

Boulanger, V, Ch Baltzinger, S Said, Ph Ballon, JF Picard, JL Dupouey (2009) Ranking temperate woody species along a gradient of browsing by deer. Forest Ecology and Management 258 (2009): 1397-1406

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Abstract

As a result of diverse management policies, densities of red and roe deer have varied considerably for the last few decades in Europe. Their selective browsing on woody species can modify the interactions between competing species and thus change overall patterns of plant diversity in forests. However, no classification of woody species according to browsing by deer yet exists in Europe. The selectivity index, which measures the balance between availability and consumption of plant species by herbivores, could be used for such a classification. The aim of this study was, first, to rank woody species according to this selectivity index, then to test whether their rank changed when browsing pressure varied in space or time. We also explored morphological and ecological life traits (Ellenberg indicator values) that might explain differences in selectivity. In 2006, we re-sampled a network of 217 coupled floristic and browsing survey plots, which had been previously described twice (1976, 1981). The plots were located in the forest of Arc-en-Barrois (France), a large woodland area divided into a North and a South Forest which have had different histories of browsing pressure. For the three samples and the two forests, we calculated a selectivity index for 19 woody species. Dogwood (*Cornus* sp.) and field rose (*Rosa arvensis*) appeared to be the most selected species whereas beech (*Fagus sylvatica*), common mezereon (*Daphne mezereum*) and wild-service tree (*Sorbus torminalis*) were always avoided. The rank order of species according to their selectivity index

remained stable over the three sample years and between the two forests (Spearman's rank correlations: $r \sim 0.8$ spatially, and range from 0.3 to 0.8 temporally). This indicates that variations in browsing pressure did not strongly modify deer selectivity patterns. Selectivity was positively correlated with wood density and negatively correlated with maximum height of the species, but unrelated to other plant traits. Finally, selectivity can be seen as an intrinsic characteristic of those woody species, and could be used as an additional life trait when analyzing vegetation communities.

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