

Floral developmental failures and ovary size variability in field-grown olive trees under water deficit

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In the olive tree, *Olea europaea* L., flower development constitutes an extensive process which requires two to three months, and includes elongation and branching of the inflorescence axis and the formation of the individual flowers. Container experiments, where water deficit is more easily controlled, have shown reduction of and compensation among parameters such as inflorescence number, flower number, perfect (hermaphroditic) flower number and percentage, and ovule development, related to the timing of the deficit period. With the aim of observing the effect of water deficit in field-grown mature trees, inflorescence and flower development, including histological preparations, were observed in ‘Picual’ olive trees following a winter of severe drought. Sampling of 25 inflorescences around each tree was carried out, inflorescence structure and flower gender observed, and ovule development and ovary size evaluated in histological preparations of pistils. Inflorescence and gender quality parameters were reduced. Ovary size varied widely, with ovaries distributed in two distinct groups according to size. In the majority of the larger ovaries, 3 or 4 of the total 4 ovules were well differentiated, showing a high potential for fertilization and subsequent fruit set and development. In the small ovaries, however, ovule development was poor, with only 5-10% showing sufficient development to permit fertilization. These observations affirm the necessity of sufficient water in early spring during inflorescence and flower development, and also indicate that inadequate floral development for satisfactory fertilization and fruit set may occur but not be easily visible. The presence of two ovary populations may represent an evolutionary mechanism to provide a few high-quality ovaries to assure sexual reproduction.

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