

PLANT COMMUNITY DISTRIBUTION: *ELYNETUM MYOSUROIDES* RÜBEL 1911 IN THE EASTERN ALPS

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Abstract

Only few details are known about the synchorology of plant communities. The aim of this research project is to investigate the plant community distribution of several alpine meadows in the Eastern Alps. The following method was applied:

- scanning of the existing literature to find out which authors have dealt with these plant communities
- localisation of the relevés (exact or by means of grids)
- acquisition of additional parameters such as altitude, geology or aspect (header data).

All this information is managed in a database. On the basis of the collected data, distribution maps can be created for each plant community (at present only for associations). Further analysis is planned especially regarding the geological conditions and other abiotic features as well as distributional characteristics.

First, results are presented for the *Elynetum* Rübel 1911, a typical upper alpine to subnival plant community on calcereous-silicate rock. Other plant communities will follow in the near future. This pilot project is carried out with alpine vegetation because of the easier plant community classification and nomenclature in higher altitudes as well as the local boundaries.

Izveček

O sinhorologiji rastlinskih združb je poznanih le nekaj podrobnosti. Namen raziskave je proučiti razširjenost nekaterih asociacij alpskih travnikov v Vzhodnih Alpah. Uporabili smo naslednje metode:

- pregled obstoječih literaturnih virov, da smo ugotovili, kateri avtorji so proučevali te rastlinske združbe,
- določitev lokacije popisov (natančno ali kvadranti),
- pridobitev dodatnih parametrov, kot so nadmorska višina, geologija, ekspozicija (glave tabel).

Vse informacije smo vnesli v bazo podatkov. Na osnovi zbranih podatkov smo naredili karte razširjenosti za posamezne rastlinske združbe (trenutno le asociacije). Načrtujemo nadaljnje analize, predvsem v povezavi z geološkimi razmerami in drugimi abiotičnimi parametri.

Prvi rezultati so prikazani za asociacijo *Elynetum* Rübel 1911, tipično zgornjealpinsko do subnivalno rastlinsko združbo, ki se pojavlja na mešani silikatno-karbonatni podlagi. Sledile bodo karte ostalih rastlinskih združb. Pilotski projekt smo izvedli na alpski vegetaciji, kjer sta klasifikacija in nomenklatura jasnejši, prav tako tudi zaradi jasno omejene razširjenosti.

Key words: synchorology, plant communities, alpine meadows, *Elynetum*, Eastern Alps

Ključne besede: sinhorologija, rastlinske združbe, alpski travniki, *Elynetum*, Vzhodne Alpe

1. INTRODUCTION

Only few details are known about the synchorology of plant communities. Smaller phytosociological units such as associations and subassociations tend to have uni-centric distribution areas. Parameters

like climate zone, altitudinal belt, oceanity and continentality exert influence on the shape of a distribution area (Braun-Blanquet 1964). Not many authors have dealt with this question so far: Jakucs 1961, Ellenberg & Klötzli 1972, Tüxen 1979, Köck 1984, Géhu & Franck 1985, Dierssen & Reichelt

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1988, Mucina 1989, Nezadal 1989 and Grabner 1997 for example. But a detailed acquisition of relevés is still missing. Therefore the aim of this research project is to collect data about the plant community distribution of several alpine meadows, concentrating on the Eastern Alps.

2. METHODS

This pilot project is carried out with alpine vegetation because of the easier plant community classification and nomenclature in higher altitudes as well as the local boundaries (only in the Alps). The following plant associations are investigated (nomenclature according to Grabherr & Mucina 1993):

- calcareous bedrock: *Caricetum ferrugineae* Lüdi 1921, *Seslerio-Caricetum sempervirentis* Br.-Bl. in Br.-Bl. et Jenny 1926
- calcareous-silicate bedrock: *Elynetum myosuroides*¹ Rübél 1911
- silicate bedrock: *Caricetum curvulae* Rübél 1911, *Loiseleurio-Caricetum curvulae* Pitschmann et al. 1980

According to Ozenda (1988) the division between Eastern and Western Alps is the connection line of Lake Constance and Lake Como (meridian of Milan). In this project the eastern border is formed by the Semmering. Further on, the study area reaches from the Allgäuer and Chiemgauer Alps (Germany) in the north, to the Karawanken, Steiner and Julian Alps (Slovenia) as well as the Venetian Alps, Dolomites, and the Alps of the Bergamo Province (Orobian Alps, Italy) in the south.

