

Association Business
ABSTRACTS

Of Papers Presented at the
79th Annual Meeting of
THE POTATO ASSOCIATION OF AMERICA
Bangor, Maine (USA)
July 23-27, 1995

Groden, Ellie, Frank Drummond, Matt Liebman, Dave Lambert, A. Randall Alford, Gregory A. Porter, Jeffrey McBurnie, and Michele Marra. *Potato Cropping Systems Research in Maine: I. Comparison of Conventional Versus Low-Input and Biological Pest Management Systems.*

Since 1991, the University of Maine's multi-disciplinary Potato Ecosystem Project has conducted a 6-ha experiment comparing three pest management and two soil management systems. The pest management systems under study are: 1) a conventional system based on Maine Coop. Extension Service recommendations for the amount and type of pesticides to use based on published economic threshold values, 2) a reduced input system using the same rates and types of pesticides used for the conventional treatment, but not applied until pest densities reach twice the published economic thresholds, and 3) a biological system using only cultural, biological and biorationale materials. Since 1992 Colorado potato beetle populations have been declining in the biological treatments compared to the conventional and reduced input treatments, however, aphid populations have been greater in the biological system. Weed biomass in potatoes has been greater in biological and reduced input treatments compared to conventional treatments in 1991 and 1992, and greater in biological compared with the other treatments in 1993. In 1994 there was a trend towards an interaction between pest management and soil management system on weed biomass, with lower weed biomass in biologically treated potatoes following green manure than those following barley. In 1993 a severe late blight epidemic occurred in northern Maine. The incidence of the disease was higher in the foliage of the biological treatments in this year, but there was no difference between treatments in incidence in tubers. Differences between pest management treatments in the incidence of *Rhizoctonia* and early dying were observed in 1994.

Porter, Gregory A., Matt Liebman, Jeffrey McBurnie, A. Randall Alford, Frank Drummond, Ellie Groden, Dave Lambert, and Michele Marra. *Potato Cropping Systems Research in Maine: II. Comparison of Conventional Versus Alternative Soil Management Systems.*

Since 1991, the University of Maine's multi-disciplinary Potato Ecosystem Project has conducted a 6-ha experiment comparing three pest management and two soil management systems. The soil management systems under study are: 1) a conventional system based on rotation with a grain crop and heavy use of chemical fertilizers; 2) an alternative system which uses a green manure rotation, compost and manure applications, and reduced rates of chemical fertilizer. Soil management system effects on soil properties, nutrient uptake and yields will be presented in this paper. Since 1991, the amended soil management system has significantly increased soil organic matter content (3.20 vs. 2.82%), water stable aggregate content (34.3 vs. 31.2%), and soil test levels of calcium, potassium, and magnesium when compared to the conventional system. Despite drastic reductions in chemical fertilizer use (e.g. 65, 50, and 70% reduction in N, P₂O₅, and K₂O fertilizer use during 1994), 1993-94 crop nutrient uptake in the alternative system has been equal (N, Ca, and Mg) or significantly higher (P, K, and B) than in the chemically fertilized systems. Tuber yields were significantly higher in the amended system than in the conventional soil management system during 1993 and 1994 (average increase of 3.64 t ha⁻¹).

Opena, G.B., L. Zhang, and G.A. Porter. *Response of Superior Potatoes to Soil Management and Irrigation.*

Effects of irrigation and soil management on potato growth and yield were determined in 1993 and 1994. The amount of supplemental irrigation applied was 14.7 cm during 1993 and 9.1 cm in 1994. Soil management treatments, consisting of +/- soil amendments (22.4 t/ha compost and 44.9 t/ha manure) or no amendments, were applied in factorial combination with the irrigation treatments (none, reduced, moderate).

Early crop growth was significantly promoted by the amendments in both years. In 1993, root length density was slightly enhanced by the amendments, but not by irrigation. Root length density was significantly improved by the amendments during the 1994 growing season. Irrigation had a significant effect on root length density towards the end of the season. Roots in all treatments were mostly concentrated on the upper 30 cm of soil. During 1993, total yields in the amended treatments were 23% higher than the unamended treatments while irrigation did not improve yields. Yields

in 1994 were significantly increased by both irrigation (36%) and soil amendments (28%). The consistent effects of the soil amendment treatments in both years indicate its effective use in improving potato growth and productivity.