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D.1 Micropropagation of *Viola ucriana* Erben & Raimondo a critically endangered taxon for the Mediterranean region

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Keywords: biodiversity conservation, micropropagation, *Viola ucrìana*.

Plant tissue culture is a technique in which plant cells, tissues or organs are isolated from mother plants and growth on artificial media. It is a powerful tool that could be used not only for micropropagation of crops, decorative plants, and production of metabolites but also for biodiversity conservation purposes. *In-vitro* conservation, based on micropropagation, is considered as one of the most efficient methods for *ex-situ* conservation. Moreover, it could be considered strategic for preventing biodiversity losses and for reinforcing populations in regions of the word known to be rich in biodiversity like Mediterranean area. In particular, this region is rich of endemic plants species that evolve differently to adapt better to a specific environment. For this reason, it has been recognized as one of the first 25 Global Biodiversity Hotspots. Unfortunately, the biodiversity of this region is threatened by human activity. One example is represented by *Viola ucriana*. Ucria's violet is a rare plant which has been recognized as Critically Endangered Species according to International Union Conservation for Nature (IUCN) Red List Criteria. In addition, it is included in the top 50 of the threatened plant species of Mediterranean islands. Ucria's violet appear to be near to the extinction and preservation measures are needed. Shoot tips were obtained from germinated seeds collected near the peak of Mt. Pizzuta (Palermo, Sicily) and successfully sub-cultured *in-vitro*. We developed an efficient micropropagation protocol for Ucria's in which we combined the use of two different plant growth regulators (BAP and Zeatin) at different concentration. This protocol increased the laboratory plants population but a specific concentration of Auxin was needed to produce plants with a complete developed root apparatus. The protocol permitted us to produce well developed plant useful for reintroduction and translocation activity. The first trial will take place in Autumn in the University of Salento botanical garden.

D.2 A multidisciplinary approach for studying the invasion mechanisms of the alien tree species *Ailanthus altissima* (Mill.) Swingle

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Keywords: invasive species, remote sensing, C and N stable isotopes, metagenomic analysis, microbiome.

Ailanthus altissima is a fast growing species, originating in Asia, introduced in Europe for ornamental purposes in the second half of the 18th century. It is currently considered as one of the most invasive woody plant in Europe, so as to be included in the list of invasive alien species of European Union concern. This species shows a strong pioneering character, easily adapting to a wide range of urban, rural and forest ecosystems; it has spread widely in temperate and Mediterranean regions of the world. Winged seeds dispersion, numerous root suckers, as well as adaptability to different soil types and water regimes, have favored the spread of *A. altissima*, especially in disturbed areas along roads. It also threatens biodiversity through competition, population reduction and habitat modification. Effective management and control of such species is needed to reduce the pressure on ecosystem and limit further spread. Within the frame of the CNR-funded USEit project (Use of operational synergies for the integrated management of invasive alien species in Italy), we used a multidisciplinary approach for investigating *A. altissima:* we selected several pilot experimental sites across central and southern Italy, with the following aims: i) detecting and mapping the spatial distribution by GIS and remote sensing; ii) investigating the symbiotic relationships between *A. altissima* and associated mycorrhizae by means of stable isotopes techniques; iii) understanding the role of microbiomes in the Evolution of Increased Competitive Capacity (EICA) of *A. altissima* by metagenomic sequencing analysis of bacterial and fungal communities colonizing the root system of *A. altissima.* The original results of this study will be discussed in the frame of the current state of the art of *A. altissima* mechanisms of invasiveness.