

## Summary

This study included research on the health condition and impact on soil properties of alien tree species in the urban forests of Krakow. Ten tree species were investigated: Douglas fir, Canadian pine, marron, American bird cherry, red oak, horse chestnut, walnut, ash-leaved maple, black locust and black pine, growing in biogroups in five forest complexes: Reduta, Zeslawice, Wolski, Tyniec and in the Skalki Twardowskiego. The main objective of the research was to determine the soil and habitat conditions for selected tree species and to determine the impact of these species on the properties of soil environment: the quantity and quality of organic matter, physicochemical properties and enzymatic effects. An additional objective of the research was to determine the health condition of the studied species as an indicator of their possible use in shaping urban forest stands. The conducted research allowed concluding that the soil and habitat conditions in selected urban forests of Krakow are similar to the trophic requirements of the studied tree species. The analysis of the habitat conditions revealed the presence of very fertile soils, which translated into the high trophism of the habitats. The studied biogroups grew predominantly in the conditions of the fresh upland forest habitat, and less frequently the wet upland forest and the mixed fresh upland forest. The soil analyzes confirmed a different impact of alien species of deciduous and coniferous trees on soil properties. A beneficial effect on the properties of soil humus was found in the case of black locust and horse chestnut. The strongest acidifying effect on the surface soil levels was found for Canadian fir and Douglas fir. The research proved that the analyzed alien species affect the physical properties of soils. The highest number of small aggregates was characteristic for soils affected by bird cherry and black locust, while the lowest was for walnut and ash maple. Low enzyme activity was found in the soil affected by ash maple, chestnut, walnut and red oak. The research showed that red oak and bird cherry had a limiting effect on the species composition of undergrowth vegetation. Most of the analyzed alien species were distinguished by good health and favorable growth properties. Among the examined alien species, the poorest quality was that of the marron, which showed numerous frost damage. The Canadian pine tree showed less damage, possibly due to the lack of humidity. Minor damage developed in black locust and horse chestnut. The conducted research confirms that the habitat conditions of Krakow urban forests are beneficial to the growth of the analyzed species of alien trees reaching favorable growth parameters and healthy condition.

**Key words:** alien species, urban forests, habitat conditions, soil properties