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Inter-specific differences in growth, leaf phenology in seedlings of *Quercus suber* L., *Quercus canariensis Willd* and their hybrid (*Quercus afares* Pomel) grown in the nursery

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Outside of the systematic, leaf longevity (Leaf lifespan) is used to classify trees into two main groups: evergreen and deciduous species. It varies significantly according to the forms of life between taxonomic groups and the long succession gradient. Co-occurrence of winter-deciduous and evergreen oaks is common in some Mediterranean type climate areas. Nevertheless, in the Tunisian forests, we don't have enough information about the functional inter-specific diversity among oak species, particularly in the mixed stand marked by the simultaneous presence of cork oak (*Quercus suber* L, evergreen oak), zeen oak (*Quercus canariensis Willd*., deciduous oak) and their putative hybrid (*Quercus afares* Pomel, deciduous), endemic oak species threatened with extinction. This study has been designed to estimate the leaf lifespan, the relative growth rate in height (RGRH) and in basal diameter (RGRBD), and the count of different growth flushes in samplings in semi-controlled conditions (nursery), it made at 4 weeks interval and observations on each plant over 17 months. The aim is to better characterize and compare the hybrid to the co-occurring parental species for these functional traits. Differences were observed between parental species and their hybrid, both at growth and phenology. Indeed, *Q. suber* saplings reached higher total height and number of growth flushes (7 flushes per year) then saplings of *Q. canariensis h*ad established an average of 5 flushes per year, while *Q. afares* individuals showed much less growth flushes (2 units per year) and are the less performing specie. Also, the leaf lifespan of seedling of two species (*Q. suber* and *Q. canariensis*) has exceeded the duration of the experiment on most of cohorts, but their hybrid (*Q. afares*) lost all leaves on all cohorts. The shorter leaf lifespan of *Q. afares* is in accordance with its phenology in the field but for *Q. canariensis* the long leaf lifespan contrast with observations for adult trees in the field where phenology is strictly annual. This study allowed us to differentiate the hybrid *Q. afares* of both parental species through the characterization of growth and leaf lifespan at seeding stage.

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Effect of using two different types of nanoparticles for pineapple (*Ananas comosus* Merr.) *in vitro* plant proliferation and growth

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The aim of this research was to determine the proliferation and growth effect of nanoparticles Ag and Cu in pineapple (*Ananas comosus* Merr.) *in vitro* plants. Two types of nanoparticles were used, both of them had 20 nm size. The *in vitro* plants (approximately 15 mm length) were inoculated in to a proliferation medium. Four treatments were established: 5, 10, 15 and 20 µg/ml for each type of nanoparticles and a control without nanoparticles. The assessed variables consisted of the average number of days for multiplication, average number of plantlets per plant and the average stem length. This study determined that, in general, the Ag-nanoparticle promoted the growth of the *in vitro* plants under this assay, when compared to the Cu-nanoparticles. The lowest Ag-nanoparticle dose (5 µg/ml) evidenced the best results for the assessed variables. Additionally, the ANOVA analysis also evidenced that the plants treated with Ag-nanoparticle (5 µg/ml) increased their proliferation when compared to the control group.

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