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Applications of LandMapper™ ERM-02 in precision farming

One of the most important issues in precision agriculture is to develop site specific principles of crop management based on variability of soil and hydrological properties. Accessing spatial variability of soil properties often require high-density and repetitious sampling, which is costly, time-consuming, and labor-intensive. One of the challenges facing the adoption of precision agriculture technology is the identification of productivity-related variability of soil properties accurately and cost-effectively.

The application of the geophysical methods of electrical resistivity makes it possible to define areas of electrically contrasting soils, which have distinct properties and, therefore, should be used in agriculture in different ways. Electrical resistivity is a composite characteristic of soils, which generally related to soil texture, stone, salt, and humus contents, and arrangement of the genetic soil horizons. This is the complex of the factors, which directly influence yield of the most of the crops. The advantage of measuring electrical resistivity is that it can be measured directly in the field without actual taking of soil samples and analyzing them in the laboratory. Thus, implication of the electrical resistivity techniques of soil characterization can tremendously decreases time and labor, required to delineate management zones within the fields.

Figure below shows that lower soil electrical resistivity is generally corresponds to the decrease in cranberry yield. The data were obtained at 216 sampling locations with the prototype of LandMapper™ ERM-02 and interpolated into the map with commercial software, such as ArcView (ESRI, Inc.) and GS+ (Gamma Design Software, Inc.). Low electrical resistivity outlines the low-lying areas within the field with reduced conditions and prone to Phytophthora Root Rot disease.