



## Soil cover by natural trees in agroforestry systems

C. G. H. Diaz-Ambrona (1), C. Almoguera Millán (1), and A. Tarquis Alfonso (2)

(1) AgSystems, ETSI Agronomos, Universidad Politecnica de Madrid, Madrid, Spain (carlosgregorio.hernandez@upm.es)  
/Fax +34 91 544 99 83), (2) ETSI Agronomos, Universidad Politecnica de Madrid, Madrid, Spain (anamaria.tarquis@upm.es)

The dehesa is common agroforestry system in the Iberian Peninsula. These open oak parklands with silvo-pastoral use cover about two million hectares. Traditionally annual pastures have been grazed by cows, sheep and also goats while acorns feed Iberian pig diet. Evergreen oak (*Quercus ilex* L.) has other uses as fuelwood collection and folder after tree pruning. The hypothesis of this work is that tree density and canopy depend on soil types. We are using the Spanish GIS called SIGPAC to download the images of dehesa in areas with different soil types. True colour images were restored to a binary code, previously canopy colour range was selected. Soil cover by tree canopy was calculated and number of trees. Processing result was comparable to real data. With these data we have applied a dynamic simulation model Dehesa to determine evergreen oak acorn and annual pasture production. The model Dehesa is divided into five submodels: Climate, Soil, Evergreen oak, Pasture and Grazing. The first three require the inputs: (i) daily weather data (maximum and minimum temperatures, precipitation and solar radiation); (ii) the soil input parameters for three horizons (thickness, field capacity, permanent wilting point, and bulk density); and (iii) the tree characterization of the dehesa (tree density, canopy diameter and height, and diameter of the trunk). The influence of tree on pasture potential production is inversely proportional to the canopy cover. Acorn production increases with tree canopy cover until stabilizing itself, and will decrease if density becomes too high (more than 80% soil tree cover) at that point there is competition between the trees. Main driving force for dehesa productivity is soil type for pasture, and tree cover for acorn production. Highest pasture productivity was obtained on soil Dystric Planosol (Alfisol), Dystric Cambisol and Chromo-calcic-luvisol, these soils only cover 22.4% of southwest of the Iberian Peninsula. Lowest productivity was obtained on Dystric Lithosol.