

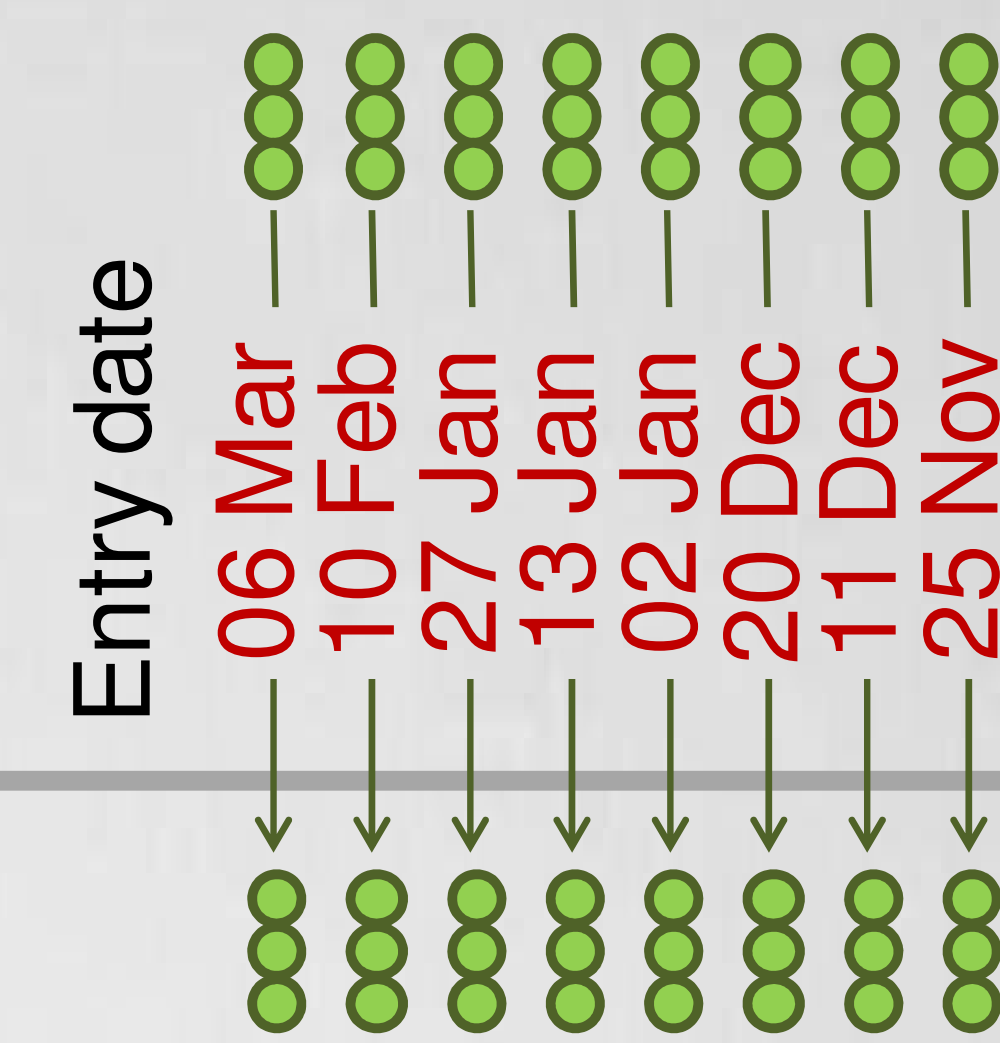
DO OLIVE VEGETATIVE BUDS UNDERGO A REAL DORMANT STATE IN WINTER?

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Introduction

Understanding the mechanisms regulating vegetative and reproductive growth is important for modelling purposes, as the partitioning of carbohydrates is dependent on phenology. In olive trees, floral buds undergo a winter endodormant state that is released once they have been exposed to long enough periods of chilling temperatures (De Melo-Abreu et al. 2004). Similarly, the apical vegetative buds stop their activity during winter, but it is unknown so far whether growth detention is triggered by endodormancy or by the unfavourable low temperature conditions (ecodormancy). The aim of the present work is to shed some light on this issue.

