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"FORESTRY AND ENVIRONMENTAL SCIENCES" (CLASS LM-73)

CURRICULUM: MEDITERRANEAN FORESTRY AND NATURAL RESOURCES MANAGEMENT

"Measuring Telomere Length in Plant and Tree Species"

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ABSTRACT

Telomeres are specialized nucleoprotein complexes located at the ends of chromosomes to protect them and ensure cell viability. In humans, telomere length research has gained great relevance because of its key role in aging and in aging-associated illnesses such as cancer, or cardiovascular disease. However, very little is known about the functional significance of telomere length in plants. To gain a better understanding of telomere biology in plants, a new technique based on quantitative real-time PCR (qPCR) to measure telomere length was developed and successfully used in *Arabidopsis thaliana*, *Zea mays* and *Populus* spp. A correlation between this newly standardized qPCR method and the conventional Terminal Restriction Fragment (TRF) analysis by Southern blot was established to validate the data. Furthermore, a comprehensive overview of the different steps involved in planning and executing a research study of telomere length in plants was provided. This can open new avenues for basic plant telomere biology research. This novel procedure will facilitate the analysis of plant telomere length (PTL) from low amounts of tissues. It can be further exploited to study plant aging and responses to environmental stress in order to determine if telomere length can be used as potential biomarker of stress. Together, these data will make a significant contribution to telomere biology in plants and can have implications on plant breeding and improvement programs.