

Red Lasoda injury from simulated glyphosate drift. Harlene Hatterman-Valenti and Collin Auwarter.

This study was conducted at the Northern Plains Potato Grower's Non-Irrigation Research site near Grand Forks, ND to evaluate glyphosate drift at different growth stages on Red Lasoda Potato. Soybeans were grown in 2009. Plots were 4 rows by 20 ft arranged in a randomized complete block design with four replicates. Seed pieces (2 oz) were planted on 36 inch rows and 12 inch spacing on June 16, 2010. Treatments were applied on July 29 (tuber initiation), August 19 (early tuber bulking), and September 8 (late tuber bulking) to the middle 2 rows with a modified ATV sprayer. Roundup Weathermax (5.5 lb/gal ai glyphosate) and AMS @ 4 pounds/100 gallons were used in this trial. Potatoes were machine harvested October 20 and graded a few weeks later. Application, environmental, and crop data are listed below:

|                        |         |          |          |          |
|------------------------|---------|----------|----------|----------|
| Date:                  |         | 7/29/10  | 8/19/10  | 9/8/10   |
| Treatment:             |         | TI       | ETB      | LTB      |
| Sprayer:               | GPA:    | 5        | 5        | 5        |
|                        | PSI:    | 40       | 40       | 40       |
|                        | Nozzle: | 80005    | 80005    | 80005    |
| Air temperature (F):   |         | 75       | 69       | 62       |
| Relative humidity (%): |         | 58       | 63       | 60       |
| Wind (MPH):            |         | 6        | 10       | 6        |
| Soil moisture:         |         | Adequate | Adequate | Adequate |
| Cloud cover (%):       |         | 10       | 0        | 10       |
| Next rain:             |         | 7/30/10  | 8/23/10  | 9/10/10  |

Glyphosate at the rate of 0.25 lb ai/a at either the tuber initiation (TI), early tuber bulking (EB), and late tuber bulking (LB) stage had the greatest affect on yield. The lowest yield was when plants were treated with 0.25 lb ai/a glyphosate at the EB stage with 103 cwt/a, followed by 0.25 lb ai/a glyphosate at the TI stage with 150 cwt/a, and 0.25 and 0.125 lb ai/a glyphosate at the LB and EB stages, respectively, with 165 cwt/a. The highest yield was from untreated plants with 326 cwt/a. The next three highest yields were from plants treated with 0.0625 lb ai/a glyphosate at the LB, TI, and EB stages, respectively. Tuber counts in 20 feet showed similar results with the greatest tuber production from plants receiving the lowest rate of glyphosate or untreated plants. Plants treated with glyphosate @ 0.25 lb ai/a produced the fewest tubers at all three application timings.

Table 1. Effect of glyphosate drift on yield and grade on Red Lasoda potatoes.

|            |             |         | App  | Total           | <4 oz | 4-6 oz | 6-10 oz | >10 oz | >4 oz   | Total                             | <4 oz | 4-6 oz | 6-10 oz | >10 oz | >4 oz  |         |
|------------|-------------|---------|------|-----------------|-------|--------|---------|--------|---------|-----------------------------------|-------|--------|---------|--------|--------|---------|
| Name       | Rate        | Unit    | Time | -----cwt/a----- |       |        |         |        |         | -----Tuber counts in 20 feet----- |       |        |         |        |        | Tuber % |
| Unt        |             |         |      | 326 a           | 55 a  | 96 a   | 47 ab   | 128 a  | 271 a   | 132 ab                            | 65 ab | 35 a   | 13 a    | 19 a   | 50 a   |         |
| RU*        | .25         | lb ai/a | TI   | 150 cd          | 54 a  | 34 d   | 15 cd   | 46 bc  | 96 cd   | 93 bcd                            | 69 ab | 13 d   | 4 bc    | 7 bc   | 25 c   |         |
| RU*        | .125        | lb ai/a | TI   | 213 bc          | 72 a  | 67 abc | 31 a-d  | 44 bc  | 142 bcd | 130 ab                            | 88 a  | 26 abc | 9 abc   | 7 bc   | 32 bc  |         |
| RU*        | .0625       | lb ai/a | TI   | 309 a           | 67 a  | 96 a   | 50 a    | 96 ab  | 241 a   | 141 a                             | 77 ab | 35 a   | 13 a    | 15 ab  | 46 ab  |         |
| RU*        | .25         | lb ai/a | EB   | 103 d           | 39 a  | 38 d   | 12 d    | 14 c   | 65 d    | 66 d                              | 45 b  | 15 cd  | 4 c     | 2 c    | 31 bc  |         |
| RU*        | .125        | lb ai/a | EB   | 165 cd          | 63 a  | 48 cd  | 18 cd   | 36 bc  | 102 cd  | 105 a-d                           | 75 ab | 18 bcd | 5 bc    | 6 c    | 27 c   |         |
| RU*        | .0625       | lb ai/a | EB   | 280 ab          | 73 a  | 79 ab  | 35 abc  | 93 ab  | 207 ab  | 139 a                             | 85 a  | 30 ab  | 10 ab   | 15 ab  | 39 abc |         |
| RU*        | .25         | lb ai/a | LB   | 165 cd          | 42 a  | 61 bcd | 27 bcd  | 35 bc  | 123 cd  | 79 cd                             | 43 b  | 23 a-d | 7 abc   | 6 c    | 46 ab  |         |
| RU*        | .125        | lb ai/a | LB   | 210 bc          | 46 a  | 72 abc | 35 abc  | 57 bc  | 164 bc  | 94 bcd                            | 49 b  | 26 abc | 10 ab   | 9 bc   | 48 a   |         |
| RU*        | .0625       | lb ai/a | LB   | 308 a           | 51 a  | 80 ab  | 43 ab   | 134 a  | 257 a   | 117 abc                           | 55 ab | 29 ab  | 12 a    | 21 a   | 53 a   |         |
| *AMS added | LSD (P≤.05) |         |      | 63              | 21    | 21     | 14      | 41     | 58      | 28                                | 21    | 8      | 4       | 6      | 11     |         |