



Monitoring forest dieback phenomenon in Italy: the key role of the SilvaCuore application

Maria Castellaneta¹, Marco Borghetti¹, Michele Colangelo¹, Angelo Rita², Giacomo Colle³, Martina Pollastrini⁴, Filippo Bussotti⁴, Giovanni Iacopetti⁴, Salvatore Seddaiu⁵, Pino A. Rui⁵, Bruno Scanu⁶, Giovanni Piras⁵, Andrea Lentini⁶, Donato Salvatore La Mela Veca⁷, Eustachio Tarasco⁸, Agatino Sidoti⁹, and Francesco Ripullone¹

¹University of Basilicata, Potenza, Department of Agricultural, Forest, Food and Environmental Sciences, Viale dell'Ateneo Lucano, 10, Potenza, Italy (maria.castellaneta@unibas.it; marco.borghetti@unibas.it; michele.colangelo@unibas.it, francesco.ripullone@unibas.it)

²Università di Napoli Federico II, Dipartimento di Agraria, via Università 100, 80055 Portici, Napoli, Italy (angelo.rita@unina.it)

³Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria, Via della Navicella 2/4, Roma, Italy (giacomo.colle@crea.gov.it)

⁴Università degli Studi di Firenze, Dipartimento di Scienze e Tecnologie Agrarie, Alimentari, Ambientali e Forestali (DAGRI), Italy (martina.pollastrini@unifi.it; filippo.bussotti@unifi.it; giovanni.iacopetti@unifi.it)

⁵Servizio della Ricerca per la Sughericoltura e la Selvicoltura, Agris Sardegna, Via Limbara 9, 07029 Tempio Pausania (SS), Italy (saseddaiu@agrisricerca.it; parui@agrisricerca.it; gvnpiras@agrisricerca.it)

⁶Università degli Studi di Sassari, Dipartimento di Agraria, Viale Italia 39A, 07100, Sassari, Italy (bscanu@uniss.it; lentini@uniss.it)

⁷Università di Palermo, Dipartimento Scienze Agrarie, Alimentari e Forestali, viale delle Scienze, Edificio 4, Ingresso H, 90128, Palermo, Italy (donato.lamelaveca@unipa.it)

⁸Università degli Studi di Bari "Aldo Moro", Dipartimento di Scienze del Suolo della Pianta e degli Alimenti (DiSSPA), Bari, Italy (eustachio.tarasco@uniba.it)

⁹Regione Siciliana, Dipartimento dello Sviluppo Rurale e Territoriale, Servizio 11 - Servizio per il Territorio di Catania, via Antonio Santangelo Fulci 40, 90127, Catania, Italy (asidoti@regione.sicilia.it)

Over the last years several forest dieback and mortality phenomena were reported across the Italian Peninsula underline an enhanced forest vulnerability due to the occurrence of extreme climate events, such as heat waves and severe droughts. During summer 2024 acute and extensive impacts, with severe defoliation, dieback and mortality, on Mediterranean forests (*Quercus ilex*, *Quercus suber*, *Phillyrea* spp. and several other sclerophyllous shrubs) were detected in various regions of Italy predominantly in Apulia, Sardinia and Sicily. Currently, in Italy as well as in other Mediterranean countries is lacking a clear picture of this emerging phenomenon, of the forest species more sensitive and the quantification of the affected forest surfaces. It is, therefore, necessary to improve the monitoring network within the regional territories to assess environmental drivers and dynamics of impacts with a multidisciplinary approach that includes ecophysiological and phytopathological aspects. In this contest, the SilvaCuore application, the first App designed in Italy by the University of Basilicata and Effetreseizero S.r.l., as a part of a Citizen Science project, can play a key role to survey declining

forest stands within the Italian territory. The support of an active users' community can not only allow researchers to survey declining forest sites, but also to better plan research activities and management measures. Specifically, SilvaCuore is a Web-application that can be used directly from smartphone, tablet or PC, and drives the user in reporting information step by step with few simple clicks thanks to a user-friendly interface. The data to be provided are the tree species, symptom detected (i.e. defoliation, drying crown, bark necrosis etc.), the uploading of some descriptive photos and the geo-localization on the map. In this context, the App allowed to identify most of the affected areas by mapping the extension and contributing to the development of a valuable scientific database in Italy. Monitoring of forest health is crucial for implementing appropriate adaptive management strategies and for improving the resilience of declining stands. Indeed, the selection approach may drive the existing legislation and forest management still ill-suited to the current conditions of forest stands affected by climate change.