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Seasonal changes of ABA and Cytokinins in olive during off and on year

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ABSTRACT

Present studies were conducted in the experimental field of Dr Y.S. Parmar University of Horticulture and Forestry, Nauni, Solan to know the periodical fluctuations in the endogenous levels of ABA and cytokinins in different tissues of olive cultivar- Frantoio during their off and on years. Maximum accumulation of ABA and cytokinins was found in auxillary buds followed by terminal buds and leaves. A decrease in endogenous levels of abscisic acid was found from the month of October and it continued till May. A decline in endogenous levels of cytokinins was observed from the months of October to December; thereafter their levels began to increase till May. Higher endogenous levels of cytokinins were found during on year of olive as compared to their levels during off year. Higher levels of endogenous abcisic acid were observed during off year as compared to their levels during on year.

Key words: Olive (*Olea europaea*), ABA, Cytokinine, Seasonal changes, Off and on year

Olive (*Olea europaea*) is a subtropical fruit crop, which requires chilling for its fruitfulness and is grown for its fruits, used for oil, which is a rich source of polyunsaturated fatty acids (PUFA). It possesses numerous biological properties and therefore occupies a pivotal position in human nutrition. Olive is a principal crop in all countries situated in the Mediterranean region of the world. Cultivation of olive in India is restricted to states of Jammu and Kashmir, Himachal Pradesh and Uttaranchal. It requires bright illumination and its cultivation is de-limited by its poor resistance to frost and excessive drought during winters. In order to exploit vast potentials available in this state for olive growing a good number of exotic cultivars were introduced in the state in early sixties. But the available information on the present status of olive growing in the state have revealed that a trend of irregular or shy bearing coupled with lower and fluctuating yields have seriously hampered the pace of proliferation of this industry. Therefore role of hormonal, nutritional and environmental factors in flower induction of olive crop needs to be properly defined and the information thus acquired is used to formulate a theory of flowering (Halevy, 1990). Usually, all trees within an orchard are synchronized in bearing status owing to previous climatic or phytopathological circumstances. Such synchronization is maintained by endogenous factors (Cuevas *et al.*, 1994). The seeds of the high fruit population developing during the summer of the 'on' year inhibit flower induction for the next 'off' year (Fernandez-Escobar *et al.*, 1992). Although there is a tendency to alleviate the alternate bearing habit by increasing fruit set when light flowering occurs (Lavee, 1986), this increase cannot compensate for the great differences in the flower population between 'off' and 'on' years. In olive flower bud induction occurs before endocarp sclerification (Fernandez-Escobar *et al.*, 1992) and is connected to a hormonal signal from the growing fruits which would stimulate the production of differentiation inhibitors (mainly phenolic compounds) depending on the intensity of the signal with environmental conditions particularly low winter temperature (Badr and Hartmann, 1972). Present work aims on the study of seasonal fluctuations in ABA and Cytokinin during their off and on years to know the variations of these endogenous hormones as the season progresses.

MATERIALS AND METHODS

The present studies were carried out in the experimental orchards of the Department of Pomology, Dr. Y.S. Parmar University of Horticulture and Forestry, during 2000-02. Uniform healthy and disease free bearing trees of olive cultivar Frantoio were selected for undertaking the present studies. The experimental trees were raised on wild olive (*Olea cuspidata*) rootstocks. All experimental trees were kept under uniform cultural practices during the course of present investigations. Auxillary buds and leaves were selected from middle portion of the shoots. The terminal buds from previous season's shoots were also sampled. These samples were collected at monthly interval between Octobers to May. Leaf and bud samples were then placed in properly labelled butter paper bags and immediately placed in an icebox and then brought to the laboratory. In the