Forest Structural Attributes and Tree-Related Microhabitats in Central and Southern Apennines (Italy): An Open Dataset

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Abstract:

Forests cover about one-third of Earth's landmass and provide essential ecosystem services that benefit human health, well-being, and environmental balance. These ecosystems play a critical role in mitigating climate change by acting as carbon sinks and contributing to global biodiversity conservation. Monitoring forest attributes—both structural and compositional—is essential for assessing their evolution. However, fieldwork is time-consuming and costly, particularly when acquiring data on biodiversity-related structures like deadwood and microhabitats, which require additional effort due to their complexity and diversity.

This study presents a set of field-based forest attributes collected between 2012 and 2018 in the Appennine mountains of Italy. Data were gathered from six forest sites – Gran Sasso, Abeti Soprani, Bosco Pennataro, Matese, Cilento, Aspormonte, from north to south - across four Italian regions: Abruzzo, Molise, Campania, and Calabria. These sites included a range of forest management regimes, from old-growth forests to orchards, with a total of 199 circular plots (13-meter radius) sampled. The dataset includes data on living trees, deadwood, and tree-related microhabitats, aiming to promote collaboration among researchers and enhance the study of forest ecosystem evolution.

The sampling method was systematically aligned across most sites, except for Gran Sasso and Cilento, where a non-aligned systematic approach was used. For each sampling station, UTM coordinates (WGS84 33N) and altitude were recorded using a GPS. Living trees with a minimum diameter at breast height (DBH) of 10 cm and deadwood with a minimum diameter of 5 cm were measured, marked, and numbered. Data recorded for each tree included DBH, height, species, and canopy cover (estimated visually).

The survey also included dead downed trees, snags, coarse woody debris, and stumps, for which lengths, heights, and diameters were measured. Snags were defined as standing dead trees without crowns, at least 1.3 meters tall, while standing dead trees with crowns (dead branches and twigs) were also noted. The volumes of living trees, standing, and dead downed trees were calculated using the double-entry volume equation, while snags, coarse woody debris, and stumps were assessed using the cone trunk formula.

This dataset, following a standardized sampling protocol, provides valuable information for the analysis of forest structure and biodiversity, facilitating the assessment of forest ecosystem dynamics and evolution.