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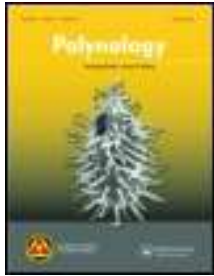
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Time trend in the viability of pollen grains in the 'Picual' olive (*Olea europaea* L.) cultivar

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Time trend in the viability of pollen grains in the ‘Picual’ olive (*Olea europaea* L.) cultivar

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The aim of this study was to evaluate the viability and longevity of the pollen grains of the olive cultivar ‘Picual’, the most extensive and important olive cultivar in the Iberian Peninsula. Over a 3-year period (2007–2009), viability of the pollen grains of 15 ‘Picual’ cultivar trees was measured using the Fluorochromatic Reaction (FCR). These olive trees were distributed along different altitudinal areas of the province of Jaen (southeast Iberian Peninsula). The percentages of viability did not show any geographical variability. In general, the percentage of viability did not vary from one year to another. With an average value of 49%, the viability of the pollen in the cultivar ‘Picual’ could be classified as medium-range. ‘Picual’ pollen grains have the highest viability after 24 hours of anther dehiscence. Viability declines rapidly with time. The longevity of the pollen grains was about seven days. The first three days after anthesis are the most important for fertilisation. A rapid decline in pollen viability may considerably reduce effective fertilisation and could negatively influence fruit production. For this reason, these findings should be considered for the improvement of olive fruit yields.

Keywords: fluorescein diacetate; *Olea europaea* L.; pollen viability; trend line

1. Introduction

Olive trees (*Olea europaea* L.) are one of the most extensively cultivated fruit crops in the world, playing a social and economic role of extreme importance (Barranco et al. 2008). These evergreen trees or shrubs are native to the Mediterranean, Asia and Africa. Tree height ranges from 8 to 15 m. The trees have silvery green leaves and are famous for their gnarled and twisted trunks.

Olive trees have abundant small, fragrant, cream-coloured flowers. There are two kinds of olive flowers: the perfect flower, which contains both male and female reproductive organs, and the staminate flower, which contains only stamens. In olive trees and other hermaphrodite plants, the presence of staminate or imperfect flowers is frequently observed (Reale et al. 2006). According to Cuevas and Polito (2004), the most obvious advantage provided by staminate flower production is the increase in the number of pollen grains available to achieve fertilisation. This is particularly important under anemophily and, as pointed out by Stephenson and Bertin (1983), in species experiencing intense male competition in which the likelihood of paternity is influenced by the quantity of pollen produced. Although the olive tree is an amphiphilous species, its pollination strategy relies mainly on anemophily, with most olive cultivars being

self-fertile (Trigo et al. 2008). A series of studies have revealed that the pollen production and viability of olive groves depend heavily on (among other things) the cultivar of the olive tree, which sometimes presents cases of male sterility (Rapoport 2008).

The fruit is a small drupe which is 1–1.25 cm long and is harvested during its green to purple stage for canned olives and olive oil production. The fruit’s pericarp is usually 60–70% oil, and typical yields are 1.5–2.2 kg of oil per tree per year. Green olives are harvested from the end of September to the middle of November, blond olives from the middle of October to the end of November and black olives from the middle of November to the end of January or early February (Rallo et al. 2005).

With 39% of the world’s total olive oil output, Spain is the biggest olive-growing area in the world. The province of Jaen is responsible for 25% of the total Spanish olive production (Barranco et al. 2008). Olive groves cover 41.5% (571,000 ha) of the total surface area of this province. In this intensive monovarietal cultivation, 97% of olive trees belong to the ‘Picual’ cultivar, which comprises about 50% of Spain’s olive production and about 20% of world olive production. The fruit of this cultivar has a strong but sweet flavour and its oil has some of the best chemical properties found in olive oil (Barranco et al. 2008).

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