

Potential Replacements for Dacthal in Onions

*Richard Smith, Farm Advisor
University of California Cooperative Extension
Monterey County*

Background

Controlling weeds in onions is difficult for the following reasons: 1) the crop is not competitive with weeds; 2) planting configurations used do not allow for efficient use of cultivation on the bed top; and 3) the growing season for onions frequently spans the season for winter and summer growing weeds. To further aggravate the situation, hand weeding costs for onions can be extremely expensive because of the high density plantings that are used (i.e. 180-220,000+ seed per acre) and numerous seedlines per bed (i.e. 4-6). As a result of this situation, growers have come to rely upon a preemergence herbicide program to help control the initial flush of weeds that compete early in the cropping cycle. Preemergence herbicides that are available for use on onions include Dacthal, while Prefar is only available for use on dry bulb onions. For postemergence use, there are several options such as Buctril, Goal, Prowl, topical applications of liquid fertilizers, as well as grass herbicides such as Fusilade, Poast and Prism. There are limitations on the growth stage that various postemergence materials can be applied to onions, which limits their ability to control the early weed flush; This underscores the need for an effective preemergence program in onions to maintain yields and keep hand weeding costs in check.

Alternative Preemergence Options Evaluated

Carfentrazone is an aryl triazinone that is used under the trade names Affinity and Shark. It is used as a post emergence material in corn, rice and cereals. In large scale screening trials of potential new herbicides conducted by Dr. Steve Fennimore and others, it was shown to be tolerant on onions. When used preemergence it burns the tissue of plants as they emerge through the soil. Onions can tolerate some of this type of injury because the flag leaf protects the emerging first true leaf. The selection of soil type that this material is used on is critical because on an extremely light soil it was not safe at any rate, however on a soil with only slightly higher clay and organic matter content, it provided excellent safety to onions (table 1). Carfentrazone showed good crop safety at 0.075 lb a.i./A on a wide range of soil types. At 0.10 lb a.i./A significant yield loss was seen only at the site referred to in table 1. However, at 0.015 lb a.i./A, significant yield loss was also observed at one site. More investigations are needed to further evaluate the safety of carfentrazone at the 0.10 lb a.i./A rate on various soil types. This is the rate that provides significant weed control, but more data on its safety at this rate needs to be developed. It is particularly effective on shepherd's purse, which is not controlled by Dacthal and has activity on several other weed species (see table 2).

Prowl: Prowl is registered as a postemergence application on dry bulb onions at the 2-6 true leaf stage. We evaluated Prowl as a post plant, preemergence application on onions. Prowl

can be safe on onions if used preemergence, however the rate, soil type and planting depth of the onions all factor into the level of safety that is achieved. We evaluated the following rates of Prowl this year on our trials on green and dry bulb onions: 0.25, 0.50 and 0.75 lb a.i./A. It appears that the 0.75 lb a.i. rate is probably too high to give good safety to the onions (see table 3). The 0.50 lb a.i./A rate was safe at all sites except at the sandiest site, and the 0.25 lb a.i. rate was safe at all five sites evaluated. The other key factor that affects the safety of Prowl when used preemergence on onions is the depth of planting. In one trial we observed that onion seed needs to be placed a minimum of 0.5 inch deep to maintain an adequate stand (see table 4). Prowl is a preemergence option that growers could turn towards rapidly because it is already labeled on the crop, however the issue of liability remains to be resolved.

Preemergence Flaming: In one trial, there was some evidence that preemergence flaming followed by a topical application of AN 20 fertilizer to burn weeds postemergence reduced the number of purslane and sow thistle (data not shown). This technique may have some promise in situations where there is a good amount of days (i.e. 5-10 days) prior to emergence of the onions. This allows a large number of weeds to emerge, which can then be killed by flaming. The weeds that emerge subsequent to this flaming application tend to be smaller and more susceptible to postemergence applications of herbicides or fertilizers one month later when the onion plants are at the first true leaf stage.

Alternative Techniques: Postemergence flaming of onions and corn gluten meal were evaluated in one trial. Corn Gluten provided moderate control of groundsel, but was weak on many other key weeds. Postemergence flaming of onions at the 1st and 2nd true leaf stages reduce onions yield by over 45% (see table 5)

Table 1. Affect of soil characteristics from two sites on crop safety of carfentrazone.

Onions	Sand	Silt	Clay	Organic Matter	Crop Safety
Dry Bulb Onions	83	11	6	0.46	None
Green Onions	64	23	12	0.73	"Safe"

Table 2. Green onion trial. Number of weeds from 13 sq ft of row – July 23.

Material	Rate a.i./A	Material/A	Shep. Purse	Nettle	Pig-weed	Purs-lane	Lambs quarter
Untreated	----	----	34.5	2.3	3.8	1.0	5.0
Carfentrazone 40DF	0.05	0.125 lb	13.5	2.5	2.3	0.0	2.3
Carfentrazone 40 DF	0.75	0.187 lb	3.0	1.5	1.0	0.3	1.3
Carfentrazone 40 DF	0.10	0.250 lb	5.3	0.0	1.3	0.0	1.3
Carfentrazone 40 DF	0.15	0.375 lb	0.8	0.0	0.0	0.0	0.3
Dacthal	8.00	10.65 lb	19.5	1.3	3.0	0.0	0.0
Prowl 3.3 EC	0.50	1.2 pt	13.3	3.8	0.3	0.3	1.3
Prowl 3.3 EC	0.75	1.8 pt	9.5	1.3	0.5	0.3	1.0
LSD(0.05)	----	----	13.1	2.7	2.4	0.6	2.3

Table 3. Standardized yield (percent of the untreated control) of bulb and green onions under various treatments.

Materials	Rate a.i./A	Bulb Onion Sand	Bulb Onion Loam	Bulb Onion Clay Loam	Green Onion Loam	Green Onion Clay Loam
Dacthal	8.00	90.1	104.9	101.9	102.2	90.4
Carfentrazone	0.05	14.4*	98.3	89.3	105.7	97.6
Carfentrazone	0.075	6.9*	95.8	97.7	104.5	102.3
Carfentrazone	0.10	1.6*	97.5	95.3	110.3	85.7
Carfentrazone	0.15	----	----	----	103.4	80.9*
Prowl	0.25	88.3	99.6	95.8	----	----
Prowl	0.50	65.7*	91.7	96.6	102.2	95.2
Prowl	0.75	----	----	----	87.3*	90.4

* - significant yield loss

Table 4. The effect of planting depth on the stand of onions treated with Prowl at 0, 0.50 and 0.75 lb a.i./A.

Material	Depth (Inches)	October 25	December 13
Over All Rates	0.12	208.8	151.1
Over All Rates	0.25	210.7	161.9
Over All Rates	0.50	205.8	203.1
LSD (0.05)	----	n.s.	17.4

Table 5. Number of weeds and phytotoxicity ratings of onions on April 9, 1999 and yield evaluations on September 23, 1999.

Material	Material/A or Stage	Groundsel	Phyto*	Number of bulbs	Weight of bulbs
Untreated	----	15.6	0.0	235.0	144.1
Corn Gluten	900 lbs	5.2	0.0	---	---
Corn Gluten	1350 lbs	5.6	0.0	156.3	123.2
Flame	1 st true leaf	2.3	7.3	71.7	58.3
Flame	2 nd true leaf	3.0	5.7	119.0	80.2
Flame	1&2 true leaf	0.0	8.9	44.0	46.1
LSD(0.05)	----	10.0	4.8	96.7	65.9

* 0 – no damage to crop to 10-crop dead.