

### **Evaluation of seedpiece and in-furrow treatments to control common scab – Antigo, 2003**

A trial was established 19 May at the Langlade County Research Area, Antigo, WI, to evaluate the potential of seedpiece and in-furrow chemical treatments to control common scab. The trial was located in a field where common scab has been a persistent problem. To increase pressure for scab development, hydrated lime has been added to the area before planting each year since 1993 to raise the pH. Lime was applied this year on 16 May at the rate of 5 ton/A (70-79 grade). The soil type was Antigo silt loam, pH 6.1 (4 Apr 03). An advanced breeding line, A90586-11 (Rich Novy, USDA/ARS Aberdeen, ID), selected for field resistance to late blight, tolerance to early blight and potential for processing, but which is susceptible to common scab, was used for the trial. US#1 tubers were mechanically cut into approximately 2 oz seedpieces at the Hancock Agricultural Research Station, Hancock, WI, and treated as described. Seedpiece treatments were applied to 40 lb samples of freshly cut potatoes in large plastic bags. The bags were then rolled to shake seedpieces and uniformly distribute the chemicals. Seedpieces were transported to Antigo and were planted. The experiment was a randomized complete block design with four replications and each plot consisted of two 20-ft-long rows spaced 3 ft apart. Seedpieces were mechanically planted at 12 in. spacing in the row. Furrows were left open at planting and in-furrow treatments were applied in an 8-inch-wide band over the seedpieces at a rate equivalent to 2 gal/1000 rft at 40 psi, using a hand-held boom with a single HC-2 70° hollow disc cone nozzle. After treatment, all seedpieces were mechanically covered using hilling disks. This study relied on natural inoculum present in field soil. Plots were fertilized with 500 lb/A of 14-37-12 in the row at planting and a sidedress application of 300 lb/A of NH<sub>3</sub>SO<sub>4</sub> on 26 Jun. Insects were controlled with Admire 2F incorporated in fertilizer used at planting (16 fl oz/500 lb) and application of Asana (8 fl oz/A - 23 Jul; 10 fl oz/A - 29 Jul, 5, 13 Aug). A combination of Dual 8E, 1.6 pt/A + Linex DF, 1.6 lb/A was applied on 29 May to control weeds. A standard foliar fungicide program for early and late blight control included: Bravo Ultrex (1.2 lb/A – 23 Jun, 8, 15, 29 Jul, 5, 13, 22 Aug) and Quadris (7.5 fl oz/A - 30 Jun and 23 Jul). Vines were killed with applications of Reglone, 1.5 pt/A, on 3 and 9 Sep. Plots were mechanically harvested and graded 17 Sep. Total yield from each plot was graded into US#1, undersize, and cull categories. After undersize tubers were graded out, but before cull potatoes were removed, tubers were washed and 40 tubers from each treatment plot were chosen at random and assessed for scab severity (area covered by lesions and lesion type). Lesion type was rated on a 5-point scale with: 0 = no lesions; 1 = superficial, less than 10 mm; 2 = superficial, greater than 10 mm; 3 = raised, less than 10 mm; 4 = raised, greater than 10 mm; 5 = pitted scab. Cull potatoes included misshapen, green, and rotten potatoes along with tubers exhibiting pitted scab. Rainfall (in.) measured during the growing season was 19-31 May (1.01); Jun (3.11); Jul (2.9); Aug (0.63) and 1-16 Sep (2.25). Plots received 0.7 in. irrigation in one application on 24 Jul.

The potato breeding line A90586-11 produces a large white skinned tuber with moderate susceptibility to common scab. Treatment of the seedpieces with Maxim or in-furrow treatment with Quadris or Blocker appeared to delay emergence slightly although the final stands were unaffected by these treatments. Treatment of cut seedpieces with mancozeb significantly reduced plant stand. The scab lesion area and lesion type indices were highest in plots with the furrow treatments with Moncut or Quadris and lowest in plots planted with seedpieces treated with Maxim MZ. None of the treatments eliminated symptoms of common scab and yields were unaffected by either seed or furrow application of fungicides.

