

## Chestnut trees (*Castanea sativa* Mill.) for climate change

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Abstract:

As climate changes, getting warmer and drier in countries within the Mediterranean Basin, selection of new chestnut trees to be planted in orchards and forests is needed. In 2015, the Faculty of Forestry at Universidad de Extremadura (Spain) initiated a breeding program aimed to select *Castanea sativa* genotypes tolerant to global change. This program is currently supported by chestnut growers, regional funds and the Ministry for the Ecological Transition. Nuts from natural *C. sativa* stands located in Andalusia (Constantina and Paterna del Río) and Extremadura (Hervás and Valle de Matamoros) were collected and sown under a randomized block design. Circa 300 one-year-old seedlings per population were challenged with *Phytophthora cinnamomi* for two years. The eight most tolerant plants were selected, established *in vitro* and micropropagated. Clonal replicates were subjected during two years to drought, heat, waterlogging, and *P. cinnamomi* conditions (n=8). Commercial 111-1, 7521, 2671 and 90.044 clones, tolerant to *P. cinnamomi*, were included in the tests as controls. Two *C. sativa* genotypes, 'Paterna del Río 18' and 'Valle de Matamoros 1', showed resistance to *P. cinnamomi*, high levels of tolerance to drought and heat stress, and acceptable levels of tolerance to waterlogging. SSR markers confirmed that both clones were *C. sativa*. Replicates have been planted in two different experimental field plots in order to assess plant performance and adaptation (n=10). 'Paterna del Río 18' and 'Valle de Matamoros 1' will be registered soon, being the first chestnut clones tolerant to climate change deployed in Spain.

Keywords: tree breeding, climate change, ink disease