RELATION OF SOIL CHARACTERISTICS TO PECAN TREE GROWTH AND PRODUCTION

by

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It is a well known fact that most plants grow especially well on soils of certain characteristics, and those who observe native vegetation are struck with this tendency of natural soil selection, not only with plants growing under natural conditions but those we use as crops. The pecan is especially interesting in this regard, for under natural conditions we find the pecan tree growing well and giving good production on a small group of soils which are of such structure that the functions of the soils, especially as regards moisture relationships, are particularly favorable for plant growth.

The soils on which the pecan thrives best under natural conditions are highly productive alluvial soils which have moderately good surface drainage, and fairly free underdrainage. Trees planted on such soils are thrifty and do well, but in many cases where commercial plantings have been made on upland soils and even on some alluvial soils, tree growth has been unsatisfactory, although the soils may be productive for many other crops.

The soil types in Texas which support the best growth of pecans are of the Miller, Yahola, Frio, Catalpa, Trinity, and Ochlooknee series. And only in places where drainage is adequate do the trees thrive, even on these soils.

The pecan tree requires much moisture for good growth but will not thrive where free water occurs for a considerable time.

Therefore on low alluvial soils that are highly productive but which are so heavy as to prevent access of moisture, air, and roots the tree does not grow well.

Herein is given in detail the characteristics of Catalpa silty clay loam, where the Wilkerson Pecan grows in Leon River Valley about one mile southeast of the village of Bland in Bell County, Texas. This famous native tree, growing among other vigorous pecan trees, is about 153 inches in circumference, approximately 80 feet high, and has a limb spread of about 60 feet on each side. The record production of nuts for one year is 1217 pounds. The tree is located on a second bottom bench at the point where the surface begins to slope to a lower bench and therefore has good surface drainage. An excavation was made near the tree to a depth of several feet and the auger was used to bring up the material extending on down to a depth of over 16 feet. The physical characteristics of the soil are as follows:

0 to 12 inches of a dark grayish-brown, calcareous silty clay loam; granular in structure; friable and readily penetrated by moisture; roots abundant and evidently largely of those which provide the smaller feeding roots; grades below into

12 to 30 inches grayish-brown, calcareous silty clay loam; lighter in color than above; granular, permeable, friable; few feeding roots, but some large roots; grades below into

30 to 40 inches of brown clay loam; calcareous; granular; permeable; occasional root present; grades below into

40 to 48 inches of brown heavy fine sandy loam; calcareous, friable, permeable; grades below into

48 to 56 inches of grayish-brown calcareous clay loam; friable, permeable; grades below into

56 to 60 inches of a heavy gray, fine sandy loam; calcareous; friable; permeable; grades below into

60 to 102 inches of grayish-brown silty-clay loam; calcareous; friable; granular; permeable; grades below into

102 to 180 inches of heavy grayish-brown calcareous silty-clay loam; permeable; grades below into

180 to 198 inches of dull gray calcareous silty clay; permeable; very wet, evidently near the water table. Evidence indicates that the most of the feeding root system—or much of it—lies within 2 feet of the surface; that the texture and structure of the soil layers permit ready penetration of moisture, air, and roots, but that the texture is sufficiently heavy to permit the retention of a considerable store of moisture, but not so heavy but that this moisture is given up readily as required by the growth of the tree.

Additional soil profile studies are being made in various places in order to gather facts indicating the relation of the pecan to soil characteristics and samples of the various horizons are being taken for mechanical and chemical analyses. This is being done, not only where pecans naturally thrive, but on soils where plantings of the tree have given unsatisfactory growth, and it is hoped that some very profitable facts can be learned regarding the suitability of soils for pecans.