PREDICTIVE MODELING OF SPECIES DISTRIBUTIONS: OCCURRENCES AND ENVIRONMENTAL VARIABLES WITH FRUIT TREES

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The identification of what geographic and environmental factor might determine species range limits in fruit trees is specially important for understanding why some regions, such a mountains, have elevated biodiversity. The main goal of this work was to predict the spatial distribution of old pear and apple cultivars located in abandoned areas and at risk of extinction, that are supposed to have an important agronomic and genetic value This study was conducted in mountain areas of Aragon (Spain) with different geographic features. These areas included the Pyrenees and Iberian System Locality data for these local species were collected using a GPS and an intensive inventory of these geographic areas was elaborated with an important number of local pear and apple trees. Based on this inventory, a specialized database was created to describe each tree´s individual attributes, including different environmental variables (climate and topography) that influence in the persistence of species and germplasm diversity. Thus, occurrence data from these regions combined with digital layers of environmental variables were used to predict potential distributions of these fruit trees in both geographic areas using a niche-based model constructed from presence only data (Maxent). The study showed that Maxent model is improved if the analysis is performed in the mountain areas separately, optimizing the geographical area although the number of occurrences used is less. In addition, this model revealed that the influence of several environmental variables depend on the study geographic region, Mediterranean or Subalpine mountain climate. These results support our previous results obtained with multinomial logistic regression analysis frequently used for modelling species distributions. The environmental factors characterizing the potential geographic distribution of these fruit trees might help in future breeding programs to create new fruit tree crosses and varieties adapted to determined cultivated regions.