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Application of spectral signature of selected Invasive Alien Plants (IAPs) of Malta and Sicily for ecological monitoring

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Abstract

The detection and characterization of spectral signatures offer an efficient and cost-effective method for the assessment and monitoring of the distribution range of IAPs. The development of geospatial technology, specifically remote sensing, is no longer limited to satellite imagery. In fact, in the last decade, consumer-grade Unmanned Aerial Vehicles (UAVs) have extended the accuracy of vegetation mapping.

Spectral characterization of the most widespread IAPs of the Maltese Islands (including *Agave* spp., *Ailanthus altissima*, *Arundo donax*, *Cardiospermum* spp., *Ricinus communis* and *Opuntia ficus-indica*) is being used to produce vegetation maps in Special Areas of Conservation (SACs) of the Maltese Islands, including L-Inħawi tax-Xlendi u tal-Wied tal-Kantra (Gozo); Rđumijiet ta' Malta: Mix-Xaqqa sal-Ponta ta' Bengħisa (western coast of Malta) and Il-Magħluq tal-Baħar ta' Marsaskala (southern Malta). All mentioned localities are protected areas of the Natura 2000 network of the Maltese Islands.

Using open access satellite imagery available from the USGS Earth Explorer portal, published data from the SIntegraM project and novel material from dedicated UAV surveys, the spatial distribution and range expansion of IAPs will be assessed and validated by ground-truthing. The variability of the spectral signature due to the species phenology and seasonal illuminance is considered in the classification method used for the vegetation mapping.

The workflow of the methodology will be easy to follow, accessible to everyone and reproducible. The dynamic mapping of IAPs over time would set the baseline for future conservation measures and facilitate the science-based management of the protected areas.

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