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Dark Red Norland, Atlantic, Superior and Russet Burbank potatoes were planted at the Hancock Agricultural Research Station to evaluate the effect of chemical and cultural treatments on seedpiece decay, emergence, stand, and yield. All seedpieces were cut mechanically with most treatments cut the day of planting. To apply chemical seedpiece treatments, seedpieces (40 lb - Dark Red Norland; 45 lb - Atlantic, Russet Burbank, Superior) were placed in plastic bags with the chemical and shaken until seedpieces were uniformly coated with chemical. The majority of the treatments were planted April 22. To compare the effect of weather conditions at planting and during emergence, an additional set of two treatments for each cultivar (fresh cut and healed 6 days) were planted on April 27. All seedpieces were planted with an assist-feed planter approximately 3 inches deep. Conditions on April 22 were: Air temperature 68°F, soil temperature 63°F at the depth of seedpiece placement, seedpiece temperature 66°F and relative humidity 21%, skies were generally clear with a few scattered clouds and the soil was slightly moist. Conditions on April 27 were: Air temperature 59°F, soil temperature 50°F at the depth of seedpiece placement, seedpiece temperature 60°F and relative humidity 28%, skies were generally clear with a few high thin clouds and the soil was moderately moist. The experiment was designed as a randomized complete block with four replications. Each plot consisted of 50 feet of row with seedpieces planted 12 inches apart in the row and treatment rows were spaced three feet apart. Soil type was a Plainfield loamy sand with pH 6.3. Fertilizer consisted of 200 lb/A of 0-0-60 (broadcast as a preplant application), 600 lb/A of 5-10-30 (applied in the row at planting), sidedress applications on May 20 (21-0-0-24, 350 lb/A) and June 10 (34-0-0, 375 lb/A) and broadcast application June 2 of Cal-Sul, 500 lb/A. Insects were controlled with Admire (16 oz/A) incorporated in the fertilizer at planting and with foliar application of Asana XL, 5.8 fl oz./A, July 31 and August 8. Linex 50 DF (1.0 lb/A, May 11) was applied for weed control. Bravo Zn fungicide was applied on a standard schedule for early and late blight control (1.13 pt/A - June 25, July 3; 1.5 pt/A - July 10, 17, 24, 31; 1.75 pt/A - August 8, 14, 21, 27). Vines were killed with applications of Diquat, 1.0 pt/A, plus Peptol, 1.0 qt/A (Dark Red Norland and Superior on August 3; Atlantic and Russet Burbank on August 28). Rainfall measured during the growing season (inches) was 0.3 (April 22-30); 3.0, May; 6.4, June; 2.5, July and 6.5, August. An additional 19.6 inches of water was applied as overhead sprinkler irrigation in 39 applications (May 6 - September 2).

Forty seedpieces (4 replicates consisting of 10 seedpieces each) from each treatment were placed in a chamber with continuous mist at 70° F and 100% RH in the laboratory in Madison, WI to be evaluated for seedpiece decay. The mist kept seedpiece surfaces wet throughout the incubation period. Plastic canopies protected the seedpieces from dripping water and contamination from other samples. Severity of decay was rated after 96 hours.

Emergence was counted for each plot eight times between May 11 and June 8 for all treatments and an additional time on June 15 for the later planted trial. Height measurements were taken for all plants in the trial on May 26 and June 8, and for only the later planted treatments on June 15. To evaluate seedpiece decay, disease development and general plant vigor, 10 hills per plot were evaluated -- June 10 for the earlier planted trial and June 15 for the later planted trial. The 10 hills from each plot were dug by hand and the number of stems per plant, Rhizoctonia severity, incidence of black leg symptoms and extent of seedpiece decay were recorded. Seedpieces from plants which were dug and evaluated were removed and discarded. Total fresh weight of all leaves and stems, and weight of daughter tubers was recorded for the sample of plants dug from each plot. These values were expressed as grams (fresh weight) per hill. Plant height was expressed in two different ways: height per plant is the sum of all plant heights measured, divided by the actual number of plants which emerged; height per hill is the sum of heights measured.
divided by 50, the number of hills planted. Height per hill thus represents a measure of general vigor of all
plants in a plot, since this value would be very low if few plants emerged. A forty-foot section of row in
each plot was mechanically harvested (Dark Red Norland and Superior on August 20; Atlantic and Russet
Burbank on September 14) and graded into US#1, undersize, and culc categories. Specific gravity was
measured on a sample of tubers from each plot of the Russet Burbank treatments. US#1 tubers from all
plots were sorted using an optical size grader into six categories: <4 oz., 4-6 oz., 6-10 oz., 10-13 oz., 13-
16 oz., and >16 oz.

Weather conditions were ideal for emergence and stand establishment with uniformly warm soil
temperatures throughout the emergence period. Periodic rainfall was adequate, but not excessive. As a
result, plants emerged quickly and established row closure earlier than normal. Plot observations are listed
below by cultivar.

