicum dichotomiflorum* Mich.), and broadleaf signalgrass (*Brachiaria platyphylla* (Griseb.) Nash.) (data not shown). Pendimethalin does not have appreciable activity on the large seeded broadleaf weed species or yellow nutsedge found in these studies, consequently this herbicide will not be discussed further (22).

**Jimsonweed**. Jimsonweed was controlled at least 90% by all systems that used either imazethapyr or AC 263,222 (data not shown). Jimsonweed is extremely sensitive to imazethapyr at rates as low as 53 g $ha^{-1}$ (10).

**Smallflower morningglory.** Imazethapyr alone, applied either PPI or EPOST, all imazethapyr-containing systems, and all AC 263,222 applications controlled smallflower morningglory at least 99% (Table 2). Both AC 263,222 and imazethapyr have shown excellent control of smallflower morningglory in past research (10, 11, 13, 17, 21).

**Ipomoea morningglory species.** The *Ipomoea* morningglory species complex included entireleaf (*Ipomoea hederacea* var. *integriuscula* Gray), ivyleaf [*Ipomoea hederacea* (L.) Jacq.], pitted (*Ipomoea lacunosa* L.), and tall morningglory [*Ipomoea purpurea* (L.) Roth.]. These *Ipomoea* species did not exhibit a differential response to the herbicide(s) in this research (10, 11, 13, 16, 17, 18, 19, 20), consequently data has been combined for presentation. Both imazethapyr and AC 263,222 controlled the *Ipomoea* morningglories at least 91% (Table 2). AC 263,222 was more effective than imazethapyr applied either PPI, PRE, or EPOST. Control from EPOST application of imazethapyr was improved when tank mixed with either alachlor or metolachlor, or fb either 2,4-DB (POST) or 2,4-DB + lactofen, paraquat, or pyridate (POST). The control provided by AC 263,222 was not improved by the addition of 2,4-DB. Although imazethapyr controls *Ipomoea* morningglories applied either PPI, PRE, EPOST, or POST (19, 20), maximum control is otained with EPOST applications on small *Ipomoea* morningglories (10). Lactofen and pyridate also are effective against small *Ipomoea* morningglories (9, 16, 18, 22). *Ipomoea* morningglories are sensitive to 2,4-DB, although pitted morningglory is more tolerant (22).

**Yellow nutsedge**. Yellow nutsedge control was 83% with imazethapyr applied PPI and at least 90% with all other systems that contained either imazethapyr or AC 263,222 (Table 2). The addition of either alachlor or metolachlor to imazethapyr applied EPOST did not improve control compared to imazethapyr applied alone. Control from imazethapyr applied EPOST was not improved when fb any POST treatment. AC 263,222 controlled yellow nutsedge at least 90% as either EPOST or POST application. Grichar et. al (6) reported variable yellow nutsedge control with imazethapyr at 70 g $ha^{-1}$. They also reported better yellow nutsedge control with imazethapyr + metolachlor compared to metolachlor alone (6). Imazethapyr controls small yellow nutsedge (less than 8 cm tall) and control is obtained primarily through soil absorption (12). Since control is primarily through soil absorption, dry conditions after soil or foliar application would limit root absorption and reduce control (15). AC 263,222 controls yellow nutsedge both through soil and/or foliar absorption (14). Bentazon, paraquat, and pyridate also may control yellow nutsedge (22). However, several applications generally are required since none of these herbicides are extensively translocated (5, 22).

**Prickly sida**. Imazethapyr controlled prickly sida at least 91% when applied either PPI or EPOST (Table 2). No subsequent POST treatment improved control compared, to that obtained with imazethapyr alone. However, prickly sida control from imazethapyr tank mixed with either alachlor or metolachlor applied EPOST, or imazethapyr alone applied EPOST fb a POST application of 2,4-DB,

**Table 2. Influence of herbicide systems on weed control in Georgia and Virginia, 1990-1991.**

| Herbicide applications | | | Weed species | | | | | |
|---|---|---|---|---|---|---|---|---|
| PPI | EPOST | POST | Smallflower morningglory | Ipomoea morningglory | Yellow nutsedge | Prickly sida | Bristly starbur | Coffee senna |
| | | | % | | | | | |
| Imaz. | —— | —— | 99 | 93 | 83 | 91 | 89 | 96 |
| —— | Imaz. | —— | 99 | 91 | 93 | 94 | 96 | 100 |
| —— | Imaz. + metol. | —— | 100 | 96 | 93 | 100 | 99 | 100 |
| —— | Imaz. + alac. | —— | 100 | 96 | 97 | 100 | 99 | 99 |
| —— | Imaz. | Para. + 2,4-DB | 100 | 99 | 90 | 100 | 100 | 100 |
| —— | Imaz. | Pyri. + 2,4-DB | 100 | 99 | 96 | 100 | 100 | 100 |
| —— | Imaz. | Lact. + 2,4-DB | 100 | 100 | 92 | 100 | 100 | 100 |
| —— | Imaz. | 2,4-DB | 100 | 100 | 90 | 97 | 100 | 98 |
| | | | 100 | 99 | 93 | 100 | 100 | 100 |
| —— | —— | AC 263 | 100 | 99 | 94 | 98 | 100 | 100 |
| —— | —— | AC 263 + 2,4-DB | 100 | 100 | 90 | 98 | 100 | 100 |
| —— | —— | —— | 0 | 0 | 0 | 0 | 0 | 0 |
| LSD (0.05) | | | 1 | 4 | 10 | 6 | 7 | 4 |