Relevés from the southern and south-eastern parts of the Alps are not integrated yet but will be included and quoted during the further progression of this project (e.g. Boiti et al. 1989, Credaro & Pirola 1975, Oriolo 2001).

First of all a scanning of the existing literature (mainly Grabherr & Mucina 1993) had to be done to find out which authors have dealt with these plant communities. The next step was the localisation of each relevé. If the description of the location is detailed enough, an exact statement in degrees and minutes is possible. Otherwise a certain area has to be distinguished (coordinates or by means of raster). Additional parameters such as altitude, geology, aspect, and coverage (header data) are recorded for all relevés.

Temporarily all this information is managed as a spreadsheet (Excel[®]), before being integrated in a database. On the basis of the collected data, distribution maps are created for each plant community (at present only for associations). As class, order, and alliance are also determined, mapping the distribution of these units will also be possible.

3. RESULTS

At this point of time only results of the *Elynetum* are available. The acquisition of the other four plant communities is being carried out at present. Finally the distribution areas and geology of all investigated associations can be compared.

Elynetum myosuroides is a typical upper alpine to subnival plant community on calcareous-silicate rock. The association naming species *Kobresia myosuroides* (Figure 1) can be found in the central parts of the Eastern and Western Alps mainly on schist rocks which are high in lime (Albrecht



Figure 1: *Kobresia myosuroides* nearby the glacier “Pasterze”, Grossglockner (Photo by I. Kurtz).

Slika 1: *Kobresia myosuroides* v bližini ledenika “Pasterze”, Grossglockner. (Foto I. Kurtz).

¹ In fact, according to the Code of Phytosociological Nomenclature (CPN) correct as “*Elynetum myosuroidis*”.

1969). There is a differentiation between the so called ridge-*Elynetum*, which inhabits windy ridges, mountain peaks, rocks, taluses with massive thermal fluctuation, and slope-*Elynetum*, which is not situated on such extreme locations (Heiselmayer, 2004). The *Elynetum* consists of small patchy areas with a smooth transition to other alpine meadows (Albrecht 1969).

About 500 relevés are situated all over the Eastern Alps (Figure 2; data based on Grabherr 1993 as well as Braun-Blanquet & Jenny 1926, Dalla Torre 1982, Griehser 1992, Heiselmayer, 2004, Lechner 1969, Oberhammer 1979 and Rübél 1911). The mountain range of Hohe Tauern represents a distribution center of this association, according to favourable geological conditions. Other important areas are the Swiss Alps, parts of Tyrol and South Tyrol as well as the Allgäuer and Berchtesgadener Alps. The easternmost relevé was found in the mountain range Nockberge (Zunderwand). But it must be taken into consideration that there are more locations of the *Elynetum* which have not yet been investigated or published.

The *Elynetum* is spread in altitudes from 1800 and 3050 meters (Figure 3). Most of the relevés are located between 2500 to 2700 meters.

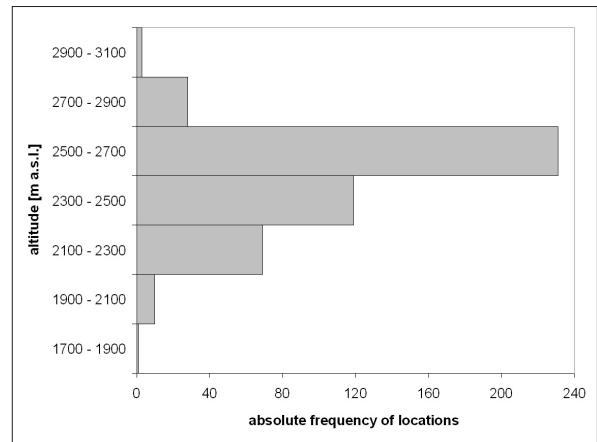


Figure 3: Altitudinal distribution of *Elynetum myosuroides*. **Slika 3:** Višinska distribucija asociacije *Elynetum myosuroides*.