●●● ← Negative control

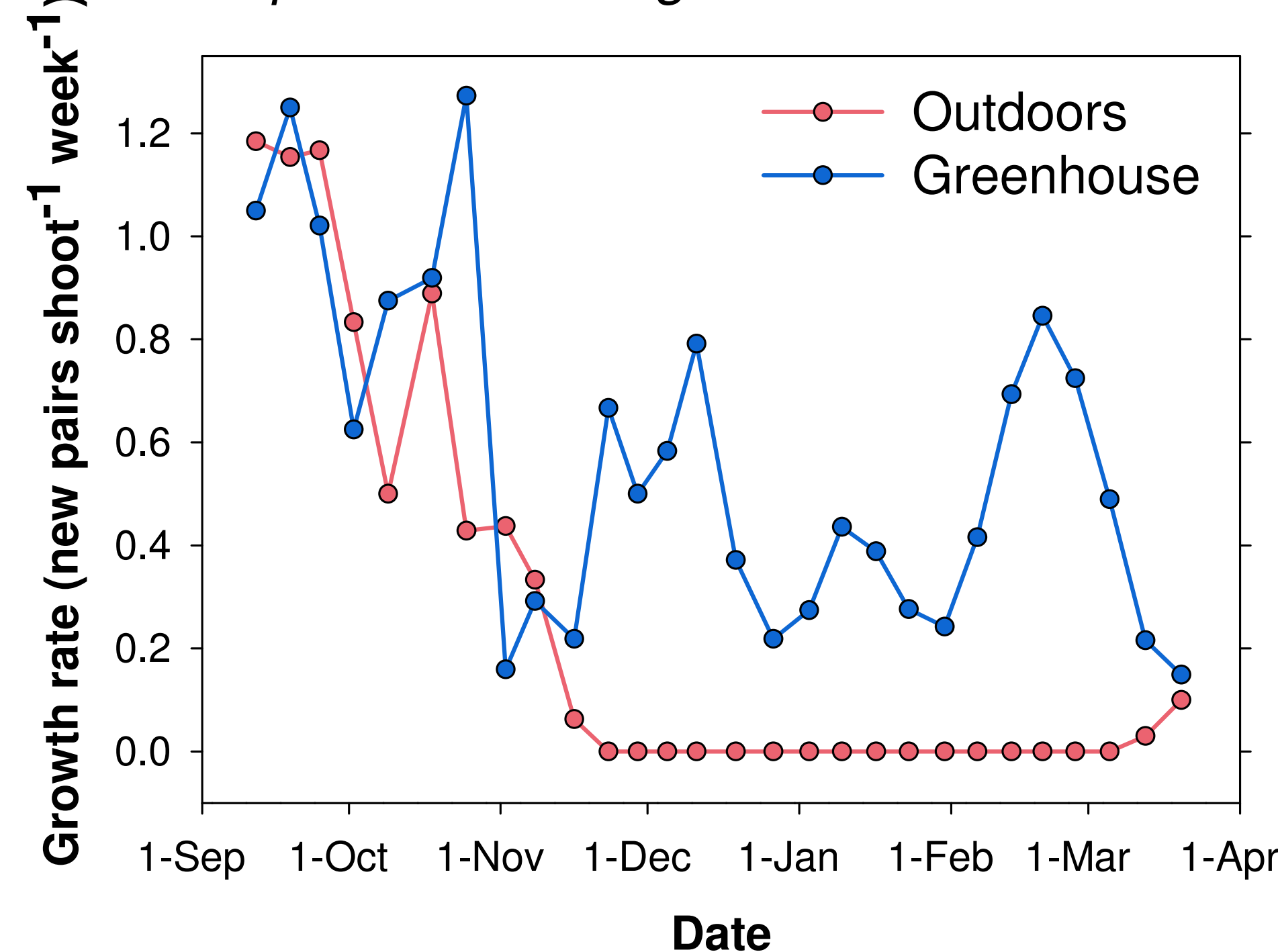


●●● ← Positive control

Greenhouse (T_{min} ≥ 18 °C)



Fig. 1. Seasonal course of growth rate for both the positive and negative controls



Materials and methods

An experiment was carried out in Córdoba (Spain) with 30 young potted olive 'Arbequina' trees. Plants were grouped in sets of three individuals that were transferred to a greenhouse with an optimal temperature for growth at different dates over the course of a winter (from late November to early March). Besides, two additional sets were kept either inside or outside the greenhouse for the whole experiment, serving as reference controls. The activity of vegetative buds was assessed weekly by counting the number of new leaf pairs generated in market shoots.

