The Soil Factor in the Growth of Fruit Trees in Southwestern Michigan.

By

N. L. Partridge and J. O. Vestch,
Michigan Agricultural Experiment Station.

The Departments of Horticulture and Soils of the Michigan Agricultural Experiment Station have been engaged in an examination of the influence of the soil variations found in southwestern Michigan on fruit tree development. Since both the soils and the species of plant studied have been different in the various orchards, the soil factor of prime significance has been dissimilar in various instances. For example, variations in the height of the water table were important in a raspberry patch (1) and on the other hand, the thickness of the A1 horizon in a grape vineyard (2). However, certain factors have recurred in the various studies and some generalizations may be made, although the study is incomplete.

These observations have been directed primarily toward the influence of soil variations upon tree growth, since many horticulturists have shown that with certain exceptions the productivity of fruit trees is related rather closely to their growth. It should be emphasized however, that factors other than soil variations may exert a predominant influence upon the growth and productivity of fruit trees.

The soils of southwestern Michigan are very diverse in character. The extreme variations run from a nearly pure dune sand to stiff heavy clay, from droughty to excessively wet, from soils very low in organic matter to mucks and peats and from low fertility to high fertility. Fruit trees have been planted and are able to exist on most of these soils but there are considerable differences in their vigor and productivity. The variability in the profile character of the soil causes differences in the development of the root systems which are reflected in the ability of the plant to supply its requirements of moisture and mineral salts.

With these diverse soil conditions, it is difficult to determine what the typical form of root system is for any particular fruit plant. However, the root system of a fruit tree growing on a friable, penetrable, sandy loam or light loam soil with good drainage in the surface horizons, such as the Bellefontaine type, is fairly typical. The majority of the roots are found in the upper one and one-half to two feet of soil, roughly corresponding to the A horizons. In