**Atlantic (Tables 1-4)**

Seed treatment significantly affected the percentage of emerging plants. Emergence was highest in
plots planted with seed cut and healed for 6 days. Treatment of freshly cut seed with fungicide dusts
slightly reduced the final stands compared with plots planted with fresh cut but untreated seed.
Emergence was slightly higher in the earlier vs. later planted plots. Treatment of seed had little effect on
early season plant height. Seedpiece decay (primarily bacterial soft rot) in the mist chamber and in field
plots was generally higher where fresh cut seed was treated with fungicides than where the seed was
healed for 6 days before planting. For pooled data, healing seed for 6 days before planting significantly
reduced the severity of seedpiece decay in the mist chamber and in field plots. Severity of seedpiece
decay was lower in the earliest planted plot. Treatment had no effect on blackleg, Rhizoctonia stem
canker and the number of stems per plant. Yields were highest in plots planted with seed cut and healed
for 6 days before planting and lowest in plots planted with freshcut seed treated with Tops 5%D. For
pooled data, healing cut seed for 6 days before planting increased yield. Yields were also higher in the
earliest planted trial. Seed treatments had only minimal impact on the size grades of this cultivar. We
did not observe significant differences in gross value of yields or effects of treatment on overall crop
values, in spite of significant differences in total yield.

**Dark Red Norland (Tables 5-8)**

Emergence was highest in plots planted with seed cut and healed for 6 days before planting. Several
of the fungicide treatments applied to freshly cut seed pieces significantly reduced emergence. For pooled
data (across planting times), planting cut and healed seed significantly increased plant stands. Final plant
stands were significantly higher in the earliest planted plots. Plant heights were highest in plots using cut
and healed seedpieces. Seedpiece decay in the field was significantly lower in plots planted with seed cut
and healed for 6 days than in plots planted with freshly cut seed. None of the seedpiece treatments
increased or decreased the severity of seedpiece decay compared with the untreated control (fresh cut
seed). Seedpiece decay severity was generally higher in the later planted plots, likely a reflection of
higher soil temperatures during the emergence period. Seedpiece treatments did not affect the incidence
of blackleg or Rhizoctonia stem canker that was generally low throughout the plots. The number of
stems was higher in plots planted with cut and healed seed than in plots planted with freshcut seed
treated with any of the fungicide materials. Some of the fungicides significantly reduced the fresh weight
of foliage and daughter tubers on the earliest rating. Yields were highest in plots planted with cut and
healed seedpieces. Some of the fungicide dusts significantly reduced yield. This was true for total yield
and yield of US#1 and undersize tubers. A greater proportion of the US#1 tubers from plots planted with
cut and healed seedpieces fell into the < 4 oz size than any of the remaining plots. For Dark Red Norland
potatoes grown under the conditions observed in this trial, there appeared to be an advantage for
emergence, reduction of seedpiece decay and yield to simply cut the seed and allow the seedpieces to heal
for 6 days before planting. There appeared to be no particular advantage to planting freshly cut seed with or without fungicide treatment. We did not observe significant differences in gross market value or effects of treatment on crop value.

**Russet Burbank (Tables 9-12)**

Cutting and healing seedpieces before planting or treating freshly cut seedpieces with fungicide before planting had little effect on plant emergence. Emergence was somewhat higher for the earlier planted plots. Seedpiece decay after mist chamber incubation was lowest for seedpieces treated with Tops MZ and the LS materials. In the field, seedpieces treated with LS209 exhibited the lowest decay severity, comparable with the seedpieces that were cut and healed for 6 days before planting. Treatment did not affect the incidence of blackleg or Rhizoctonia stem canker. Minimal effects were observed on fresh weight of foliage and daughter tubers at the June rating. Seedpiece treatment had minimal effect on the various yield categories and significant differences were not observed between treatments. Analysis of the gross value of yield and the effect of treatment on crop value demonstrated an economic benefit from application of several of the fungicides tested in this trial to fresh cut seed.

**Superior (Tables 13-16)**

Treatment of cut seedpieces had little effect on the emergence of Superior potatoes. For data pooled over planting dates, there appeared to be slightly higher emergence when the seedpieces were cut and healed for 6 days before planting. Plant height was unaffected by any of the treatments. Seedpiece decay after incubation in the mist chamber was unaffected by seedpiece treatment. In the field, there was less decay in plots planted to cut and healed seedpieces and in plots with fresh cut seed treated with Tops fungicide. Treatment did not significantly affect the incidence of blackleg or Rhizoctonia stem canker. Likewise there were no differences in the weight of foliage or daughter tubers between treatments. Yields were also not affected by seedpiece treatment. This was true for all categories of yield. There appeared to be a slight advantage in yield for the later planting date. Economic evaluation of yields indicated only small and generally non-significant differences between any of the treatments for this cultivar.
Figure 1. Soil Temperature and rainfall/irrigation - Hancock Agricultural Research Station, 1998

- Shaded gray band represents minimum-maximum soil temperature range each day
- Planting dates: April 22 (early trial), April 27 (late trial)

**April 1998**

**May 1998**

**June 1998**

**July 1998**