



Developing a Novel Martelloscope for Assessing Biodiversity and Growing Stock Volume with the aid of a Digital Twin

Introduction

As part of the OG, an experimental martelloscope was used, where trees were surveyed through acquisition with the Geoslam ZEB Portable Laser Scanner system, which made it possible to recreate a 3D digital twin. Then, for each of the trees surveyed and forming part of the martelloscope, dendromicrohabitats were then obtained by means of traditional surveying, which made it possible to derive the Index of Potential Biodiversity (IBP) for each tree, in order to be able to introduce the quantification of biodiversity into the forest management plans and provide the users of the "gymnasium" an output in relation not only to productive interventions (wood growing stock) but also silvicultural interventions that take into account the biodiversity parameters.

Operationally, in a 1-hectare area of transitional beech stand, each individual tree (tree or sucker) was numbered, measured (crown insertion height and total height) and georeferenced, and its calculated volume and position data recorded in special software. In addition, each individual tree or stump was checked for the presence of dendrothelia (alterations, cavities, cracks in the stem and branches) that may constitute microhabitats for various plant and/or animal species and increase the ecosystem value of the stand in terms of biodiversity.

Lessons learned

The use of new technologies is becoming more and more widespread in the analysis and monitoring of forest stands, and in particular forestry application of mobile LiDAR is becoming more widespread as it allows a considerable reduction in survey time and costs and returns good data accuracy, whereas up to now it has been used mainly in the building and infrastructure sector. Furthermore, the monitoring and quantification of biodiversity variation based on silvicultural choices made with the martelloscope is a useful added value for forest sustainable management, ecosystem services enhancement, as well as production aspects.

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Further information

<https://www.innovarurale.it/pei-agri/gruppi-operativi/bancadati-go-pei/biodiversita-e-servizi-ecosistemici-foreste-e-territorio>



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