

## Summary

Invasive plants are generally understood as alien taxa that have a tendency to displace native species and decrease biodiversity through formation of dense monoculture. Although in recent years many studies have been conducted in invaded communities, there are still alien plant species whose ecology and invasive potential have not been sufficiently examined. In addition, a lot of research focus on ground-vegetation, whereas, soil seed bank and physicochemical properties of soil play a major role in maintaining floristic diversity.

*Rudbeckia laciniata* is an herbaceous perennial species from the family *Asteraceae*. It is native to North America, however it was brought to Europe as an ornamental plant in the 17<sup>th</sup> century. Nowadays it spreads into semi-natural and natural habitats across Europe and Asia.

The aim of this study is to investigate how *Rudbeckia laciniata* affects three components of invaded communities: 1) native ground-vegetation; 2) size and composition of soil seed bank; and 3) physicochemical soil properties.

The studies were conducted in two types of habitats, which differ in humidity – meadows within and outside of a river valley. Each site was divided into three zones (control, transition and invaded), with different coverage of *R. laciniata* – from zero in the control zone to more than 70 percent in the invaded zone. In each zone, 100 phytosociological relevés were recorded and 125 soil samples were collected. To estimate size and composition of soil seed bank, seedling germination method was used. The observation of seedling growth was carried out in laboratory condition for one year. To estimate chemical and physical soil properties, the acidity, organic matter, and main cations were measured. To quantify the differences between each zone and meadow type, diversity indexes were calculated as well as PERMANOVA and SIMPER analysis were applied.

The statistical analysis shows significant differences between each zone in terms of ground vegetation. The plots with a high abundance of *R. laciniata* are characterized by the lowest species richness and functional diversity. The plant traits analysis shows that the share of competitors and anemochores decreases along with *Rudbeckia* abundance, while the share of leafy stem plants increases. In both types of meadows, the transition zone is more similar to the control zone than the invaded one. In the soil seed bank, the number of all propagules was several times higher in the invaded zone than in the control zone, in both habitat types. However, this is due to the huge number of *Rudbeckia* seeds. The number of other seeds, as well as species richness in each zone were similar. In the transition zones the number of *Rudbeckia* seeds was significantly lower, and no seeds of this species were found in the control zone, both on the meadow within and outside of the river valley. These results indicate high reproduction ability of *R. laciniata* with a concurrent lower dispersion potential. Majority of the invader seeds were in the surface layer of soil, which confirms the tendency to form “short-term persistent” seed bank by *R. laciniata*. The effect of *R. laciniata* on the physicochemical properties of the soil was not confirmed.

Yednejosak