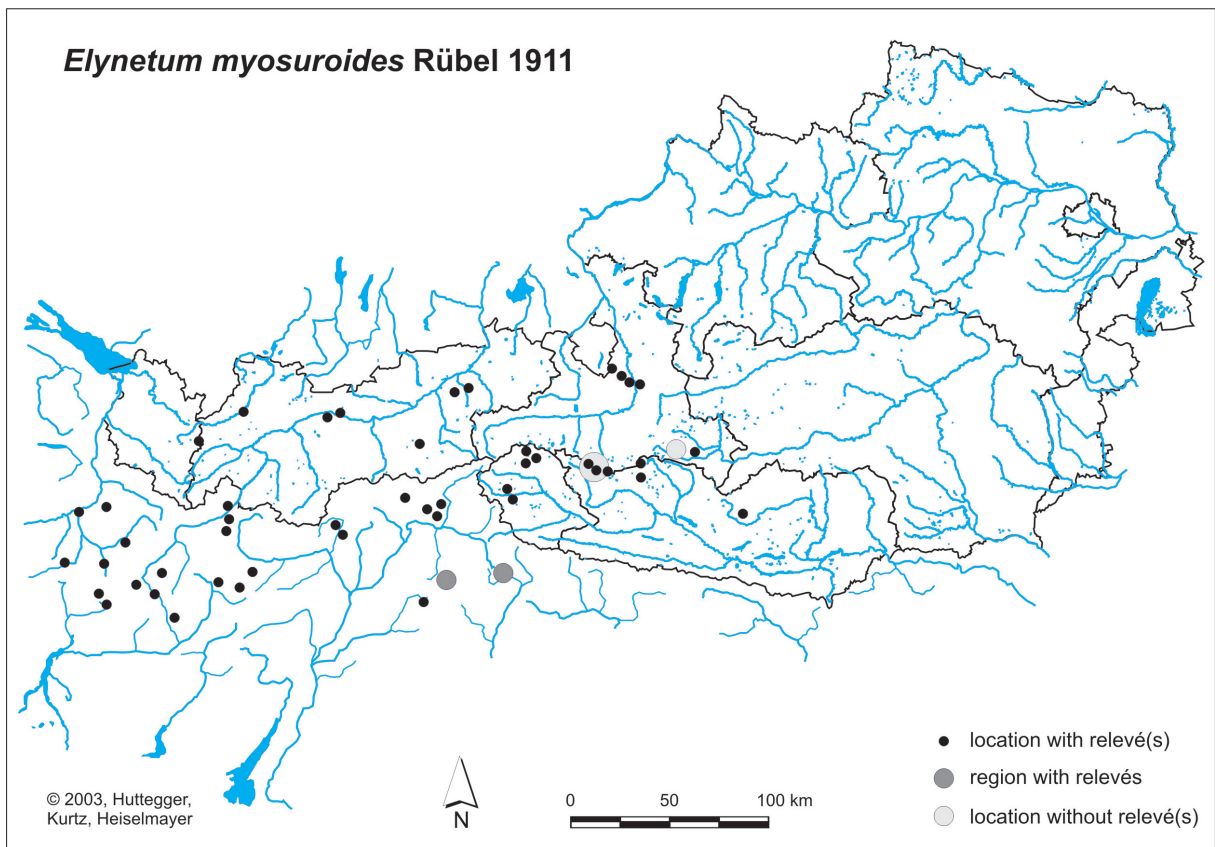


Figure 2: Distribution area of the association *Elynetum myosuroides*. **Slika 2:** Razširjenost asociacije *Elynetum myosuroides*.

4. DISCUSSION

Further (statistical) analysis is planned especially regarding the geological conditions and other abiotic features as well as distributional characteristics. Another interesting field comprises the subassociations of the investigated alpine meadows and their geographical differences in the Eastern Alps.

The basic knowledge of distribution areas is essential for a deeper insight into the formation, history and dynamics of plant communities as well as the ecological background. This information can be used in the following fields of application: bio- and environmental monitoring, nature conservation (endangered plant communities for example), basis for other scientific investigations.

By means of concept development, realisation, and connection of all this information a fundament for a plant-community-database – named SynDat – is set. The SynDat is going to be implemented into the already existing BIS (Botanical Information System), in which the distribution of the vascular plants, bryophytes, and lichens of Salzburg and Carinthia, respectively Austria, is available (Institut für Botanik und Botanischer Garten, Universität Salzburg, 2002).

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