

Irrigation of Olives.

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The importance of irrigating olives.

There are many myths about olives circulating amongst first time growers and enthusiasts as people rush to get into another growing agricultural industry. One of the classic bits of misinformation that inevitably arises is that the “olive tree will grow anywhere and does not need irrigation”. Without pondering all the possible meanings of this statement international experience would say that if you want to develop an economically viable, commercial olive oil plantation you have to irrigate your trees. It is also abundantly clear from overseas experience that the investment you make in your irrigation system is probably the most important decision you need to make about your olive development. The reason for this is that the irrigation system is not a “necessary evil” but rather an essential management tool that you will need to properly produce consistent quantity and quality of oil.

A review of international research concerning irrigation of olives reveals a wealth of valuable information. Samish and Spigel (1961) found that oil yield increased as a result of irrigation averaging 30% above that of non irrigated fruit. Tombesi et al. (1996) found that irrigated trees bear more fruit per tree and produce more oil per hectare than non irrigated trees. Lavee and Wodner (1991) found that there was a definite relationship between irrigation application and oil accumulation in olives. They also found that irrigation could be used to minimise environmental factors affecting oil production and that well managed irrigation systems could bring fruit uniformly to maximum oil content and hence provide an economical harvest time.

It is generally accepted that an irrigation system in the correct climatic zone can effectively be used to control bloom, fruit set and reduce the effect of alternate bearing on oil yield. Table 1 below summarises the critical stages of growth in the olive tree and points out the effect of low soil moisture levels. It can be seen from examining this information that the irrigation system is a management tool that can have a large bearing on the successful establishment and management of an olive grove.

The olive tree is an alternate bearing tree, which means that one year it has a heavy crop and in the alternate year it bears a lighter crop. The alternate bearing of the olive tree is caused because the heavy crop suppresses shoot growth and exhausts food reserves. This results in reduced flowering and fruit set in the following year (Sibbett 1994). It has been shown that irrigation applications during the year can overcome the effects of alternate bearing. Irrigation applied early in the growing season enhances shoot growth, which in turn increases the number of fruits in the subsequent season (Samish and Spiegel 1961). The oil percentage at corresponding stages of maturity remained that same and therefore the total oil yield was increased because of the greater number of fruits. Research by Tombesi et al. (1996) found that the number of fruits per tree is determined in spring and early summer. It is in this period that irrigation is essential if a high number of fruits with high oil yield is to be achieved in

the subsequent season. Early irrigation is advantageous in overcoming the effects of alternate bearing but has little influence on the current season's fruit.

Late irrigation (after the spring flush) can be used to manage the current season's crop by increasing the fruit size and the flesh stone ratio whilst delaying maturation (Samish and Spiegel 1961). The amount of irrigation required is a function of the environmental and soil factors that are peculiar to individual sites. A summary of the importance of irrigation at various times in the season could be stated as follows. Early irrigation encourages shoot growth, which increases the number of fruits in the second season. Irrigation during the season influences fruit size and the stone flesh ratio.

Period	Growth events	Effect of low moisture in soil
August to December	1 Flower bud development 2 Bloom 3 Fruit set 4 Shoot growth	1 Reduced flower formation 2 Incomplete flower 3 Poor fruit set 4 Increased alternate bearing 5 Decreased shoot growth
December to January	1 Stage 1 of fruit growth due to cell division 2 Shoot growth	1 Small fruit size due to decreased cell division 2 Fruit shrivel 3 Decreased shoot growth
Late March to harvest	1 Stage 3 of fruit growth due to enlargement 2 Shoot growth	1 Small fruit size due to reduced cell expansion 2 Fruit shrivel 3 Decreased shoot growth

Table 1. Critical periods for soil moisture in olive groves in the southern hemisphere (adapted from Beede and Goldhammer 1994).

After reviewing only a small amount of international research it would appear that the need to properly plan and implement irrigation for olive production is quite clear. The quality and performance of the irrigation system will be a major asset in crop management and economically viable production particularly in areas of low to medium summer rainfall. Now that the need for good irrigation practices has been established it is important to overview the options for irrigation systems and the individual components that make a system functional.