Evaluation of Preemergence Herbicides for Early Season Onion Weed Control

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Abstract

Two experiments were conducted to determine the efficacy and safety of soil applied broadcast preemergent herbicides including Nortron, Prowl, Prefar, and Prefar + Prowl combinations applied at planting to fall seeded dry bulb onions. Crop stand reductions ranging from 10 to 33 percent resulted from Prowl 3.3EC use rates of 1.2 and 2.4 pt/acre. Prowl 3.3EC applied at 0.6 pt/acre, Prefar 4E applied at 4 and 6 qt/acre, Nortron 4SC applied at 2 pt/acre, and the combination of 0.6 pt Prowl 3.3 EC plus Prefar 4E were safe on fall seeded onions. Prefar plus Prowl combinations also provided winter weed control equal to or better than the standard 14 lb/acre Dacthal 75WP.

Introduction

Most growers rely on soil surface applied DCPA for preemegence control of summer annual weeds during stand establishment of fall planted onions. Dacthal W-75 (DCPA) applied at 6-14 pounds product/acre at seeding provides excellent preemergent weed control in slow to establish onions. With the recent phase out and loss of increasingly expensive Dacthal herbicide, onion growers need an alternative preemergent herbicide.

Several preemergent herbicides have been examined for efficacy and safety in fall seeded onions. These materials include Nortron (ethofumesate) applied at rates from 1-2 lb a.i./acre (2-4 pt 4SC/acre) as part of an IR-4 project, Prefar (bensulide) applied at rates from 4-6 lb a.i./acre (4-6 qt 4EC/acre) , and Prowl (pendimethalin) applied at rates from 0.25-1 lb a.i./acre (0.6-2.4 pt 3.3EC/acre).

In previous field experiments, Nortron at 1-2 lb a.i./acre was safe on fall seeded onions, however the material provided only marginal control of light to moderate annual broadleaf weed infestations. However, Nortron can be applied preemergence to reduce competition with purple nutsedge. Prefar at 4 lb a.i./acre was safe on onions, while Prefar applied at 6 lb a.i./acre resulted in slight stand reductions ranging from 5-10 percent. Prefar provided good annual broadleaf weed control. Prowl applied at 1 lb a.i./acre resulted in serious crop injury (as high at 62-88% stand reduction),while Prowl applied at 0.5 lb a.i./acre resulted in some stand loss (5-35% reduction), and Prowl applied at 0.25 lb a.i./acre was safe on fall seeded onions. Prowl provided good to excellent control of annual grass and broadleaf weeds. Prefar at 4 lb a.i./acre combined with Prowl at 0.25-0.375 lb a.i./acre was safe on fall seeded onions and provided preemergent weed control equal to that obtained with Dacthal at 14 lb product/acre.

Two experiments were conducted to determine the efficacy and safety of soil applied preemergent herbicides including Nortron, Prowl, Prefar, and Prefar + Prowl combinations applied at planting to fall seeded dry bulb

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onions.

Materials and Methods

Two field experiments were conducted during fall, 1998 in Parker Valley located in western La Paz County to evaluate the efficacy and safety of soil applied preemergent herbicides including Nortron, Prowl, and Prefar in fall seeded dry bulb onions. These herbicides were also compared to a growers standard consisting of 14 lbs Dacthal/acre and untreated check plots. The two sites were within commercial onion fields at CRIT Farms and Buckelew Farms. The CRIT Farm site had a silt loam soil and the Buckelew Farm site had a sandy loam soil texture. Onion seeds were planted at a 1/2-3/4 inch depth in four rows in conventional 40 inch wide raised beds and the field was furrow irrigated.

Treatments included an untreated check, Dacthal 75WP at 14 lb/acre, Nortron 4SC at 2 and 4 pt/acre (1 and 2 lb a.i.), Prefar 4E at 4 and 6 qt/acre (4 and 6 lb a.i.), Prowl 3.3 EC at 1.2 and 2.4 pt/acre (0.5 and 1 lb a.i.), and two combinations of Prefar at 4 lb a.i./acre or Nortron at 2 lb a.i./acre plus Prowl at 0.25 and 0.5 lb a.i./acre. The Nortron treatments were not applied at Buckelew Farms. Each plot was two beds wide by 30 feet long and each treatment was replicated four times in a randomized complet block experimental design.

All herbicide applications were made with a CO2 backpack sprayer with a hand held boom equipped with four flat fan 8002 nozzles. Herbicide treatments were broadcast applied in 26 gpa water pressurized at 40 psi. All test sites were irrigated within one to two days of herbicide application. Onions were planted and herbicide treatments applied on October 15, 1998 at the CRIT Farm site and October 22 at the Buckelew Farm site. Weed control ratings and stand counts were taken on December 11.

Results and Discussion

Early season weed competition/pressure was negligible to nonexistent at the CRIT Farm site. Thus, no winter weeds were present at the December 11 weed rating, so only stand counts were taken. Untreated onion plots had an average of 227,000 onion plants/acre.

