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Abstract

We illustrate the need to take nutritional soil variables into account when modelling plant species distribution, through the predictive modelling of *Acer campestre* L. distribution in forests from France.

We used presence/absence information of *Acer campestre* in 3,286 forest plots scattered all over France, coupled with climatic and soil resources information. More than 150 climatic variables (temperature, precipitation, solar radiation, evapo-transpiration, water balance) were obtained by a geographic information system (GIS), and six direct soil variables (pH, C/N ratio, base saturation rate, concentrations of calcium, magnesium and potassium) were available from EcoPlant, a phytoecological database for French forests. Using forward stepwise logistic regression technique, we derived two distinct predictive models for *Acer campestre*, the first one including climatic variables only, the second one including climatic and soil variables. To validate the ecological models, we had access to 88,004 supplementary relevés from the French National Forest Inventory (IFN).

We found that the distribution of *Acer campestre* was poorly modelled when including climatic variables only (global success rate of prediction of presence/absence S = 55 %), and that the inclusion of soil variables significantly improved the quality of prediction (S = 81 %) for this species, allowing prediction of patches of presence/absence at local scales.

We conclude that nutritional variables may improve some plant species distribution models.

Key words

Acer campestre, species distribution modelling, predictive mapping, generalised linear modelling, climatic variables, nutritional variables, EcoPlant, France.