STUDIES ON ROOTING OF CUTTINGS OF SOME RECENTLY INTRODUCED OLIVE CULTIVARS IN NORTH SINAI USING DIFFERENT TECHNIQUES

By

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ABSTRACT

This study was conducted in North Sinai Research Station at El-Sheikh Zuwayid, Desert Research Center during the 2006 and 2007 seasons. It aimed at evaluating the effect of different propagation techniques, collection dates and determines the effect of endogenous chemical content of cuttings on rooting ability of five recently introduced olive cultivars. Leafy subterminal cuttings of olive 'Chiperssino', 'Tanche', 'Jabaa', 'Conservollia' and 'Itrana' were prepared during March, June, September and December, treated with IBA at 4000 ppm and rooted using intermittent mist, vapor pressure deficit (V.P.D.) and wooden boxes propagation techniques. A wide variation in rooting ability of the studied cultivars was found. Cuttings of olive 'Chiperssino' had a significantly superior rooting percentage, whereas, those of olive 'Itrana' gave the lowest significant percentage. Moreover, cuttings sown in wooden boxes exhibited the highest significant rooting percentage in comparison to V.P.D. and mist propagation techniques. Generally, June collection date showed the highest significant rooting percentage, number of roots, root length and survival percentage under V.P.D. and mist propagation techniques. Meanwhile, the wooden boxes propagation technique significantly resulted in the highest rooting percentage during March collection date. Moreover, the highest significant content of total carbohydrates, C/N ratio, sugars and IAA were obtained from different olive cultivars during March and June collection dates. Whereas, the highest significant level of total nitrogen and ABA was found during September and December collection dates. In addition, anatomical study showed significant correlation between sclerenchymatous ring in the studied different olive cultivars and their rooting ability.

Key words: Olive, propagation, cutting, cultivars, dates, techniques, endogenous chemicals

DEDICATION

I dedicate this work to whom my heart felt thanks; to my mother and my father for their patience and help, as well as to my brother, my sisters and finally for my lovely family, my wife and my sons Hazem and Motaz for their patience and for all the support they lovely offered along the period of my post graduation.

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INTRODUCTION

The olive tree (*Olea europea* L.) belongs to the family Oleaceae. It is considered one of the most important crops which can be grown under harsh conditions especially drought and salinity (Robinson, 1987).

Accordingly, it is considered one of the most suitable fruit species for plantation in desert and new reclaimed soils in Egypt especially Sinai, Northwestern coast and the New Valley as well as Tushka. Olive trees include many cultivars which are used for oil extraction, pickling or for the double purposes. The oil proportion in the fruit, ranged from 35 to 70% on dry weight basis (Balatsouras *et al*., 1988).

Olive production plays an important role in the economy of many countries. It increases not only the land value where the soil was unsuitable for other crops, but also it contributes to soil conservation. It helps to combat problems of environment and its protection that are currently of concern to nation authorities and organization (Denis, 1977).

Olive trees propagation is done either using; sexual propagation (seeds) or asexual propagation by stem cuttings, ovules, suckers and grafting. Propagation by stem cuttings is considered the most important and widely commercial method as it provides a large number of plants with good quality from a limited source of parent material in a short time. It is also inexpensive, rapid and simple and does not require the special techniques necessary in grafting or budding. Using IBA

treatment improved greatly cutting propagation (Bini, 1981; Caballero, 1981 and Chaari-Rkhiss and Trigui, 1996).

Some olive cultivars are easily rooted, while the others are rooted very difficulty. The variation among cultivars may be attributed to the differences in the rooting potentialities. Propagation by cutting of these cultivars has also presented problems because of low rooting ability (Hartmann and Kester, 1978; Abou-Shanab, 1982; El-Said, 1986 and Wiesman and Lavee, 1995a).

Over the years, practices based on these rooting factors have been developed in order to promote rooting in difficult to root cultivars. These factors can be divided into chemical factors (endogenous and exogenous contents which promote rooting), plant factors (juvenility, cutting type, presence of buds and or leaves, etc.), environmental (humidity control, temperature, bottom heat, etc.), and others (media and wounding). When used separately or in various combinations, they significantly affect the rooting response.

Twenty eight different olive cultivars were imported from the Arab Center for the Studies of Arid Zones and Dry Lands (ACSAD), grown in the Experimental orchard of North Sinai Research Station at El-Sheikh Zuwayid. However, some researchers evaluated these cultivars and chose the best five olive ’Chiperssino‘, ’Tanche‘, ’Jabaa‘, ’Conservollia‘ and ’Itrana‘, which proved their superiority in (oil content – yield kg – fruit weight – flesh fruit – etc.) under North Sinai condition (Amar, 2003 and Ghieth, 2003).

Therefore, the aim of this study is to investigate the best technique to propagate these cultivars under high salinity and lack of

water conditions to distribute them to farmers, so these points should be studied consequently:

1. Determine the rooting ability of sub-terminal cuttings for the studied olive cultivars.
2. Evaluate the seasonal fluctuation of sub-terminal cuttings on rooting ability of the studied olive cultivars.
3. Evaluate the effect of different propagation techniques on rooting percentage.
4. Determine the effect of endogenous chemical contents of sub-terminal cuttings on rooting ability of the olive cultivars.
5. Verify the effect of histological characteristics of each of the studied olive cultivars on rooting ability.