Summary of the thesis: Studia taksonomiczne ostnic z sekcji *Stipa*, ze szczególnym uwzględnieniem między- i wewnątrzpopulacyjnej zmienności *Stipa pennata* L. w Polsce [Taxonomic studies of feathergrasses from section *Stipa* with particular emphasis on variation between and within populations of *Stipa pennata* L. in Poland]

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Stipa Linnaeus is one of the largest genera in the family Poaceae, subfamily Pooideae. In the narrow approach, it comprises over 150 species distributed in open haitats of the Old World. One of the numerous and taxonomically problematic sections in the genus *Stipa* is the nominal section, which comprises (depending on the approach) from 15 to 55 species. In Central Europe the section *Stipa* is represented by about 10 species: *S. bavarica*, *S. borysthenica*, *S. dasyphylla*, *S. eriocaulis*, *S. pennata*, *S. pulcherrima*, *S. styriaca*, *S. tirsa* and *S. zalesskii* and many taxa of lower rank. The section *Stipa* can be divided into many critical groups of closely related and morphologically similar taxa. One example is *Stipa pennata* s. l.

Until now, in the territory of Poland, only three species from the above-mentioned section have been recognized, they are *S. borysthenica*, *S. pennata* and *S. pulcherrima*. All of them reaching here the northwestern limit of their general range of geographical distribution, they are rare, protected and red listed. They occur only in xerothermic grasslands of *Festuco-Brometea* or *Koelerio glaucae-Corynephoretea canescentis* classes, developing under specific conditions. Mainly on steep hills (like river valley slopes) with southern exposition and low soil moisture, on limestone, gypsum or sandy backing with high content of calcium carbonate.

The main aim of this thesis was to examine taxonomic relationship between selected species from section *Stipa*. As well as assessing morphological diversity between and within Polish populations of *Stipa pennata* and check whether the morphological variability is influenced by environmental factors. The purpose was also to characterize plants communities with share of *Stipa pennata* s. l., habitats occupied by them, as well as changes of these communities in the last 50 years. And also to evaluate the extinction risk of taxa from *Stipa* section in Poland.

During the research, herbarium materials collected in selected Polish and European herbaria (AA, B, GOET, JE, KRA, KRAM, LE, M, MSB, MW, OP, PE, POZ, PR, TK, TRN, WA, SZUB) were reviewed. Plant materials from Polish populations were collected in years 2012–2015. The morphological characteristics of the vegetative and generative structures were examined on over 800 well-developed specimens. Phytosociological and ecological data were collected during 4 growing seasons. The main tools used during the study were multi-dimensional statistical analysis of macro- and micromorphological, phytosociological and ecological data (e. g. cluster analysis, principal coordinate analysis, principal component analysis, canonical discriminant analysis, canonical correspondence analysis, detrended

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correspondence analysis) as well as modeling species niches and distribution by applying a machine-learning technique.

Based on numerical analyses of morphological characters, scanning electron microscopy observation of lemma micromorphology, as well as field observations, seven taxa belonging to section *Stipa* have been recognized on the territory of Poland, including two new taxa: *S. pennata* subsp. *ceynowae* and *S. pennata* var. *hirsuta*. The new subspecies is morphologically similar to *S. pennata* subsp. *pennata* and somewhat to *S. borysthenica* but it differs mainly by its longer ligules of vegetative shoots. While *S. pennata* var. *hirsuta* differs from the typical variety by the presence of strongly hairy culm sheaths. As a result of conducted analysis one new combination, *S. pulcherrima* var. *nudicostata* was proposed and an epitype for *S. pennata* was designated. Additionally, during revision of herbarium materials, new record of *S. eriocaulis*, species not listed in the flora of Poland was found. Species should be considered as probably extinct in the territory of Poland. It has been shown that the Polish populations of *S. pennata* are characterized by greater between than within morphological variability, which is typical of small, isolated populations. Illustrations of micromorphological structures of the lemma, patterns of leaf and leaf sheaths hairiness as well as an identification key for all studied taxa are provided. A taxonomic synopsis including information on nomenclatural types, synonyms, descriptions of the taxa, flowering period and information about geographical distributions are presented. As supplementary information, a list of the specimens examined is also included.

The differences in the species composition of grasslands with *S. pennata* occurring on different types of habitats were presented. The grasslands growing on gypsum and lime substrate are characterized by greater species richness and diversity than grassland on loose sands. It has been also shown that *S. pennata* achieves the best conditions for growth on the calcium rich gypsum grasslands. Also changes in species composition during last fifty years were described – share of shrubs (e.g. *Prunus spinosa, Rosa sp.*) and expansive grass species (such as *Arrhenatherum elatius, Brachypodium pinnatum* or *Calamagrostis epigeios)* increased, whereas the share of the *S. pennata* decreased. It was found that the species composition of the surveyed communities is most affected by soil factors, while the climate variables are significantly less affected. For the first time, predictive model of *S. pennata* distribution was presented. The average temperature of driest quarter and precipitation of the coldest quarter proved to have a limiting effect on *S. pennata* occurrence in Poland. For all studied taxa, maps of distribution and list of contemporary and historical localities in Poland were included. Also IUCN categories of threat have been assigned to all taxa from section *Stipa* occurring in Poland.

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