**Table 1. Effect of treatment on emergence of A90586-11 potatoes.**

| Treatment   | % of Plants Emerged <sup>1</sup> |        |        |        |        | Avg. days to emergence <sup>2</sup> |
|---|----------------------------------|--------|--------|--------|--------|-------------------------------------|
|   | 12 Jun                           | 16 Jun | 19 Jun | 23 Jun | 26 Jun |                                     |
| Untreated   | 39.4                             | 75.6   | 81.3   | 83.8   | 86.3   | 26.8                                |
| Moncut 70 DF, 1.18 oz prod/1000 rft, in furrow        | 45.0                             | 80.0   | 87.5   | 89.4   | 90.0   | 27.2                                |
| Quadris, 0.6 fl oz/ 1000 rft, in furrow               | 28.8                             | 65.6   | 81.3   | 86.3   | 88.1   | 28.1                                |
| Blocker 4F, 7.5 pt/A = 8.26 fl oz/1000 rft, in furrow | 20.6                             | 61.3   | 79.4   | 90.0   | 92.5   | 28.8                                |
| Potato Seed Treater (mancozeb) 0.75 lb/cwt, seedpiece | 37.5                             | 69.4   | 75.0   | 77.5   | 79.4   | 26.7                                |
| Maxim MZ, 0.5 lb/cwt, seedpiece                       | 29.4                             | 69.4   | 80.0   | 83.8   | 90.6   | 28.6                                |
| Pr > F <sup>3</sup>                                   | < 0.01                           | < 0.01 | 0.08   | 0.06   | 0.08   | < 0.01                              |
| LSD <sup>3</sup>                                      | 8.5                              | 8.2    | 7.8*   | 8.3*   | 8.9*   | 1.2                                 |

1 Emergence based on 40 seedpieces planted in 40 ft of row.

2 The average number of days to emergence was calculated for all plants that grew.

3 Analysis of variance was performed on data and Fisher's protected least significant difference (LSD) was calculated (alpha=0.05). NS = not significant at  $P = 0.10$ . \* indicates significant at  $P = 0.10$  but not at  $P = 0.05$ .

**Table 2. Effect of treatment on scab symptoms and yield of A90586-11 potatoes.**

| Treatment   | Lesion Area Index <sup>1</sup> | Lesion Type Index <sup>2</sup> | Yield       |       |      |                        |      |       |      |  |
|---|--------------------------------|--------------------------------|-------------|-------|------|------------------------|------|-------|------|--|
|   |                                |                                | Total cwt/A | US#1  |      | Undersize <sup>3</sup> |      | Culls |      |  |
|   |                                |                                |             | cwt/A | %    | cwt/A                  | %    | cwt/A | %    |  |
| Untreated   | 8.8                            | 19.1                           | 257.4       | 174.7 | 67.1 | 18.4                   | 7.1  | 64.3  | 25.8 |  |
| Moncut 70 DF, 1.18 oz prod/1000 rft, in furrow        | 10.4                           | 26.8                           | 277.2       | 184.1 | 65.8 | 20.3                   | 7.3  | 72.7  | 26.9 |  |
| Quadris, 0.6 fl oz/ 1000 rft, in furrow               | 15.5                           | 35.1                           | 262.7       | 152.3 | 58.4 | 18.5                   | 7.1  | 91.9  | 34.6 |  |
| Blocker 4F, 7.5 pt/A = 8.26 fl oz/1000 rft, in furrow | 6.4                            | 12.0                           | 263.8       | 204.0 | 77.3 | 18.5                   | 7.0  | 41.3  | 15.7 |  |
| Potato Seed Treater (mancozeb) 0.75 lb/cwt, seedpiece | 5.8                            | 13.6                           | 273.4       | 200.0 | 73.2 | 18.2                   | 6.8  | 55.2  | 20.0 |  |
| Maxim MZ, 0.5 lb/cwt, seedpiece                       | 4.5                            | 9.6                            | 262.4       | 185.3 | 70.6 | 20.7                   | 7.9  | 56.4  | 21.5 |  |
| Pr > F <sup>4</sup>                                   | < 0.01                         | < 0.01                         | 0.86        | 0.17  | 0.02 | 0.89                   | 0.85 | 0.02  | 0.02 |  |
| LSD <sup>4</sup>                                      | 4.2                            | 9.3                            | NS          | NS    | 9.9  | NS                     | NS   | 26.3  | 10.3 |  |

1 Lesion area index. Lesions were rated on a 5-point scale with: 0 = no lesions; 1 = 1-10% of the surface area of the tuber affected; 2 = 11-25% affected; 3 = 26-50% affected; 4 = 51-75% affected; 5 = > 75% affected. The lesion area index = the sum for all classes of [(the number of tubers in that class x the class number) x 100]/(5 x total number of tubers rated). The maximum value for this index (if all tubers were rated 5) is 100.

2 Lesion type index. Lesions were rated on a 5-point scale as described in the text. The type lesion index = the sum for all classes of [(the number of tubers in that class x the class number) x 100]/(5 x the total number of tubers rated). The maximum value for this index (if all tubers were rated 5) is 100.

3 Undersize indicates potatoes < 1 7/8 in. diam.

4 Analysis of variance was performed on data and Fisher's protected least significant difference (LSD) was calculated (alpha=0.05). NS = not significant at  $P = 0.10$ .