

Ecology, physiology and behaviour

Can we open the forest for deer? Evaluating fencing as a method of forest protection against browsing

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Ungulate browsers, especially deer, when at high densities, may have adverse effects on their environment and are significant drivers of threatening forest biodiversity and ecosystem services. That is why foresters try to protect young forest stages against browsing and bark-stripping young trees by deer. In Poland, for the last 25 years, the most common method of forest protection against deer is fencing. Even though it is an expensive method, it also has a substantial ecological impact on the forest ecosystems, both in fenced and unfenced habitats. Logically, increasing the proportion of fenced forest habitats elevates deer pressure on unfenced areas. To better illustrate the scale of this phenomenon, it is good to know that the area of protected forest by fencing in the last 20 years in Poland increased fourfold in the previous 20 years, i.e. from 50,000 to 200,000 ha. What was essential, at the same time, was to observe an increase in populations of large predators (mainly wolves) and stabilization of red deer and roe deer populations in Polish forests.

With that in mind, the study aims to answer the question: are fences in forests necessary to protect forest plantations against deer browsing? We conducted a large-scale experiment in 19 forest districts (FD) in five different Poland regions to answer this question. In each FD, in half of their area, all new forest plantations were unfenced, whereas in the other part they were fenced as usual. At the same time, efforts were made to connect non-fenced areas to form a compact forest complex. In each FD, ten forest plantations were drawn on the fenced and unfenced parts for browsing monitoring. To analyse the browsing impact on the fenced part of the FD, the ten drawn forest plantations located on the fenced part remained unfenced. In the first year, significantly less pressure on young trees in unfenced parts of the FD was noted for all tree species. In contrast, however, similar deer pressure on palatable tree species (oak) on both fenced and unfenced parts was recorded in the second year, while browsing pressure on the remaining tree species was similarly lower in unfenced areas than in the first year. Interestingly, a significant relationship was observed between the size of the forest plantation (ranging from 0.2 to 8 ha) and the intensity of browsing pressure, but only in unfenced areas. The intensity of deer browsing increased by more than 40% with the increase in the plantation area. The results show that fencing forest plantations significantly impacts deer foraging and usually increases the pressure on young trees in unfenced areas. At the same time, browsing pressure on palatable tree species increases with increasing tree age and forest plantation area. We therefore recommend creating forest plantations with small areas (less than 1 ha) and limiting fencing to palatable tree species, such as oak, only.