

Syntaxonomical analysis of *Arrhenatheretalia elatioris* Tüxen 1931 order in the central part of Western Bulgaria

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The aim of the current PhD thesis is to establish the syntaxonomical diversity of *Arrhenatheretalia elatioris* order in the central part of Western Bulgaria, and to provide characteristics of the associations. The studied area covers more than 10000 km². The climate is characterized by warm summer and cold winter and by high annual amplitude of air temperature.

A total of 539 relevés were collected, following the Braun-Blanquet approach, during 2007–2009. Classification and ordination of vegetation is performed. The vegetation was classified up to alliance level by TWINSpan program and executed within the software package JUICE 7.0. Alternatively, the alliances were reproduced by Cocktail method. Formal definitions were assessed for the alliances using sociological species groups. Delimitation of syntaxa is obtained using the logical operators: AND, OR and NOT. The classification of vegetation up to association level was made with the help of Isopam method by JUICE software. Indirect Gradient Analysis (Detrended Correspondence Analysis) is applied using the R-project and the CANOCO software packages. As a result of the classification two alliances were recognised within *Arrhenatheretalia* order – *Arrhenatherion elatioris* and *Cynosurion cristati*. Within *Cynosurion* alliance two well distinct subgroups were observed, differing in moisture of the substrate – provisionally called “wet” and “dry” *Cynosurion*. Four associations were identified within *Cynosurion* alliance: *Anthoxantho odorati-Agrostietum tenuis*, *Festuco rubrae-Agrostetum capillaris*, *Bromo racemosi-Cynosuretum cristati*, and *Cirsio cani-Festucetum pratensis*. *Arrhenatherion* alliance is presented by four associations also: *Ranunculo repentis-Alopecuretum pratensis*, *Tanaceto vulgaris-Arrhenatheretum elatioris*, *Pastinaco sativae-Arrhenatheretum elatioris*, and *Ranunculo bulbosi-Arrhenatheretum elatioris*. The quality of classified syntaxa is expressed by the indexes of Sharpness and Uniqueness. All syntaxa are presented in synoptic tables by two indicators: Fidelity measure, expressed by the *Phi*-coefficient and *Constancy*, expressed in percentages. Environmental conditions in the habitats were assessed using the Ellenberg Indicator Values

(EIV). All variables (EIV, total cover, altitude, soil pH) are summarized and presented by box-and-whisker plots. The observed differences in variables among the studied vegetation units were tested by one-way ANOVA. A syntaxonomical synopsis of *Arrhenatheretalia elatioris* order at all hierarchic levels on European scale is presented.

Additionally, mesic and xeric grasslands in the same study area were classified and comparatively analysed about species diversity and management practices. The analysis was based on 868 relevés. Five alliances within two classes were recognized: class *Festuco-Brometea*, represented by three alliances, namely *Cirsio-Brachypodium pinnati*, *Chrysopogono-Danthonion calycinae* and *Festucion valesiaca*, and class *Molinio-Arrhenatheretea*, represented by two alliances, namely *Arrhenatherion elatioris* and *Cynosurion cristati*. The dry grasslands of the *Festucion valesiaca* alliance are the most species rich within the analyzed dataset, presenting also the highest β -diversity values. The vegetation of mesic grasslands is more homogenous than that of dry grasslands, and has the lower β -diversity values. The Shannon-Wiener diversity index is highest within the *Cynosurion* alliance indicating the highest community complexity. The pasture/mowing management of the studied vegetation types is commented.