



## Root Health Bio-Assay

Root health assessment is a measure of the quality and function of the roots as indicated by size, color, texture and the absence of symptoms and damage by root pathogens including the fungi *Fusarium*, *Pythium*, *Rhizoctonia*, *Thielaviopsis*, and plant-parasitic nematodes such as northern root-knot. For vegetable production systems, a soil bioassay with beans was shown to be highly effective in assessing root health as a component of overall soil health. Beans are susceptible to the major pathogens that impact vegetable, legume, and forage crops grown in New York and the Northeast region, thus their suitability as an indicator plant. The selection of other indicator plants might be needed for the proper assessment of root health of soils under different production systems.

General Overview of Root Bio-Assay:

A sub-sample from the composited bulk soil sample is thoroughly mixed.

Approximately 200 cubic cm of soil is placed in each of 4 cone-tubes which have a light cotton ball placed in the bottom to prevent soil loss through the drainage holes.

Each tube is planted with one snap bean seed such as cv. 'Hystyle' or others. The seeds are treated with a combination of fungicides to prevent seed decay and seedling diseases. The helium (curved side) of the seed is placed flat/horizontally to encourage successful seed germination and emergence (straight vertical shoots).

The plants are maintained in a greenhouse and watered regularly for 4 weeks.

The beans are then harvested, the roots are washed and then they are individually rated on a scale from 2-9 (2 being nearly perfect and 9 being dead). The average of the four ratings determines the Soil Health rating for the Bean Root Bio-Assay.

All text taken directly from or adapted from The Cornell Soil Health Manual-version II

