

LIMA BEAN (*Phaseolus lunatus* 'C-Elite')
 Carpetweed *Mollugo verticillata*
 Palmer amaranth *Amaranthus palmeri*
 corn gluten meal, product-S, Dual, Agrobiltz

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Evaluation of alternative compounds for preemergence weed control

An experiment was conducted at the University of Delaware's Research and Education Center in 2016 to determine if product-S had potential for weed suppression as an alternative option to commercial herbicides. The experimental area was a loamy sand, 1.2% o.m. and 6.4 pH. The experiment was conducted as a randomized complete block design with fifteen replications. Seedbed was prepared with two diskings prior to planting. Plots consisted of eight 30-in. rows, 10 ft. long. Lima bean was planted July 27 and treatments were applied on July 28.

Treatments were product-S at 50, 25, and 10% v/v, corn gluten meal at 20 or 40 lb/1000 ft² (850 or 1700 lbs/A), Agrobiltz at 7.8 % v/v (1.6 gal/A), Dual Magnum (s-metolachlor) at 0.75 pts/A, and an untreated check. Product-S is an experimental compound suspect of having herbicidal properties. The Agrobiltz label makes no claim for weed control, but it was included as an organic fertilizer source. All liquid products were applied at 20 g/A spray volume, at 3 mph, using a CO₂ backpack sprayer using 19 psi and applied in a 16-inch band using a hooded sprayer. Corn gluten meal was hand-applied in a 12-inch band over the lima bean row. Two weeks after application, all carpetweed and Palmer amaranth plants in an area 6-inches wide (centered over the row) and the length of the plots were counted. These were the only species consistent throughout the experimental site.

While corn gluten meal and a high rate of product-s reduced carpetweed density compared to the untreated check, only Dual reduced densities more than 30%. Dual also was the only treatment to reduce Palmer amaranth densities lower than the untreated check. The site received about 2 inches of rain within 24 hr of applying the treatments and an additional 0.75 inches before counting the weeds, so there was adequate moisture at the site; and adequate rainfall if any of the compounds needed to get "activated". Both carpetweed and Palmer amaranth and small-seeded species and were presumed to be more susceptible to these treatments than large-seeded species.

Table 1. Comparison of various soil-applied treatments two weeks after application.

Trt No.	Treatment	Rate	Unit	Applic	Carpetweed	Palmer amaranth
					----- No. per 10 ft row -----	
1	Untreated				95 a	7 ab
2	Product-S	50	% v/v	PRE	79 bcd	7 ab
3	Product-S	25	% v/v	PRE	86 abc	7 ab
4	Product-S	10	% v/v	PRE	92 ab	5 b
5	Corn Gluten Meal	20	lb/1000 ft ²	PRE	72 cd	8 a
6	Corn Gluten Meal	40	lb/1000 ft ²	PRE	70 d	7 ab
7	Agrobiltz	10	fl oz/gal	PRE	82 a-d	7 ab
8	Dual Magnum	0.75	pt/A	PRE	13 e	1 c
LSD P=.05					14.8	3.3
CV					20.4	73.9
P*>F					0.0001	0.0018

Means within a column followed by the same letter are not significantly different ($p=0.05$) according to Fisher's protected LSD test.

*P values ≤ 0.05 indicate significant differences exist among treatments.

While product-S and corn gluten meal may have reduced the density of carpetweed, Dual was the only product to provide an acceptable level of control.