Field trials were established May 19 at the Langlade County Research Area, Antigo, WI to evaluate the effect of chemical and cultural treatment of potato seedpieces on seedpiece decay, emergence, stand, and yield. A commercial grower mechanically cut US#1 size Atlantic and Snowden tubers into approximately 2 oz seedpieces. To compare the effect of healing, for some treatments, tubers were cut one to ten days before planting and seedpieces were kept in the grower's storage at 55°F and 90% relative humidity to permit healing to occur. Remaining treatments were cut the morning of planting. Chemical treatments were applied to 36 lb seedpiece samples by shaking cut seedpieces with the chemical treatment in plastic bags until seedpieces were uniformly coated. Effects of high populations of soft-rotting bacteria on the surface of tubers and of bruising occurring during rough handling of seedpieces or tubers, were tested as two treatments. To inoculate seedpieces, 250 ml of inoculum containing $10^7$ colony forming units per ml (Erwinia carotovora pvar. atroseptica) was sprayed on 36 lb of cut seedpieces in a plastic garbage bag. Seedpieces were bruised by dropping a bag containing seedpieces 10 or 20 times from a height of 3 feet onto a concrete floor. Seedpieces were planted with an Underhaug assist-feed planter at a depth of approximately 3 inches. Conditions at planting were: Air temperature 70°F; soil temperature 61°F at the depth of seedpiece placement; relative humidity 70% and seedpiece temperature, 63°F. Cloud cover was 10-25% during planting.

A randomized complete block design with four replications was used. Each plot contained two 25 foot rows spaced three feet apart with seedpieces planted 12 inches apart in the row. Soil type was an Antigo silt loam, pH 5.6. Plots were fertilized with 525 lb/A of 9-23-31 in the row at planting, and 100 lb/A of 33-0-0 as a prehill topdress application on July 3. Insects were controlled with foliar applications of Asana XL (7.8 fl. oz./A, July 21) and Thiodan (1.33 qt/A, August 10). Weeds were controlled by a pre-emergence application of Linex 50 DF, 2.0 lb/A + Dual II, 2 pt/A on June 6. A standard foliar fungicide program for early and late blight control included: Manzate 200 DF, 1.0 lb/A (July 15,28); Bravo 90DG, (1.0 lb/A - July 21, 1.25 lb/A - August 3); Dithane DF, 2.0 lb/A (August 10); Bravo 720, 1.5 pt/A (August 15); Manzate 200 DF, 2.0 lb/A + Kocide, 2.0 lb/A (August 21, September 5) and Bravo 720, 1.5 pt/A + Kocide, 2.0 lb/A (August 28).

Vines were killed with applications of Diquat H/A, 1.0 pt/A + Valent X-77 spreader, 1.0 pt/100 gal. on August 29 and September 4 and 8. Total accumulation of rainfall and overhead sprinkler irrigation (May 12 - August) was 19.1 inches.

A forty-seedpiece sample from each treatment (four replicates of 10 seedpieces) was evaluated for seedpiece decay in our laboratory in Madison, WI. Seedpieces were placed in a mist chamber at 70°F and 100% RH to keep seedpiece surfaces wet through the incubation period. Plastic canopies protected seedpieces from dripping water and contamination from other samples. Decay severity was rated after 96 hours.

Emergence data were recorded nine times for each plot between June 12 and July 20. Treatments were also rated on July 20 for overall plant vigor -- a combined evaluation of number and size of plants, and above-ground symptoms of black leg -- and then ten plants from each plot were hand harvested. Severity of seedpiece decay, incidence and severity of black leg, severity of Rhizoctonia stem canker, number of stems per plant, average height, and average fresh weight of stems and leaves was evaluated. The remaining portion of each plot was mechanically harvested September 13 and graded into US#1, undersize, and cull categories.

Soil was moderately moist at planting and soil temperature was 61°F. During the two weeks after planting soil remained slightly to moderately moist and soil temperature (4" below the surface) remained in the 50-70°F range, conditions generally considered favorable for seedpiece healing, emergence and early season plant development (See Appendix I). The lack of heavy rain and saturated soil also helped minimize severe early seedpiece decay and contributed to generally high final emergence for all treatments except the bruised and inoculated treatments which were expected to be the poorest performing treatments.
Seedpiece treatment had minimal effects on emergence although treatment of fresh cut seedpieces with PCC 518 had the lowest final stand and plant vigor. Seedpiece decay in the field on July 12 was highest in plots planted with fresh cut seed treated with PCC 511 and PCC 518. Treatments did not affect the incidence or severity of blackleg or Rhizoctonia stem canker, but treatment did have a small effect on stem numbers and plant height. Yields were not affected by seedpiece treatment.

Excellent emergence was observed in all plots except those planted with fresh cut seedpieces bruised and inoculated with *Erwinia carotovora* pvar. *atroseptica*. Bruising and inoculation also reduced plant vigor, the number of stems per plant, plant height and the fresh weight of vines on the July 12 evaluation. Seedpiece decay after incubation in a mist chamber for 4 days was very low on seedpieces cut and healed for 1-10 days and highest on seedpieces bruised and inoculated. A similar trend was observed in the amount of seedpiece decay in the field on July 12. Bruising seedpieces increased the incidence and severity of blackleg. Although low throughout the plot, Rhizoctonia was generally lowest in plots where seedpieces were treated with fungicide, particularly where Maxim was applied to the seedpieces. Yields were significantly reduced when fresh cut seedpieces were bruised and inoculated before planting.