Results of Intended Herbicide Injury at the Winter Test

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Recently seed potato treated with glyphosate and dicamba were sent to the warm climate in Florida at the North Dakota Winter Test for seed potato certification. One of the challenges this year in Florida was too much rain. Because of all the rain there was a poor stand due to seed rotting, similar to what happened in spring 2013 in North Dakota and Minnesota. The purpose of the trip was to evaluate the effect of glyphosate and dicamba in potato seed that was intentionally sprayed. We wanted to determine if dipping seed in gibberellic acid would change the way herbicide-affected seed would respond, evaluate the effects of herbicide injury in the winter test, and help inspectors identify the effects of herbicide residues in seed potato.

In spring 2013 we planted Dark Red Norland and Dakota Pearl at the Grand Forks research farm. When potatoes were at the mid-bulking stage five treatments were applied with a backpack sprayer (Table 1). Potato plots were harvested and 100 seed pieces from each variety and treatment was sent to Florida. Seed was planted in Homestead, FL on November 21, 2013. On January 13, 2014 evaluations were made.

Table 1. Plot treatments at Grand Forks, ND in 2013.

Treatment	Herbicide	Rate (fl oz/acre)
1	Untreated	-
2	Glyphosate	1.8
3	Glyphosate	3.7
4	Dicamba	0.67
5	Dicamba	1.3

Because of the wet conditions, there were poor stands and it was difficult to determine the complete effect of these herbicides. However, seed potato response to glyphosate was similar to what we see in our field research in North Dakota or Minnesota when seed with glyphosate residues is planted back. Glyphosate at 1.8 oz/acre slowed emergence, caused leaf malformations, and produced multiple shoots. The higher rate of glyphosate, 3.7 oz/acre, had the same symptoms as the low rate, but also caused a greater number of shoots to accumulate around many, if not all the eyes of the seed potato (Figure 1).

Dicamba had a different effect on the seed potato than glyphosate. The lower dicamba rate, 0.67 oz/acre, caused severe bubbling, leaf crinkling, twisting and bending of leaves as would be expected from a plant growth regulator herbicide. The symptoms seem to be latent, not affecting the first few leaves, but affecting the leaves thereafter. Seed potato affected with dicamba had one to two stems per seed piece from the apical end (Figure 2). We did not observe multiple shoots, like is so often seen in seed with glyphosate residues. The dicamba treatment of 1.3 oz/acre was probably too much dicamba because few plants emerged under this treatment, but too much precipitation may have also

reduced the stand. Like in soybean and other crops, dicamba can be very active at low rates in potato seed.

The winter test is a good opportunity to observe and identify herbicide carryover in seed potatoes. Symptoms were similar to what we typically see in the field in North Dakota or Minnesota. The challenge is finding herbicide injury in a small seed lot that is sent for winter testing. We are working on other methods to test for herbicide residues in seed potatoes. Currently the best steps to protect a seed crop are to communicate to your neighbors that you are growing seed potatoes and they are sensitive to many herbicides, consider having a dedicated sprayer for potatoes that is not used for glyphosate applications, and plant borders around fields to protect them from drifting herbicides of nearby fields.

Figure 1. Effects of glyphosate residues (3.7 fl oz/acre) in Dark Red Norland, dipped in gibberellic acid and planted in Homestead, FL.

Figure 2. Effects of dicamba residues (0.67 fl oz/acre) in Dark Red Norland, dipped in gibberellic acid and planted in Homestead, FL.