Towards a better understanding of conifer somatic embryo development via proteomic analysis

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Development of clonal propagation method, such as somatic embryogenesis (SE) has potentially numerous applications such as the production of a large number of genetically improved plants. It is necessary to optimise somatic embryo development, which remains difficult in pine species. Since the early protocols of SE were developed for spruce species (*Picea*), it was assumed that they would be applicable to pines; however, it became apparent that pines were less responsive. One limitation to large-scale propagation of majority of commercial pine species through SE is the lack or low somatic embryo maturation efficiency, which result in the inability to capture certain families. This has caused great concerns among breeders and foresters of potential adverse selection pressure.

Current maturation protocols lead to a development of mature somatic embryos that morphologically resemble zygotic embryos. These somatic embryos are harvested after arbitrarily chosen periods of time and are germinated and further grown in a greenhouse. This procedure only gives an indication that the maturation was successful if produced somatic embryos were able to convert to plants. Such an empirical approach does not give any information of the quality of somatic embryos with respect to storage reserves accumulation or water content, nor does it gives information on the optimal time for harvesting to achieve maximal plant conversion rates. Therefore, there is a need to develop markers that could be used for quality control of different batches of somatic embryos that are matured, or when different maturation protocols are applied. Storage protein accumulation and hydrous potential have been followed and the identity of the proteins accumulated by the somatic embryos has been tested by 2D gel electrophoresis.

Final objective is to have a better understanding of the maturation of *Pinus pinaster*. The description of SE would contribute to optimise the maturation process and the *in vitro* production of plants.