

## **Everest® 2.0 (flucarbazone) carryover in barley, pea, lentil and garbanzo bean: a comparison with PowerFlex® (pyroxsulam) and Maverick® (sulfosulfuron) carryover**

Field studies were conducted to evaluate Everest 2.0 (flucarbazone) carryover and injury to barley, garbanzo bean, lentil and field pea. Both studies used PowerFlex (pyroxsulam) and Maverick (sulfosulfuron) as comparison treatments.

The first study was established in 2012 at the Spillman Agronomy Farm near Pullman, WA. The study design was a split-plot with main plots arranged in a randomized complete block with 4 replications. Soil pH ranged from 5.7 to 6.1. Main plots were herbicide treatments and split plots were crop. Plots were 24 ft by 32 ft. Crops were planted on May 2, 2013 with a Monosem precision vacuum planter. Herbicide treatments consisted of Everest 2.0 applied at 1, 1.5 and 2 fl oz/A, PowerFlex applied at 3.5 and 7 oz/A, Maverick applied at 0.67 and 1.33 oz/A and a non-treated check. Herbicides were applied in the spring of 2012 to winter wheat in the 4-to-5 tiller stage (conditions at the time of application are detailed in Table 1). Each crop was planted in an 8 ft wide pass perpendicular to the main plot.

Injury was visually evaluated throughout the season. Lentil and garbanzo bean were harvested on October 4 and pea and barley were harvested on October 7, 2013 by sampling 2, 10.8 ft<sup>2</sup> quadrats on each split-plot. Only dry biomass (in lb/A) data is available for pea and lentil due to premature shattering. Barley and garbanzo bean samples were threshed to obtain grain yield in lb/A.

Herbicide treatment had no effect on crop injury (data not presented) or crop yield (Table 2).

The second study was established in the fall of 2013 and consisted of 4 separate trials, each one designed as a randomized complete block for a specific crop (barley, garbanzo bean, lentil or pea) with 4 treatments. Soil pH on trial sites ranged from 5.3 to 5.8. Crops were planted May 2, 2014 with a Monosem precision vacuum planter. Treatments consisted of Everest 2.0 applied at 2 fl oz/A, PowerFlex applied at 7 oz/A, Maverick applied at 1.33 oz/A and a non-treated check. Herbicides were applied on winter wheat stubble in the fall of 2013 (conditions at the time of application are detailed in Table 1).

Injury was visually evaluated 30 and 58 days after planting (DAP). Stand counts were measured 30 DAP by counting the number of emerged plants per ft of row over 2, 3.3 ft samples per plot. Biomass was clipped over 2, 10.8 ft<sup>2</sup> quadrats per plot on September 17, 2014 and each sample was then threshed to obtain grain yield.

Everest 2.0 had similar or less carry-over effects than PowerFlex or Maverick on any of the studied crops (Table 3).

Injury symptoms in Everest 2.0-treated plots were observed only in lentils (Table 3). Injury caused by Everest 2.0 was not significantly different than that caused by PowerFlex or Maverick. Lentil stands were not affected by herbicide treatment in that there were no significant differences in yield among herbicide-treated and non-treated plots. There was a trend that lentil yields were lower in herbicide-treated plots than in the non-treated check plots.

Injury was observed on peas established into soil treated with PowerFlex or Maverick, but not with Everest 2.0. Peas established into Maverick-treated soil yielded significantly less (65%) than peas established into Everest 2.0-treated soil.

*Table 1. Treatment application details*

Study year	2012-2013	2013-2014
Date	May 10, 2012	September 17, 2013
Application volume (GPA)	15	15
Crop Stage	Pre-plant (on growing winter wheat)	Pre-plant (on winter wheat stubble)
Air temperature (°F)	61	63
Soil temperature (°F)	59	61
Wind velocity (mph)	3.9	3.6
Cloud cover (%)	0	100

*Table 2. Yield in lb/A for barley and garbanzo bean (grain weight), lentil and pea (total biomass). Spillman Agronomy Farm, Pullman, WA, 2013.*

Treatment	Rate		Yield			
	oz pr/A	lb ai/A	Barley	Garbanzo	Lentil	Pea
			grain weight		total biomass	
			lb/A		lb/A	
<b>Nontreated Check</b>			2580	1360	6160	3320
<b>Everest 2.0</b>	1	0.027	2560	1460	6410	2950
	1.5	0.04	2650	1360	6580	2910
	2	0.054	2750	1570	6450	3350
<b>PowerFlex</b>	3.5	0.016	2600	1230	5500	2960
	7	0.033	2850	1230	5420	2870
<b>Maverick</b>	0.67	0.031	3015	1460	6250	3290
	1.33	0.062	2620	1290	5970	2580

Table 3. Injury (%) and yield (lb/A) for barley, garbanzo bean, pea and lentil. Cook Agronomy Farm, Pullman, WA, 2014. Within one crop, means followed by the same letter are not significantly different.

Crop	Treatment	Rate		Injury	Emergence	Injury	Yield
		oz pr/A	lb ai/A	%	plants/ft	%	lb/A
Barley	Nontreated Check			-	5.2	-	1260
	Everest 2.0	2	0.054	5 b	6.1	0 b	1470
	PowerFlex	7	0.033	3 b	4.9	0 b	1200
	Maverick	1.33	0.062	43 a	5.2	75 a	870
Garbanzo bean	Nontreated Check			-	1.8	-	1080
	Everest 2.0	2	0.054	0 b	1.8	0 b	1280
	PowerFlex	7	0.033	35 a	2.1	73 a	620
	Maverick	1.33	0.062	0 b	2.4	3 b	1180
Pea	Nontreated Check			-	4	-	280 ab
	Everest 2.0	2	0.054	0	4	4 b	380 a
	PowerFlex	7	0.033	19	4	35 a	280 ab
	Maverick	1.33	0.062	25	3.7	50 a	130 b
Lentil	Nontreated Check			-	5.2	-	540
	Everest 2.0	2	0.054	14	6.4	31	360
	PowerFlex	7	0.033	16	5.5	56	280
	Maverick	1.33	0.062	10	4.6	56	280

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