tank mixed with either lactofen, paraquat, or pyridate were superior to imazethapyr alone applied PPI. AC 263,222 controlled prickly sida 98 to 100% with either EPOST or POST application. Imazethapyr has been shown in past research to provide good prickly sida control applied either PPI or PRE (19, 20). POST application of imazethapyr should be limited to prickly sida with less than three true leaves for adequate control (10, 19, 20, 22). Pyridate and lactofen also provide POST control of prickly sida (9, 18, 22). Generally paraquat is not an effective POST treatment for prickly sida control (16, 22).

**Bristly starbur**. Imazethapyr applied alone either PPI or EPOST controlled bristly starbur 89% and 96%, respectively (Table 2). All other imazethapyr-containing systems provided statistically equivalent control. All AC 263,222-containing systems provided complete control. Bristly starbur must be less than 4 cm tall for effective postemergence control with either imazethapyr or AC 263,222 (22). At present, the only registered herbicide in peanut for bristly starbur control other than imazethapyr is bentazon applied POST (22). Bentazon does not provide residual control (22).

**Coffee senna**. Coffee senna control was near complete with either imazethapyr or AC 263,222, regardless of application method (Table 2). Imazethapyr controls coffee senna as a soil application or when applied EPOST to coffee senna at less than two leaves growth stage (11, 17). AC 263,222 applied EPOST will control coffee senna with at least four true leaves growth stage (Wilcut, unpublished data). No other herbicide registered in peanut controls both coffee senna and sicklepod (22).

**Sicklepod**. Imazethapyr alone applied either PPI or EPOST controlled sicklepod less than 50% (Table 3). Similar results have been previously reported (10, 11, 17, 22); and the addition of alachlor or metolachlor to imazethapyr applied EPOST did not improve control. All POST applications following imazethapyr EPOST improved control compared to imazethapyr alone, among which paraquat + 2,4-DB was the most consistent. Both paraquat and 2,4-DB are effective for sicklepod control (4, 11, 22, 23). At Attapulgus in 1991 and Plains in 1990, imazethapyr applied EPOST fb paraquat + 2,4-DB controlled sicklepod equivalent to the AC 263,222 systems. AC 263,222 controlled sicklepod at least 93% across all locations and regardless of application method. Control from AC 263,222 was not improved by addition of 2,4-DB. AC 263,222 at the rate used in this study has previously shown excellent sicklepod control (13, 17, 21).

**Florida beggarweed**. Imazethapyr alone applied PPI or EPOST controlled Florida beggarweed less than 40% (Table 4). Imazethapyr tank mixed with either alachlor or metolachlor and applied EPOST improved control over imazethapyr alone at Plains in 1990 and 1991. Similar results have been seen when either alachlor or metolachlor were tank mixed with either paraquat or paraquat + bentazon (4). Florida beggarweed control with POST applications varied with location. Imazethapyr applied EPOST, fb paraquat + 2,4-DB POST completely controlled Florida beggarweed at Plains in 1990. Equivalent control also was provided by imazethapyr EPOST, fb pyridate + 2,4-DB, or lactofen + 2,4-DB POST, and AC 263,222 applied POST with and without 2,4-DB. At Plains in 1991, greatest Florida beggarweed control was with imazethapyr applied EPOST fb paraquat + 2,4-DB, AC 263,222 applied EPOST or POST, and AC 263,222 + 2,4-DB applied POST. At Chula in 1991, AC 263,222 applied EPOST and AC 263,222 + 2,4-DB applied POST controlled Florida beggarweed 93% and 79%, respectively. AC 263,222 should be applied EPOST for greatest efficacy on Florida beggarweed (13, 17, 21). AC 263,222 is much more effective

