

MANAGING MUCK SOILS FOR VEGETABLE CROPS

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Muck soils are uniquely different from mineral soils. They may contain 20 to 80% organic matter compared with mineral soils that can contain 1 to 5%. Muck soils have developed under saturated or ponded water conditions from deposits of plant material (grasses, sedges and/or mosses) that accumulated over very long periods of time. Tile and surface drainage are essential. When cultivated, muck soils tend to subside over time due to de-watering and oxidation of the organic matter. When the soil surface is dry, the light weight organic soil particles are subject to wind erosion. Use of cover crops and companion crops to protect the soil and young seedlings is essential.

Muck soils are naturally low in many of the essential elements, especially phosphorus, potassium, copper, manganese and zinc. The most desirable soil pH range for optimum nutrient availability is 5.2 to 5.8, which is different than for mineral soils (6.2 to 6.8). Too high a soil pH will result in reduced availability of phosphorus, manganese and zinc. When small muck areas occur in mineral soil fields, these areas may be under or over limed and may be inadequately drained. This may result in plant growth problems. Acid mucks will require 1000 to 1400 pounds lime per acre to raise the soil pH 0.1 unit.

A large amount of nitrogen is released from the organic matter by microbial activity during a growing season, but a significant amount may also be lost by leaching and denitrification (conversion to volatile nitrous oxides). The net release of available nitrogen will usually range from 40 to 100 pounds per acre. Hence, less supplemental nitrogen will be required on muck soils than on mineral soils.

Potassium is not held as tightly in muck soils as in mineral soils due to low clay content and high levels of available calcium. As a result potassium is subject to leaching when large amounts of water move through the soil profile. Phosphorus levels can be built up fairly easily in muck soils, but it is more difficult to build up and maintain potassium levels. Soil tests should be used to determine the appropriate amount of each to apply for each crop.

For many crops grown on muck soils, foliar applications of manganese are essential, 1 to 2 pounds Mn per acre applied 1 to 3 times. Soil applications of manganese are generally not very effective. For root crops, celery, and celeriac soil application of boron (2-3 pounds B per acre) is necessary to avoid quality problems.

Even though drainage is essential for crop production on muck soils, irrigation can be beneficial at various times during the establishment and growth of a crop.