# SOME STUDIES ON GROWTH AND NUTRITION OF YOUNG OLIVE TREES

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# C O N T E N T S

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# I N T R O D U C T I O N

The olive tree, ( Olea europaea L. ), family Oleaceae, is a widely distributed tree grown in many arid areas of the world. The Mediterranean region, is its native habitat.

The olive tree is an evergreen, attaining a height of thirty to thirty five feet when fully developed. Its symmetrical growth and beautiful foliage make it very ornamental and worthy of a place in the home grounds as well as in the commercial orchard.

The olive tree yields two main products : oil and table olives. The olive oil is by far, the most important source of income among the two, being greatly prized in the entire Mediterranean region both for its fine flavour and its cooking properties.

Most olive varieties have the habit of bearing a heavy crop one year and very little the next.

The olive is adapted to extremely arid conditions, because of its special leaf structure and ramified root system. Trees are known to maintain themselves under

extremely hot, dry conditions with a mean annual rainfall of not more than four inches. Another habit of the olive is that of forming suckers around the base. If allowed to grow without pruning, it develops several trunks and persists in throwing out protecting sprouts. Olive trees attain great age, as is evidenced by the old monarchs of the plant world growing in parts of Europe and Asia.

The olive plant is generally considered a slow-growing tree; but under favourable conditions its growth is quite rapid.

Little information has been mentioned in the literature about the olive tree as far as the nutrition of its young tree was concerned. Consequently, it was quite imperative to provide the literature with such further information which would help its growers with such data to enable them to make their job easier.

The aim of our investigation presented in this thesis was to study the effect of differential nitrogen levels on growth and vigor of the young olive seedlings.

The effect of shade on growth of young olive seedlings has been a controversial issue since long time

ago. Accordingly, another set of tests were also involved in this investigation to enlighten this subject clearly.

# REVIEW OF LITERATURE

## 1. Effect of Nitrogen Fertilization :

Gourley ( 1946 ) mentioned that the supplying of nutrients to fruit trees, in form of artificial fertilizers, whether in organic or inorganic form, introduces a subject on which there is some difference of opinion. However, much experimental evidence and practical experience are available, and in many sections the results can be predicated with considerable certainty.

Same author mentioned also that sulphate of ammonia $(NH_4)_2SO_4$ commonly contains 20.5 percent nitrogen and has probably been used to a greater extent in orchard fertilization than any of the other nitrogenous fertilizers. It is readily soluble, but in a form not easily leached from the soil and has been one of the cheaper sources of nitrogen. It is a synthetic material manufactured by utilizing the nitrogen from the air.

Commercial fertilizers may often be applied to nursery stock with profit. Usually nitrogen is needed in liberal supply to insure strong growth, Kains (1930).

Gourley ( 1946 ) in a comparative tests on the use of organic fertilizers, such as dried blood, tankage, and cottonseeds meal, and such inorganic materials as nitrate of soda, sulphate of ammonia, and superphosphate, the evidence has usually indicated that the inorganic materials are to be preferred. The latter are quicker acting.

Results of same author in West Virginia, covering a period of 13 years, showed that nitrogen was the only element which increased growth or yield, and neither phosphorus nor potassium was recommended.

Hume ( 1949 ), found that sulphate of ammonia is of such physical character as to be readily distributed through the soil. The form of the nitrogen has to be changed to nitrate through the process of nitrification before it can be utilized by plants, hence it does not act so quickly as nitrate of soda.

Smith ( 1958 ), noticed that the main fertilization trends in Florida over the past 25 years have been an increase in rate of N fertilization.

2- General Nursery and Seedbed Practices :

Kains ( 1930 ), mentioned that nursery trees are seem to take only small amounts of plant food from the soil. Nursery lands, should be supplied three to ten times the plant food needed by the trees.

Same author suggested that soil which has just produced a crop of nursery stock should not be devoted to nursery stock again without a "rest"; this too, in-spite of the fact that instances of success under repeated cropping may be cited. Nursery-men, therefore , change their land and in many cases rent what they need for terms of several years.

Adriance ( 1939 ), mentioned that soil for the growth of nursery stock should be at least moderately fertile. Moreover, a poor soil has a tendency to cause a widespread root system with comparatively few branch roots. Such a root system is unsatisfactory for transplanting; a close, compact set of roots is considered most desirable. In addition to that, he disclosed that trees and plants that are to remain on the land only one season will not be affected so much as those whose growth will extend over a period of years.

The author suggested that a mixture of compost, sand, manure and loam makes an ideal soil for use in seedbeds or for potting.

Dyal ( 1942 ), found that the soil for all seeds should be loose and porous to allow the excessive moisture to escape and the warmth to penetrate. The seeds should be sown at the proper season depending upon the locality. As soon as the plants grown from the seeds are large enough, they may be translated to other beds or boxes at a greater distance apart.

Talbert ( 1946 ), pointed that perhaps the vigor or growth is the most important factor determining the age at which bearing is reached. Growers generally have recognized the fact that young fruit trees and berry plants kept in a much more than average growing condition.

Same author mentioned that, the reliable nurseryman, therefore, who makes a speciality of the business of grafting and budding and using other methods in multiplying plants is generally able to produce better nursery stock at a lower cost than the average grower. The grower may also save from 1 to 2 years, time in bringing

the orchard into bearing and obtain desirable sizes of thriftily and well grown plants if he buys them from the nursery-man instead of endeavoring to propagate them himself.

It was suggested by Naik ( 1947 ), that success is only possible if the soil is of good texture and fertility and of perfect drainage,aided by an unfailing supply of good water for irrigation.
He suggested also that well-rotted cattle manure or compost in a fairly pulverised condition is the popular ingredient mixed with the seedbed soil, and this too should be available on the spot for frequent use. Since frequent and daily watering mainly by hand is essential for the seedbeds, they should be located close to a water source.

Christopher ( 1958 ), noticed that growing nursery stock in containers, usually metal cans of 1 to 5 gallon capacity, is extensive. Plants may be started as rooted cuttings or after a year or more in the nursery. Advantages are claimed from the standpoint of both production and sales. Soil texture, fertility, and water supply are more exactly controlled than is possible in

the field. By treating the soil, certain pest and weed problems may be eliminated. Root pruning ceases to be necessary. Less space per 1,000 plants in required, and the problem of digging for sale during inclement weather is eliminated. Plants may be sold at any time of the year since there is no problem of shock such as may be experienced when large numbers of roots are cut during digging. There are disadvantages associated with the use of cans which may prevent universal use.

The author mentioned also that heavy chemical fertilization at planting time is seldom recommended, for two reasons. First, there is considerable danger of burning the new roots and thus killing, or at least weakening, the plant at a time when root-top balance is already upset. Second, a very rich soil in a limited area results in a restricted root development rather than a widely spreading one so desirable to provide better anchorage of trees. Good loam about the roots is usually considered sufficient at that time. If the soil is not naturally good, it should be improved with lime and compost or completely replaced with new soil.