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# Optimization of seasonality and mother plant nutrition for vegetative propagation of *Pinus pinaster* Ait

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**Abstract** Due to the high economic importance of *Pinus pinaster* Ait., there is considerable interest in developing, improving and extending the use of its families for mass clonal propagation and in breeding programmes. In the current study, we evaluated shoot growth, rooting ability and mini-cuttings production of *P. pinaster* in response to nitrogen fertilization and seasons. We compared eight half-sib families of *P. pinaster* from Asturias and Galicia (Northern Iberian Peninsula), searching for useful parameters and growing conditions to be included in a mass propagation program for clonal family forestry. We fertilized *P. pinaster* seedling mother plants kept in a greenhouse with three levels of nitrogen: high (HN), medium (MN) and low (LN) to evaluate rooting ability of mini-cuttings. In addition, we evaluated the maximal potential production of rooted mini-cuttings considering nine cycles of propagation over 1 year, also using three levels of nitrogen. The HN treatment significantly influenced the rooting process, with length, area and volume of roots all being positively affected. Spring was the most favourable season for mini-cuttings in the HN treatment. This study provides valuable new information to optimize the clonal propagation protocol for *P. pinaster* and shows that the mini-cuttings technique has great potential in mass scale cloning, providing high quality sprout production and well-formed new plants.

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