

EXPERIENCE OF APPLYING THE PRINCIPAL COMPONENT ANALYSIS (PCA) FOR THE ORDINATION OF MEADOW VEGETATION OF THE VYATKA RIVER FLOODPLAIN

K. V. Shchukina

*Komarov Botanical Institute RAS
Prof. Popova Str., 2, St. Petersburg, 197376, Russia
e-mail: vyatka_ks_72@mail.ru, schukina@binran.ru*

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The aim of the study was testing the method of principal components (PCA) to identify the main factors affecting the differentiation of floodplain meadow vegetation. 305 phytosociological relevés of the Vyatka River floodplain meadows were analyzed with using indirect ordination (PCA) and Ramenskiy's indicator values (Ramenskiy et al., 1956). Ordination of syntaxa of the Vyatka River meadows in the axes of 2 main factors using ecological scales showed the presence of relatively short gradients in the structure of the used data. The communities of 21 meadow syntaxa (variants, subassociations and associations) of the Vyatka River floodplain have close values of moisture and active soil fertility. Most of them are located within the same rank according to these indicators and can be characterized as wet meadows on fairly rich soils. A comparison of the ordination results of the upland meadow formations of the Kirov Region with the floodplain syntaxa of the order Arrhenatheretalia R. Tx. 1931 showed (with some exceptions) the similarity of habitats of the communities of similar associations in the floodplain and the upland. Multivariate analysis of the syntaxa based on the occurrence matrix of 200 vascular plant species of the studied meadow phytocenoses made it possible to identify 3 leading components, which account for 67.8% of the variance. The moisture (including its variability) and alluviality are recognized as leading factors of differentiation of the meadow vegetation in the Vyatka River floodplain. Estimation of the minimum spanning tree between the syntaxa in a linked weighted undirected graph confirmed the existence of a consistent relationship between the associations belonging to the same order. As a result of PCA analysis, most of the variance of the syntaxa (58%) is explained by the first 2 components, that indicates a high efficiency of the application of the principal component method for ordination of the meadow vegetation of the Vyatka River floodplain. The ordination of meadow syntaxa shows that, if the conditions of applying the PCA method are met, it gives adequate, visual and well-interpreted results.

Keywords: meadows, the Vyatka River floodplain, Kirov Region, Ramenskiy's indicator values, indirect ordination methods, principal component analysis (PCA)

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