

Identification of factors responsible for low sexual reproduction efficiency in marginal populations of shrub birch *Betula humilis* Schrk.

The shrub birch, *Betula humilis*, is endangered species in the western and central parts of Europe. It is a much-branched shrub, occurring mainly fens and wet meadows. Due to the drying of its habitats, about 80% of the Polish shrub birch populations have disappeared during the twentieth century. The present-day populations of *B. humilis* are located mainly in north, north-eastern and south-eastern parts of Poland. In populations from north-eastern Poland high level of genetic diversity was recorded. Suitable level of genetic variation is a key factor in adaptation to the environmental changes. For this reason, shrub birch populations from north-eastern Poland are particularly valuable in the protection of the species. Unfortunately, previous analysis showed lowered sexual reproductive efficiency in the Polish stands compared to the Belarusian populations from the sub-central parts of species range. Low number of germinated seeds was a main cause of that observation. Low efficiency of sexual reproduction is a matter of concern, because it may threaten maintaining of the current populations.

The main goal of our studies is to explain reasons of low reproductive success of shrub birch in marginal populations in Poland. The project will reveal how large is the proportion of seeds without embryo, whether the clonal growth strategy enhances probability of self-fertilization as well as whether self-pollination can reduce the chance of producing seeds capable of germination. As empty seed production can be related to insufficient amount of pollen, the pollen viability will be tested. Seeds will also be examined for the content of phosphorus, an element that is particularly important during germination and growth in the early stages of next generation development.

The studies will allow to identify the mechanisms that shape genetic resources of *B. humilis* populations, which is also very important to develop effective conservation strategy at the disappearing margin of the species range. Moreover, studies of some aspects of shrub birch biology will be valuable contribution to the knowledge of *Betula* genus, one of the most popular and recognizable tree genus in Europe.