Fig. 2. Accumulated growth rate versus time after transfer into the greenhouse

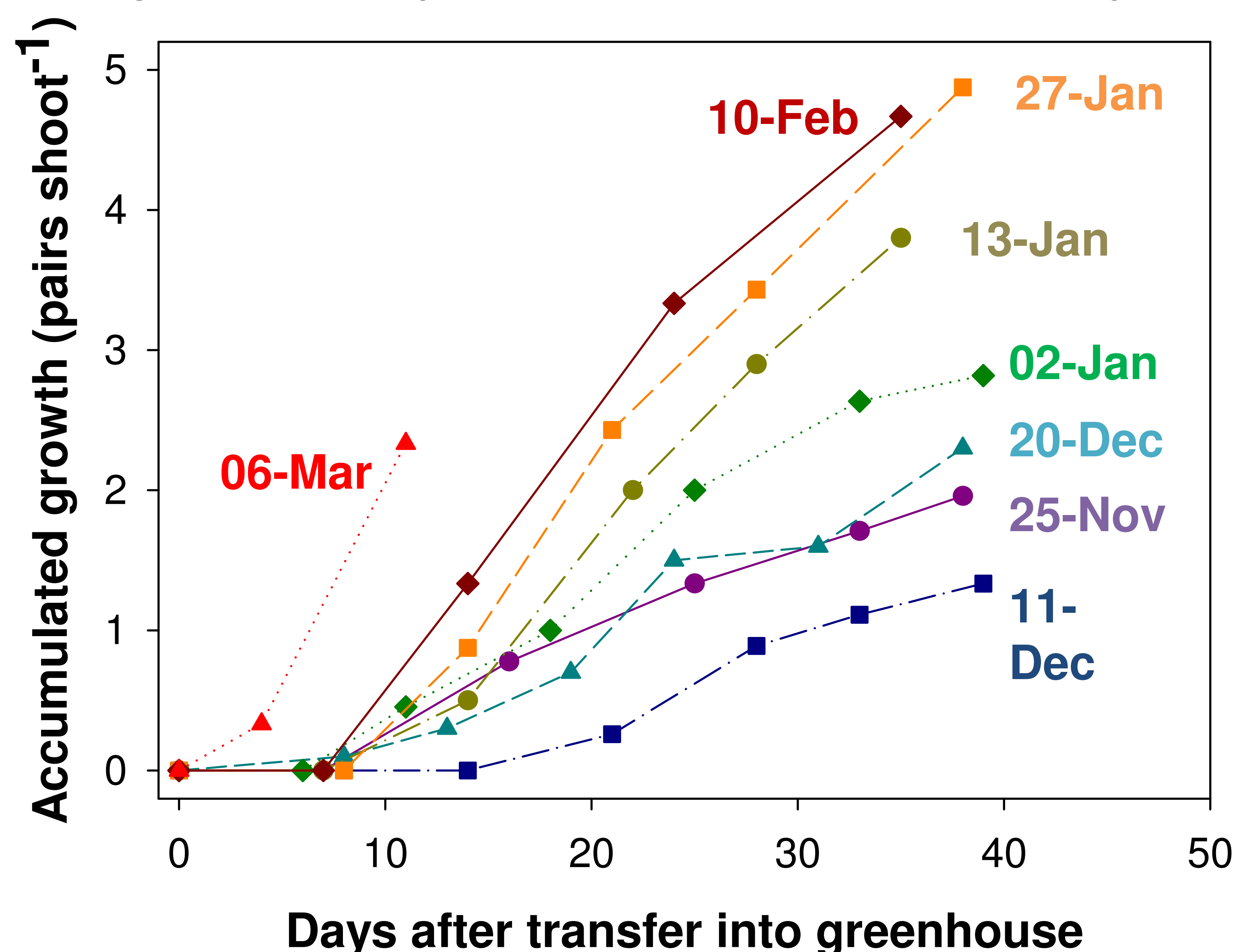


Table 1. Maximum, minimum and average temperature recorded in the greenhouse for the first 21 days after the entry date in each set of plants

Symbol	Entry date	T _{max}	T _{min}	T _{av}
—●—	25-Nov	28.0	18.1	22.1
- -■- -	11-Dec	26.1	17.7	21.6
- -▲- -	20-Dec	25.8	18.0	21.7
...◆...	02-Jan	25.3	17.8	21.5
- -●- -	13-Jan	26.0	17.9	21.6
- -■- -	27-Jan	25.5	18.0	21.6
—◆—	10-Feb	27.5	18.0	22.2
...▲...	06-Mar	29.6	18.3	23.2

Main findings:

Outdoors plants stopped their activity between mid-November and mid-March, whereas no growth detention was observed for those kept into the greenhouse (Fig. 1). In all the remaining sets of plants, apical buds resumed their activity fairly soon after their entry into the greenhouse (< 3 weeks), but both the time for and rate of new leaf apparition was influenced by the date of entry (Fig. 2): growth resumption took longer and growth rates were lower for the plants transferred into the greenhouse by early winter. Besides, differences in greenhouse temperature were apparently negligible (Table 1)

Conclusion:

Olive apical buds undergo an easily-reversible endodormant state in winter

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