

An Analysis of Pebbly Loess in the Dwarf Pine Plains, West Hampton Beach, NY

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We analyzed the physical properties of the surficial soil consisting of pebbly loess and the Ca/Al ratios in pitch pine needles along a trail in the Dwarf Pine Plains going from dwarf pitch pines in the south to more normal sized pitch pines in the north (Fig. 1). The purpose was to determine whether changes in physical soil properties and Ca/Al ratios in pine needles may correlate with the size of the pitch pines along this trail. Ten sites were analyzed for infiltration rate, porosity, soil moisture, stratigraphy, and ecology.

There was no significant difference in the soil properties in going from dwarf to normal pitch pines. Infiltration rates ranged from 1.3 minutes per inch to 6.6 minutes per inch, these infiltration rates are considered rapid to very rapid. Porosity values ranged from 41% to 50%, and maximum soil moisture values ranged from 19% to 30%. There was little difference in the stratigraphic profiles along the path. The area with the dwarf pines, however, does not have a well-developed surface layer rich with organic matter (O-horizon), while the area with the normal pitch pines does.

Ca/Al ratios in pine needles along the path range from 1.2 to 4.6 with no trend. Cronan and Grigal (1996) found that foliar Ca/Al ratios of 12.5 have a 50% risk of impacts on tree growth and that ratios of 6.2 have a 75% risk of impact. These ratios are much lower.

While the physical properties of the soil and the Ca/Al ratios do not explicitly explain the nature of the change in the area from dwarf pines to the more normal pines, the rapid to very rapid infiltration rates and low foliar Ca/Al ratios do suggest that the dwarf and normal pitch pine trees along this path are highly stressed.



Fig. 1. Path in orange rectangle along which the physical properties of the soil and the Ca/Al ratio of needles were studied in Westhampton Beach.