3.3 = Propagation techniques of *Abies nebrodensis* by the side-veneer graft

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Abies nebrodensis (Lojac.) Mattei is the most expressive element of the Sicilian Forest flora and the Madonie Natural Park, representing one of the most considerable species to be protected due to his endemic character, relict significance and serious risk of extinction. This species, included in Annexes II and IV of the Habitats Directive (92/43/EEC), is critically endangered according to the I.U.C.N. classification. For this reason, over the last 20 years, two LIFE Nature projects have been implemented (n° LIFE2000NAT/IT/7228 and LIFE18 NAT/IT/000164), with the aim of removing or limiting the endangered conditions of the species by implementing both *in situ* and *ex situ* conservation actions.

For the *ex-situ* conservation and to preserve the genetic heritage of the 30 mother trees, a clonal orchard was created within the Piano Noce Regional Forest Nursery in the municipality of Polizzi Generosa using the grafting propagation. Scions were taken from the mother plants of *A. nebrodensis,* growing in the native range at the end of winter, soon before the beginning of the growth cycle during the vegetative rest period. The field activity was carried out on three consecutive days (29, 30 and 31 March 2022), taking scions from plants no. 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 19, 20, 22, 26, 27, 28, 29, 30, 32. Due to adverse environmental conditions and/or the absence of suitable plant material, plants no. 2, 15, 21, 23, 24, 25, 31 were grafted in April 2023.

The entire process was carried out following a specific protocol. Scions were harvested by selecting the most vigorous branches of the last growing season, free of floriferous buds, with a cross-section of no less than 5 mm. Harvesting was carried out on primary branches at a height of approximately 4 m, topping the primary branch for a maximum of 10-20 cm and releasing part of the branch. This technique will allow the underlying bud to resprout and the cut branch to continue its growth. The material collected was labelled with the initials of the mother tree of origin, placed inside plastic bags and stored at +4° C at the Piano Noce RFN. The number of scions harvested from each plant was different in relation to the different ecophysiological and structural conditions of the individuals.

Grafting was carried out the day after harvesting.

The rootstocks used were between 10 and 15 years old and at least 5 mm in diameter. They came from *A. nebrodensis* open pollinated seedlings. The side-veneer grafting procedure was mainly used and only in few cases double side-veneer grafting was followed.

The side-veneer graft consists of joining the scion to the rootstock without cutting it. Each scion was prepared according to the typical guidelines of side-veneer grafting, while a longitudinal shaping of the same width as that made on the scion was carried out on the rootstock, after removing the needles on a portion of the stem at least 5 cm long, also making a small wedge at the base of the cut to favour the adhesion of the two bionts.

The scion, after being inserted inside the wedge by matching the vascular cambium of the two bionts, was tied with elastic grafting bands and covered with healing mastic. The graft was then wrapped with aluminium paper and covered with a PE bag. For the year 2022, the total number of grafts performed was 454, and the average rate of living grafts was around 33% after one year. Such a high success rate has never been achieved in the grafting of *A. nebrodensis*.