A trial to evaluate the effect of chemical and cultural treatments on seedpiece decay, emergence, stand, and yield of Dark Red Norland, Atlantic, Superior and Russet Burbank potatoes was planted April 19 at the Hancock Research Station, Hancock, WI. All seedpieces were cut mechanically. For some treatments, tubers were cut 2, 5 or 7 days prior to planting and allowed to heal in a potato storage at about 50°F and 90-95% relative humidity. Remaining seedpieces were cut the day of planting. To apply chemical treatments, seedpieces (40 lb for Dark Red Norland, Atlantic and Superior; 35 lb for Russet Burbank) were placed in plastic bags with the chemical and shaken until all seedpieces were uniformly coated. Rough treatment at various stages in the seed handling process was simulated by bruising seedpieces after cutting. A bag containing seedpieces was dropped 10 times from a height of 3 feet onto a concrete floor. Bruised seedpieces were planted immediately after bruising. To inoculate seedpieces, cut seed was placed in a large plastic bag and inoculum was sprayed over the seedpieces (10⁷ colony forming units per ml of Erwinia carotovora pvar. atroseptica or 10⁵ spores/ml of Fusarium solani; applied at 70 ml/10 lb of seedpieces). The bags were rolled back and forth during the spray application to assure uniform coverage. Seedpieces were planted with an assist-feed planter at a depth of approximately 3 inches. Air temperature at planting was 56°F, soil temperature was 54°F at the depth of seedpiece placement and seedpiece temperature was 50°F. Relative humidity was 40%. Skies cleared during planting with cloud cover at about 50% at the beginning and about 10% when planting was finished. Soil moisture at planting was at field moisture capacity.

The experiment was designed as a randomized complete block with four replications. Each plot consisted of one 50-foot row with seedpieces planted 12 inches apart in the row and treatment rows were spaced three feet apart. Soil type was a Plainfield sand with pH 6.2. Fertilizer consisted of 300 lb/A of 0-0-60 (broadcast as a preplant application), 500 lb/A of 6-24-24 (applied in the row at planting), and sidedress applications of 33.5-0-0 on May 24 (225 lb/A) and June 2 (375 lb/A). Insects were controlled with Admire (16 oz./A) incorporated in the fertilizer at planting, and foliar applications of Provado 1.6 Flowable, 3.75 fl. oz./A, (July 7), Asana XL, 5.8 fl. oz./A (July 27) and Azinphos-methyl 50, 1.0 lb/A, (August 4). Lorox DF, 1 lb/A, was applied pre-emergence on May 15 for weed control. Bravo ZN was applied for early and late blight control (2.0 pt/A - June 26, July 28; 1.75 pt/A - July 7, 14, 21; 2.125 pt/A - August 4, 11, 17). Vines were killed with an application of Diquat, 1 pt/A, plus Activator 90, 0.75 pt/A (Atlantic, Dark Red Norland and Superior on August 21; Russet Burbank on September 6). Rainfall measured during the growing season (inches) was: April 19-30, 1.02; May, 3.09; June, 2.02; July, 2.33; August, 7.76; September 1-20, 2.27. An additional 13.1 inches of water was applied as overhead sprinkler irrigation in 27 applications (May 18 - August 25).

Seedpiece decay in the laboratory in Madison, WI was evaluated for a sample of seedpieces from each treatment. 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. 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 18 and June 12. Treatments were rated June 14 for plant vigor, an assessment combining number of plants, size of plants and presence or absence of above-ground symptoms of black leg. Then, 10 plants from each plot were hand harvested and number of stems per plant, plant height, Rhizoctonia severity, incidence of black leg symptoms and extent of seedpiece decay were recorded. A forty-foot section of row in each plot was mechanically harvested in September (Atlantic, Dark Red Norland and Superior on September 6; Russet Burbank on September 20) and graded into US#1, undersize, and cull categories. Specific gravity was measured on a sample of tubers from each plot. 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.
Conditions at planting (moist soil with temperature in the mid 50's) were ideal for in-field healing of cut seedpieces. Conditions remained favorable for seedpiece healing, and plant emergence and growth, during the next two weeks with mean soil temperatures in the 50-60°F range and moderate soil moisture, leading to somewhat lower levels of decay overall than seen in the 1994 trial.

Seed cut and healed for 5-7 days before planting emerged before all other treatments and emerged plants had the highest vigor rating and greatest height on June 14. Dropping freshly cut seed and inoculation of freshly cut seed with either *Fusarium* spp. or *Erwinia carotovora* significantly reduced emergence and plant vigor. Healing cut seed before planting reduced tuber susceptibility to seedpiece decay in mist chamber and field evaluations. Black leg infection was most severe in plots planted to seed with severe bruising. Stem numbers increased slightly the longer cut seed was held in a healing environment before planting. Significant yield differences were observed between treatments. Seed healed 7 days before planting had the highest total yield and yield of US#1 tubers while fresh cut seed with severe bruising had the lowest yields. Seed treatment and handling did not affect yield of undersize or cull potatoes and did not affect specific gravity. Seed treatment also did not affect the proportion of weight of US#1 potatoes in the 6-10 oz or 6-13 oz size categories.

Seed cut and healed for 5-7 days before planting emerged earlier, exhibited a higher final stand count and plants were more vigorous on June 14 than other treatments. Healing seedpieces for 5-7 days before planting reduced susceptibility to bacterial soft rot in both mist chamber and field evaluations. Black leg incidence and severity was greatest in plots planted with seed cut 2 days before planting and fresh cut seed inoculated or bruised before planting. Rhizoctonia incidence was variable between treatments and seed handling did not affect the number of stems per plant. There were no yield differences between plots planted with seed healed for 7 days, fresh cut seed with no treatment and fresh cut seed treated with Captan fungicide. Dropping and bruising seed or inoculating fresh cut seed with *Erwinia carotovora* significantly reduced total yield and yields of US#1 tubers. Seed handling did not affect specific gravity or size grades above the 4 oz size category.

Planting seedpieces healed for 2-7 days or fresh cut seedpieces had no effect on final emergence, the time required for maximum emergence or plant vigor on June 14. Plants were slightly taller when seed was healed 2-7 days before planting. Decay of seedpieces in the field on June 14 was lowest in plots where seed was healed. Although not significant at the 0.05 level, it appeared that the seedpiece decay decreased as the healing period increased. Similar trends were not observed on seed placed in a mist chamber for 4 days. Seedpiece treatment did not affect blackleg or the number of stems per plant. Rhizoctonia infection was highest in plots planted with bruised seed and seed inoculated with *Fusarium*. Seedpiece treatment had no effect on yield categories and size grades of US#1 tubers.

Emergence of all treatments was generally high and only small differences were observed between treatments. Lowest emergence and plant vigor were observed in plots planted with bruised seed. Highest plant vigor was observed in plots planted with seed healed for 2 and 5 days before planting. Seedpiece decay after incubation of seedpieces in a mist chamber for 4 days was lowest on seed healed 2-7 days. In the field on June 14, seedpiece decay was lowest in plots planted with seed healed 2-7 days before planting and fresh cut seed with no treatment or inoculated with *Fusarium solani*. Seedpiece treatment had no effect on blackleg or Rhizoctonia and only slight effect on stem numbers. Yields were variable and significant differences were not observed between treatments in total yield and yield of US#1 tubers. Within the size grades of US#1 tubers, the highest proportion of 6-13 oz tubers was in plots planted with fresh cut untreated seed.