

## Abstract

Open mature pine or pine oak forests are home to several rare forest herbs, including the critically endangered wintergreen (*Chimaphila umbellata*) from the heather family (*Ericaceae*). This endangered forest herb has its range center in the boreal belt of Europe, Asia and North America, where it used to be quite abundant, but during the last century number and sizes of their populations have been drastically reduced. This retreat is attributed to the current form of forest management, which does not support moderate disturbance and removal of dead organic matter, e.g. by forest grazing or harvest of plant litter. This results in an ever-increasing amount of nitrogen in the soil, which greatly disadvantages most of the rare forest herbs that usually grow in soils with minimal nitrogen content.

During the survey of historical sites of wintergreen in the years 2022-2023, I recorded 46 populations of wintergreen in 11 locations in the Czech Republic. It grows most often in acid pines, oak forests or oak forests. Most wintergreen populations are in good condition and do not require any type of management. For the most shaded wintergreen populations, I recommend the thinning of deciduous trees. At present, probably the biggest threat to wintergreen in the Czech Republic is the rapid death of pine forests, which in recent years has been caused by long-lasting drought and the occurrence of bark beetles.

In 46 wintergreen populations, environmental factors were studied including light availability, cover of bilberries and graminoids, cover of seedlings of deciduous trees, soil nitrogen, available soil phosphorus and soil pH. The results indicate that light availability, bilberry cover with graminoids and available phosphorus have a positive effect on the population size and flowering frequency of wintergreen, and conversely it has a negative effect on the seedlings of deciduous trees. It must be emphasized that this only applies to adult wintergreen plants and not to young wintergreen individuals.

The longevity and clonal growth of wintergreen is likely to buffer some of the negative impacts that can result in extinction.

*Key words:* *Chimaphila umbellata*, forest, population, sprouting, environmental factors, management