

## CROP WATER MANAGEMENT THROUGH SOIL IMPROVEMENT

Jeffrey C. McBurnie,<sup>1</sup> Gregory A. Porter,<sup>1</sup> and W. Bart Bradbury<sup>2</sup>

ABSTRACT: Since 1991, methods for improving potato production in Aroostook County, Maine by soil enhancement have been investigated. In a recent experiment, the main objective has been to better manage available water resources to ensure that adequate moisture will be available to the crop throughout the growing season. The primary target has been soil organic matter improvement and the main mechanism has been organic soil amendment additions. Results to date indicate potato tuber yield improvements have been achieved, although some disease problems have been identified. Soil physical and chemical properties (moisture retention, bulk density, macro-nutrients, micro-nutrients, aeration, organic matter, etc.) have been evaluated to determine the source or sources of these improvements. Changes in individual soil physical properties when present have been modest, indicating that benefits are derived from nutritional factors and/or possible interactions among the above factors rather than any specific factor. This also indicates that the improvements may be short-term.

KEY TERMS: Aroostook County; potatoes; crop available water; compost.

## INTRODUCTION

Maine, part of the humid northeast United States, often experiences drought conditions during critical periods in the potato growing season. A significant portion of the State's economy is derived from the potato industry, thus it is imperative that soil moisture be maintained throughout the season to ensure that a high yielding, high quality, marketable crop will be produced. Although irrigation is an obvious solution, it is not readily accessible to all growers due to limited financial and water resources.

Use of organic soil amendments in agricultural applications is being studied extensively in a variety of field experiments at the Aroostook Farm Research Center in Presque Isle, Maine. One project is investigating means of managing crop water availability. One component of this work evaluates the benefits of supplemental water application for four regionally important potato varieties. A second component, the focus of this article, involves supplemental moisture applications superimposed on four rotation/soil management treatments: oat rotation, oat rotation with soil amendment, green manure rotation, and green

<sup>1</sup> Assistant Professor of Bio-Resource Engineering and Associate Professor of Applied Ecology and Environmental Sciences, University of Maine, Orono, ME 04469.

<sup>2</sup> Research Assistant in Bio-Resource Engineering, Aroostook Farm Potato Research Center, Houlton Road, Presque Isle, ME 04769.