Onion stand reductions of less than 10% resulted from the following surface broadcast preemergent herbicide applications: 14 lb/acre Dacthal 75WP, 1.2 pt/acre Prowl 3.3EC, 4 and 6 qt/acre Prefar 4E, 2 pt/acre Nortron 4SC, and the combinations of 4 qt/acre Prefar 4E plus 0.6 and 1.2 pt/acre Prowl 3.3EC (Table 1). Onion stand reductions ranging from 11-20% resulted from the applications of 4 pt/acre Nortron 4SC and the combination of 1.2 pt/acre Prowl 3.3EC plus 4 pt/acre Nortron 4SC. Onion stand reductions exceeded 20% when Prowl 3.3EC was applied at 2.4 pt/acre.

Weed pressure was high at the Buckelew Farm site. Moderate infestations of nettleleaf goosefoot (*Chenopodium murale*), shepherdspurse (*Capsella bursa-pastoris*), and littleseed canarygrass (*Phalaris minor*), and light infestations of little mallow (*Malva parviflora*) were observed in untreated check plots. Untreated onion plots had an average of 256,000 onion plants/acre.

Onion stand reductions of less than 10% resulted from the following surface broadcast preemergent herbicide applications: 14 lb/acre Dacthal 75WP, 4 and 6 qt/acre Prefar 4E, and the combination of 4 qt/acre Prefar 4E plus 0.6 pt/acre Prowl 3.3EC (Table 2). Onion stand reductions ranging from 11-20% resulted from the applications of 1.2 pt/acre Prowl 3.3EC and the combination of 1.2 pt/acre Prowl 3.3EC plus 4 qt/acre Prefar 4E. Onion stand reductions exceeded 30% when Prowl 3.3EC was applied at 2.4 pt/acre.

Prowl and the Prowl plus Prefar combinations provided excellent nettleleaf goosefoot (80-99%), sheperdspurse (78-

99%), canarygrass (86-93%), and little mallow (99%) control that was equal to or better than that obtained with Dacthal. Prowl applied alone provided fair (78%) shepherdspurse control at safe use rates. Prefar applied alone provided fair nettleleaf goosefoot (63-75%) and shepherdspurse (43-61%) control.

Table 1. Onion stand reduction resulting from the surface broadcast herbicide applications at the CRIT Farm site.

Herbicide				Onion Stand * Reduction (%)
Name	Form	a.i./ acre	actual/ acre	
None	------	-------	-----	0 d
Dacthal	75 WP	10.5 lb	14 lb	3 cd
Prowl	3.3 EC	0.5 lb	1.2 pt	10 bc
Prowl	3.3 EC	1.0 lb	2.4 pt	21 a
Prefar	4 E	4 lb	4 qt	8 bcd
Prefar	4 E	6 lb	6 qt	10 bc
Nortron	4 SC	1 lb	2 pt	8 bcd
Nortron	4 SC	2 lb	4 pt	11 bc
Prowl + Nortron	3.3 EC 4 SC	0.5 lb 2 lb	1.2 pt 4 pt	16 ab
Prowl + Prefar	3.3 EC 4 E	0.25 lb 4 lb	0.6 pt 4 qt	7 cd
Prowl + Prefar	3.3 EC 4 E	0.5 lb 4 lb	1.2 pt 4 qt	4 cd

Means within each column followed by the same letter are not significantly different at the 0.05 level of probability, according to Duncans Multiple Range Test.

Table 2. Onion stand reduction and winter weed control resulting from the surface broadcast herbicide applications at the Buckelew Farm site.

Herbicide				Onion Stand * Reduction (%)	Winter Weed Control (%)			
Name	Form	a.i./ acre	actual/ acre		NG*	CG*	SP*	LM*
None	------	-------	-----	0 d	0 f	0 c	0 e	0 c
Dacthal	75 WP	10.5 lb	14 lb	7 cd	94 ab	88 ab	90 ab	99 a
Prowl	3.3 EC	0.5 lb	1.2 pt	14 bc	88 bc	86 ab	78 b	99 a
Prowl	3.3 EC	1.0 lb	2.4 pt	33 a	98 a	86 ab	93 a	99 a
Prefar	4 E	4 lb	4 qt	2 d	63 e	80 b	43 d	85 b
Prefar	4 E	6 lb	6 qt	7 cd	75 d	83 b	61 c	93 ab
Prowl + Prefar	3.3 EC 4 E	0.25 lb 4 lb	0.6 pt 4 qt	7 cd	80 cd	89 ab	76 b	99 a
Prowl + Prefar	3.3 EC 4 E	0.5 lb 4 lb	1.2 pt 4 qt	18 b	99 a	93 a	99 a	99 a

* NG = Nettleleaf Goosefoot, CG = Canarygrass, SP = Shepherdspurse, and LM = Little Mallow.
Means within each column followed by the same letter are not significantly different at the 0.05 level of probability, according to Duncans Multiple Range Test.