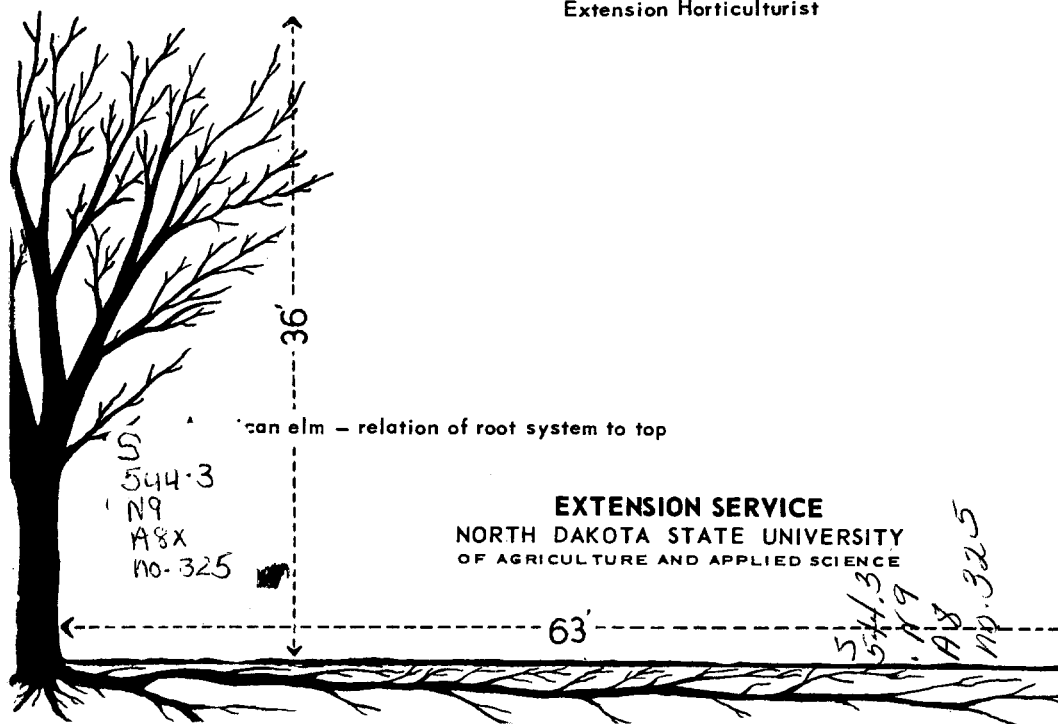


TREE ROOT SYSTEMS

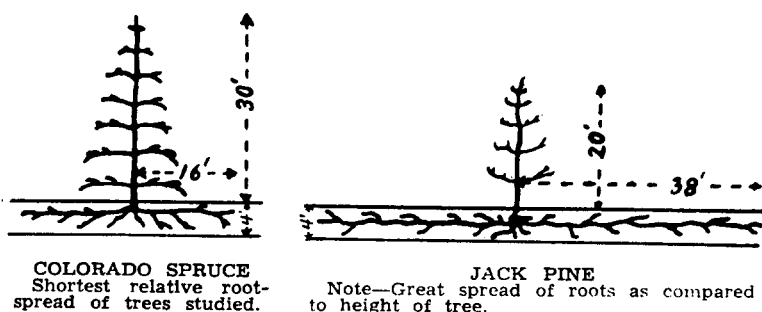


Harry A. Graves
Extension Horticulturist



Much of your trees and shrubs are under the ground. Under normal North Dakota conditions, the outward spread of roots in any direction usually exceeds the height of the tree. Under these same conditions the roots occupy much the same soil layers as do ordinary field crops. Nearly all of the roots are within the surface 4 feet of soil.

Since the feeding area of roots is near the surface, tree and shrub roots, unless irrigated, usually depend upon annual rainfall for their moisture supply. When additional water is supplied, if not excessive, tree roots spread less and penetrate deeper. This is particularly true of some of the less drouth resistant kinds, such as willows.

