

Physiological studies on alternate bearing of olive

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This study was conducted during four successive seasons of 1995, 1996, 1997 and 1998 at a private Farm at Al-Khatatba as a trial to reduce the tendency towards the alternation of bearing of two olive cultivars namely: Picual and Koroneiki. Selected trees nine —year-old, healthy, nearly uniform in growth vigour, planted at 5 X 5 m. apart on a sandy soil, subjected to drip irrigation system received regularly the same and recommended cultural practices. Moreover, the following treatments were assigned for application on the trees under investigation according to their an expected blooming conditions in the following seasons ("On" or "Off" years). The trees were in the "Off" year and were going to an expected "On" years. In other words, some of the tested treatments were applied before or during an expected "On" years (1995 & 1997) and the others were applied before or during an expected "Off" years (1996 & 1998). Consequently, Picual and Koroneiki olive trees were subjected to one of the following treatments: 1-Trees were sprayed with tap water "control". 2-Trees were previously sprayed with 500 ppm GA3 in mid-June before an expected "On" years-and supplemented with 50 ppm GA3 sprays at fruit set in an expected "Off" years (1996 & 1998). - 122 - Summary and conclusion 3-Trees were previously sprayed with 500 ppm GA3 in mid-June before an expected "On" years and provided with an additional sprays of naphthalene acetic acid (NAA) at 50 ppm at full bloom of an expected "Off" years (1996 & 1998). 4-Trees were previously sprayed with 500 ppm GA3 in mid-June. before an expected "On" years and girdled (5 mm in diameter) in mid-December of 1995 & 1997 before an expected "Off" years (1996 & 1998). 5-Trees were previously sprayed with urea 2%, two weeks after fruit set of "On" years (1995 & 1997) and supplemented with an additional spray of 50 ppm GA3 at full bloom of "Off" years (1996 & 1998). 6-Trees were previously sprayed with urea 2%, two weeks after fruit set, were supplemented with an additional spray of 50 ppm NAA at full bloom of "Off" years (1996 & 1998). 7-Trees were previously sprayed with urea 2%, two weeks after fruit set, of an expected "On" years (1995 & 1997), subjected to girdling (5 mm in diameter) in mid-December of 1995 & 1997 before an expected "Off" years (1996 & 1998). Furthermore, the control trees were sprayed with tap water and Triton X 100 was added at 0.1% as a surfactant to all spray solutions including the control "tap water". Summary and conclusion -123- Spraying process was carried out using a compression sprayer (5 L. solution/tree). Generally, this experiment is considered a factorial experiment (2 cultivars X 7 chemical and horticultural treatments). The tested treatments in this experiment were arranged in a completely randomized design with four replicates for each treatment and each replicate was represented by one tree. The obtained results could be summarized as follows : 5-1. Tree Blooming Conclusively, Koroneiki cv. had higher number of inflorescences per meter and produced higher number of flowers per inflorescence and higher percentage of perfect flowers. Besides, all tested treatments i.e. GA3 at 500 ppm or urea at 2% provided with GA3 or NAA at 550 ppm or girdling enhanced the studied tree blooming parameters. Generally, GA3 at 500 ppm and urea at 2% supported with girdling process proved to be the most efficient treatment in improving the studied tree blooming parameters. On the other hand all the combinations of Koroneiki cv. including the control showed higher values of tree blooming parameters i.e. number of inflorescences per meter, number of flowers per inflorescences and percentage of perfect flowers as compared with the analogous ones of Picual cv. Shortly, 500 ppm GA3 and 2% urea provided with conclusion girdling process proved to be most promising treatment particularly for Koroneiki cv. 5-2. Tree Fruiting Shortly, Koroneiki trees gave higher fruit set percentage per meter, lower fruit shedding

percentage and comparatively higher yield i.e. Kg/tree or number of fruits per trees and showed relatively less tendency towards alternation of bearing as compared with analogous ones of Picual. Furthermore, all tested chemical and horticultural treatments enhanced fruit set percentage per meter, reduced fruit shedding and increased tree yield as Kg/tree or number of fruits per tree and reduced the tendency towards alternation of bearing as compared with the control. Briefly, GA3 at 500 ppm + girdling or GA3 and NAA at 50 ppm treatments took the superiority in this respect. Additionally, all tested combinations of Koroneiki cv surpassed the corresponding ones of Picual cv. in enhancing fruit set percentage per meter and tree yield as Kg/tree or number of fruits per tree and reducing fruit shedding and the tree tendency towards alternation of bearing. Generally, GA3 at 500 ppm + girdling or GA3 and NAA at 50 ppm were the combinations of Koroneiki cv, which produced the most pronounced effect in this respect.

-3. Fruit Quality

Generally, Picual cv had higher values of fruit weight, length, diameter, flesh thickness, flesh weight, seed weight and flesh/stone ratio than Koroneiki cv. Besides the cultivar failed to affect fruit shape index and fruit moisture content. Moreover, Koroneiki fruit had higher oil content than the corresponding ones of Picual. On the other hand, all tested treatments enhanced fruit weight, length, diameter, flesh thickness, flesh weight, seed weight and flesh/stone ratio as compared with the control. In this respect, 500 ppm GA3 or 2% urea + girdling or 50 ppm GA3 proved to be the most effective treatments. Besides all tested treatments failed to induce a significant effect on fruit moisture content. Also, 2% urea + girdling induced the most stimulative effect on fruit oil content. On the other side, Picual trees sprayed with 500 ppm or 2% urea provided with girdling or 50 ppm GA3 had the highest values of fruit weight, length, diameter, flesh thickness, flesh weight, seed weight and flesh/stone ratio and fruit oil content.

5-4. Leaf and Shoot Chemical Content

Conclusively, the cultivar failed to affect leaf and shoot carbohydrates content and leaf and shoot C/N ratios, whereas, Picual cv had higher values of leaf and shoot nitrogen content. Besides, all tested treatments succeeded in enhancing leaf and shoot carbohydrates content and C/N ratio as compared with the control. Generally, 500 ppm GA3 or 2% urea provided with girdling proved to be the most effective treatment in increasing leaf and shoot carbohydrates content and C/N ratio. Moreover, all combinations of tested cultivars gave higher values of leaf and shoot carbohydrates content and C/N ratio as compared with the control. Generally, GA3 at 500 ppm or urea at 2% provided with girdling of both cultivars gave the highest values of leaf and shoot carbohydrates content and C/N ratio. On the other hand, the tested treatments reduced leaf and shoot nitrogen content, particularly 500 ppm GA3 + 50 ppm GA3 or 50 ppm NAA. On the contrary, Picual trees treated with 2% urea or 500 ppm GA3 provided with 50 ppm GA3 or 50 ppm NAA proved to be the most effective interaction in increasing leaf and shoot nitrogen content. Consequently, under similar conditions to that of the present investigation, it is advised to spray Picual and Koroneiki olive trees with GA3 at 500 ppm in mid-June before an expected "On" years or urea at 2%, two weeks after fruit set of an expected "On" years and GA3 at 50 ppm at full bloom of an expected "Off" years or girdling in mid-December before an expected "Off" years as a tool to reduce alternation of bearing and enhancing fruit quality of Picual and Koroneiki cvs.