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Assessing potential changes of weather-related risk on chestnut productivity

Mário Pereira (1,2), Tomas Calheiros (2), Joaquim Pinto (3), and Liliana Caramelo (1)

(1) Centro de Investigação e de Tecnologias Agro-Ambientais e Biológicas (CITAB), Universidade de Trás-os-Montes e Alto Douro, Vila Real, Portugal, Vila Real, Portugal (gpereira@utad.pt, lcaramel@utad.pt), (2) IDL, University of Lisbon, Lisbon, Portugal (tlmenezes@fc.ul.pt), (3) Institute for Geophysics and Meteorology, University of Cologne, Cologne, Germany

Weather conditions play an important role during different phases of the vegetative cycle of the chestnut trees and, consequently, several meteorological parameters seem to be associated chestnut productivity (Heiniger and Conedera, 1992, Cesaraccio et al., 2001, Wilczynski and Podalski, 2007, Gomes-Laranjo et al., 2008, Dinis et al., 2011, Pereira et al., 2011). Observed data from European Climate Assessment and simulated data by COSMO-CLM model for the actual (C20) and future (A1B and B1) climate scenarios were used in this study to: (i) assess the model ability to reproduce weather parameters distribution; and, (ii) to assess future changes in the distribution of meteorological parameters which play an important role in the productivity of chestnut for different future periods. Results points to statistical significant changes in the mean and in variance in the future, more prominent in temperature than in precipitation based parameters. Changes in precipitation will be more significant in Northwestern Iberian Peninsula and France in the end of the 21st century for A1B scenario conditions. As expected, more significant changes will be expected to occur during spring and summer, in the Mediterranean areas and in the later period. The number of days with Tmax<28ºC will generally decrease in both scenarios, while the changes in the number of days with 24ºC<Tmax<28ºC, when the maximum photosynthetic activity occurs, are more significant over Tirrano Region (Italy) and Northwestern Iberian Peninsula. The number of days with air temperature is above 32ºC, the termoinhibition threshold for adult trees, will be more frequent in the future. The number of days with Tmin<10ºC, in February, will decrease in the Iberian Peninsula and France. These changes will induce alterations in productivity of chestnut in Europe, in some areas of production.

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