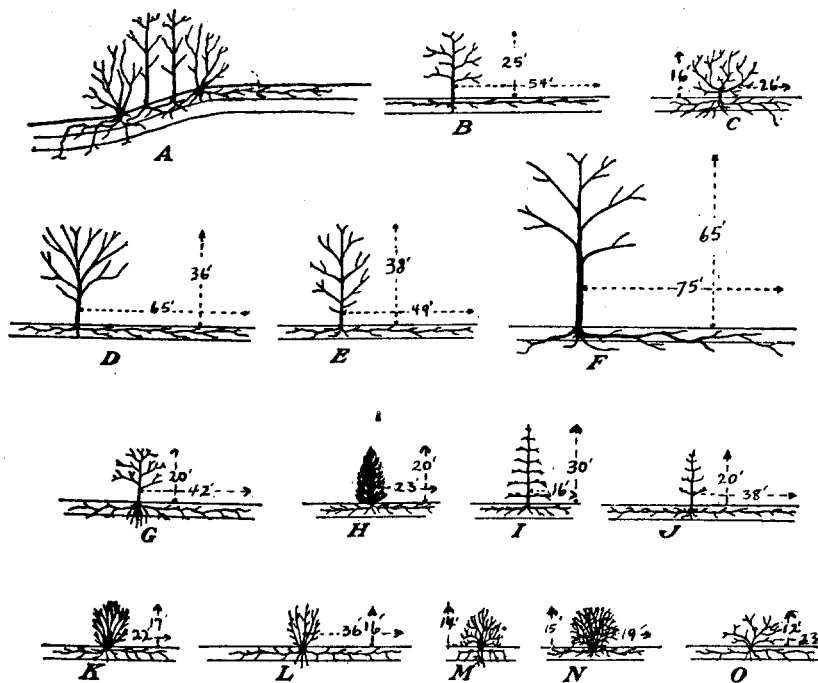


The general distribution of tree roots is much the same on clay soils as on sandy soils.

This information provides much help in planning tree plantings and their subsequent care.

Since grasses and weeds are also users of moisture and soil fertility, and their roots occupy the same areas as those of trees and shrubs, clean cultivation is important when a new plantation is becoming established.

Old established tree plantings which have become heavily sodded, and which show a lack of vigor, may be stimulated by putting the area under clean cultivation, thereby eliminating competition from grass and weeds.



Tree roots in Fargo clay. (in one direction only for wide spreading roots). Line beneath soil level indicates 5-foot depth. A, four tree rows, on slope from dry area to wet one. B, black walnut C, apple. D, American elm. E, green ash. F, cottonwood. G, bur oak. H, juniper. I, Colorado spruce. J, jackpine. K, caragana. L, chokecherry. M, tamarix. N, buckthorn. O, buffaloberry.

With clean cultivation, addition of organic matter may be helpful in increasing the water holding capacity of the soil, and thus increasing the available moisture.

Since the roots are so close to the surface, cultivation must be shallow. Deep cultivation may do much harm.

Since tree roots sometimes extend out twice the height of the tree, in watering, the practice should be to soak the area occupied by the roots instead of watering only at the base of the tree.

Consider the length the roots will eventually grow when selecting trees, particularly for small areas, such as the city lot. A short root spread allows for closer spacing of trees and shrubs, and would permit a garden to be planted closer to the trees without competition from invading tree or shrub roots.

Locate gardens and orchards far enough from established tree plantings to avoid competition from invading roots. Fifty feet away from large trees is considered a safe planting distance.

When it is necessary to plant the garden close to trees, water the trees as well as the garden. This will help keep down root concentration in the garden area, and help insure enough water for both the trees and the garden.

In replacing trees in established plantings, there may be trouble because the soil is already occupied with the roots of the old trees, and the young tree or shrub has to compete with the roots of the established planting for moisture and nutrients.

Under North Dakota conditions, it may not be practicable to replace individual trees or shrubs in established plantings, even though the open space above ground is adequate.

Either a new or old lawn established in an area spotted with large trees or shrubs must be watered generously or it will suffer from drouth, as the invading trees are competing with the grass roots for moisture and food. In such a situation, water the lawn generously and often.

Trees and shrubs with short roots, less than the height of the tree on any side, include Colorado spruce, Black Hills spruce, western yellow pine, tamarix and basswood.

Those with intermediate roots, equal to or exceeding tree height, include Colorado juniper, red cedar, Tatarian honeysuckle, caragana, buckthorn, soft maple, dwarf Asiatic elm, northern cottonwood, American plum, hackberry, green ash and boxelder.

Long rooted trees and shrubs, with a root spread $1\frac{1}{2}$ times tree height, or more, are jack pine, common lilac, buffaloberry, Russian olive, golden willow, apple, butternut, Amur maple, American elm and Siberian crab-apple.

Trees with extra long roots, twice the tree height or more in any direction, are chokecherry, bur oak and black walnut.

This information is adopted from data obtained by Dr. A. F. Yeager, former head of the Department of Horticulture and Forestry, in a study made on clay soil at Fargo and sandy loam soil at Buffalo, N. Dak., and from an Extension Service Circular based on the same data.

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