**Table 3. Influence of herbicide systems on sicklepod control in Georgia. 1990-1991.**

| Herbicide applications | | | Sicklepod control | | |
|---|---|---|---|---|---|
| PPI | EPOST | POST | Plains 91 | Plains 90 | Attapulgus 91 |
| | | | % | | |
| Imaz. | —— | —— | 15 | 35 | 30 |
| —— | Imaz. | —— | 17 | 38 | 46 |
| —— | Imaz. + metol. | —— | 27 | 40 | 41 |
| —— | Imaz. + alac. | —— | 36 | 48 | 48 |
| —— | Imaz. | Para. + 2,4-DB | 83 | 91 | 99 |
| —— | Imaz. | Pyri. + 2,4-DB | 50 | 100 | 82 |
| —— | Imaz. | Lact. + 2,4-DB | 50 | 93 | 75 |
| —— | Imaz. | 2,4-DB | 55 | 80 | 65 |
| —— | AC 263 | —— | 94 | 100 | 95 |
| —— | —— | AC 263 | 100 | 100 | 93 |
| —— | —— | AC 263 + 2,4-DB | 100 | 100 | 100 |
| —— | —— | —— | 0 | 0 | 0 |
| LSD (0.05) | | | 11 | 5 | 18 |

**Table 4. Influence of herbicide systems on Florida beggarweed control in Georgia. 1990-1991.**

| Herbicide applications | | | Florida beggarweed control | | |
|---|---|---|---|---|---|
| PPI | EPOST | POST | Plains 90 | Plains 91 | Chula 91 |
| | | | % | | |
| Imaz. | —— | —— | 37 | 0 | 0 |
| —— | Imaz. | —— | 12 | 17 | 0 |
| —— | Imaz. + metol. | —— | 45 | 30 | 0 |
| —— | Imaz. + alac. | —— | 45 | 39 | 15 |
| —— | Imaz. | Para. + 2,4-DB | 100 | 84 | 17 |
| —— | Imaz. | Pyri. + 2,4-DB | 87 | 44 | 27 |
| —— | Imaz. | Lact. + 2,4-DB | 82 | 20 | 0 |
| —— | Imaz. | 2,4-DB | 67 | 0 | 0 |
| —— | AC 263 | —— | 100 | 97 | 93 |
| —— | —— | AC 263 | 95 | 89 | 54 |
| —— | —— | AC 263 + 2,4-DB | 100 | 86 | 79 |
| —— | —— | —— | 0 | 0 | 0 |
| LSD (0.05) | | | 26 | 14 | 21 |

for Florida beggarweed control than imazethapyr (13), as evidenced by this data.

This research shows that both AC 263,222 and imazethapyr control smallflower and *Ipomoea* morningglory species, yellow nutsedge, prickly sida, bristly starbur, jimsonweed, and coffee senna. Imazethapyr generally must be applied postemergence to smaller weeds than AC 263,222 (Wilcut, unpublished data). AC 263,222 controlled sicklepod and Florida beggarweed better than imazethapyr. AC 263,222 controlled all of the aforementioned weeds equivalent to the imazethapyr systems. No registered herbicide in peanut controls coffee senna, Florida beggarweed, sicklepod, and yellow nutsedge (22).

**Peanut response, peanut injury**. Peanut injury was 19 to 23% at three wks after POST treatment with paraquat + 2,4-DB; AC 263,222; and AC 263,222 + 2,4-DB (Table 6). Visible symptoms of injury were not apparent at eight wks after treatment (data not shown).

**Peanut yield**. All EPOST and POST treatments improved yield compared to pendimethalin alone (Table 5). Addition of either alachlor or metolachlor to imazethapyr applied EPOST did not improve yields compared to imazethapyr EPOST alone. Yields from imazethapyr applied EPOST were not improved by any subsequent POST treatment. However, all systems with imazethapyr applied EPOST, fb any POST treatment yielded equivalent to the highest yielding AC 263,222 systems. Peanut yields from AC 263,222 applied EPOST or POST were greater than imazethapyr applied PPI or EPOST. The addition of 2,4-DB to AC 263,222 applied POST did not improve yield compared to AC 263,222 applied POST alone.

AC 263,222 shows excellent potential for yellow nutsedge and annual broadleaf weed control in peanut with good peanut tolerance (13, 21).


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**Table 5. Influence of herbicide systems on peanut injury and yield in Georgia and Virginia. 1990-1991.**

| Herbicide applications | | | | |
|---|---|---|---|---|
| PPI | EPOST | POST | Peanut injury | Peanut yield |
| | | | % | kg ha$^{-1}$ |
| Imaz. | —— | —— | 0 | 3610 |
| —— | Imaz. | —— | 0 | 3720 |
| —— | Imaz. + metol. | —— | 3 | 3880 |
| —— | Imaz. + alac. | —— | 0 | 4140 |
| —— | Imaz. | Para. + 2,4-DB | 23 | 4370 |
| —— | Imaz. | Pyri. + 2,4-DB | 0 | 4070 |
| —— | Imaz. | Lact. + 2,4-DB | 8 | 3860 |
| —— | Imaz. | 2,4-DB | 0 | 3940 |
| —— | AC 263 | —— | 2 | 4600 |
| —— | —— | AC 263 | 19 | 4560 |
| —— | —— | AC 263 + 2,4-DB | 20 | 4540 |
| —— | —— | —— | 0 | 2130 |
| LSD (0.05) | | | 5 | 770 |

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