



INTRODUCTION

1- INTRODUCTION

The Pecan { *Carya illinoensis* (Wangenh) C. Koch } belongs botanically to family *Juglandaceae*. It has the best nut of all about 20 species of *Carya* (Chandler , 1957). The pecan kernel contains about 60 % oil . Such high oil content combines with its carbohydrates and protein contents to make the pecan kernel rich in food value. Thus , one pound of pecan kernels may yield about 3400 calories. Furthermore , pecan kernels are considered as a good source of vitamins , specially vitamin E (Brison , 1974) . Under all suitable climatic regions in the U.S.A , the pecan is a popular tree , not only because of its quality nut , but it is also valuable as an ornamental shade tree , a windbreak , and its wood is used for making high quality furniture (Smart , 1960).

Anyhow , the total area of pecan orchards in Egypt is about 507 feddans with an average production of about 2.53 tons / feddan*.

Pecan trees are deep rooted . The tap root if not broken or severed , persists and maintains its dominant habit and downward direction of growth . It has the capacity to extend its growth 500 cms and deeper into the soil (Brison , 1974). However , for penetration to this depth , the soil must be loose and permeable with no zone restriction. A 1- year - old pecan seedling may have a tap root that is 90 to 120 cms. long, while aerial portion may be only 20 to 30 cms. During the first or second year , the tree develops very few lateral

* According to the 1987 statistics of the Ministry of Agriculture , Egypt. (Unpublished).

roots that are small , tender and frail. Such root growth habit of the pecan posses a major problem to nurserymen. Modern nursery operations require planting the seeds in seedbeds and one - year - old seedlings are transplanted to the nursery row , then after successful budding or grafting and growth of scion for one season the budlings are transplanted to the permanent place. The loss of a large portion of the plant root system in the repeated transplanting process couppled with the slow vegetative growth in the first season accounts for the long time normally required to produce a nursery tree of a standard variety.

Therefore , the first part of this research was directed toward studying the factors that may promote root branching and early formation of laterals which can contribute to better plant survival and re-establishment after transplanting.

On the other side , ultimate tree size of pecan is a major problem confronting the pecan industry. Trees commonly exceed 25 m. in height , and require an orchard spacing ranging from 12 x 12 to 30 x 30 m. Such large tree size makes pest management , harvesting and other cultural operations both difficult and expensive. Furthermore , under the best orchard management , most varieties require 4 to 7 years to begin bearing and from 7 to 12 years to produce commercial crops. Removal of major limbs and hedging can reduce tree size however , such methods are expensive and may reduce yield. Accordingly , the second part of this research was to study the factors that may contribute to the formation of a more compact and dwarfed tree form. The restricted growth of dwarfed forms can facillitate harvesting of nuts and can prescribe the equipment and applicability for cultivation , spraying and harvesting.

Therefore , the aims of this research are to .

1. Study the possibility of reducing the dominant habit and downward direction of the tap root of pecan seedlings in favor of increasing root branching and better root distribution in the soil
2. Enhance the rate of vegetative growth in the nursery to shorten the period required to produce a nursery tree.
3. Encourage the branching of tree top in favor of forming a more compact tree form.