Biodiversity of herbaceous vegetation in the transition area of Polistovsky Reserve, NW Russia

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Introduction

Semi-natural grasslands are widespread in Europe and in the forest zone connected with human activity. In recent decades without agricultural use area of the grasslands decrease and they become overgrown with forest that leads to a strong decrease in biodiversity.

Aim

The aim of the study is to reveal biodiversity of herbaceous vegetation (including semi-natural grasslands and semi-ruderal herblands connected with them spatially and successionally) in the transition area of Polistovsky Reserve, Pskov Province, Russia.

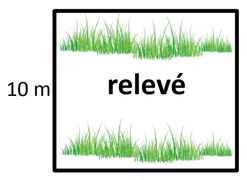
In our research we compare herbaceous vegetation remaining after several decades of abandonment and grasslands currently managed (mowing and grazing) local sites in connection to Braun-Blanquet approach.

Study area

Was organized in 1994
N: 57°00′ – 57°20′
E: 30°21′ – 30°44′
The core area is 37 983 ha; the transition area – 17 297 ha.
The mean annual rainfall – 731 mm.
The mean annual temperature – 3,6°C.
The territory of the reserve belongs to mixed coniferous forest zone

Materials and methods

For this analysis, we choose 7 associations from 3 classes (***Molinio-Arrhenatheretea, Epilobietea angustifolii*** and ***Artemisietea vulgaris***) using our earlier classification based on 196 relevés. We compared floristic composition, species richness, coenotic and functional group shares (including participation of forbs, graminoids and woody species) between the syntaxa.



149 relevés

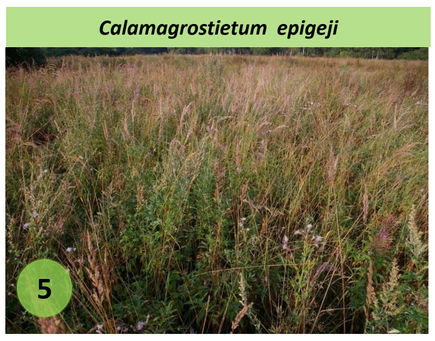
Object of research

Filipendulo ulmariae-Geranietum palustris

Convolvulo arvensis-Elytrigietum repentis

Polygono bistortae-Cirsietum heterophylli

Calamagrostietum epigeji



Epilobio-Juncetum effusi

Antoxantho odorati-Agrostietum tenuis

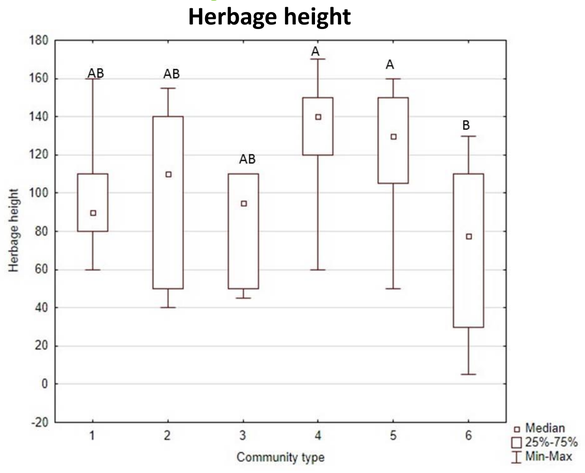
Results

Characteristics of herbaceous communities types

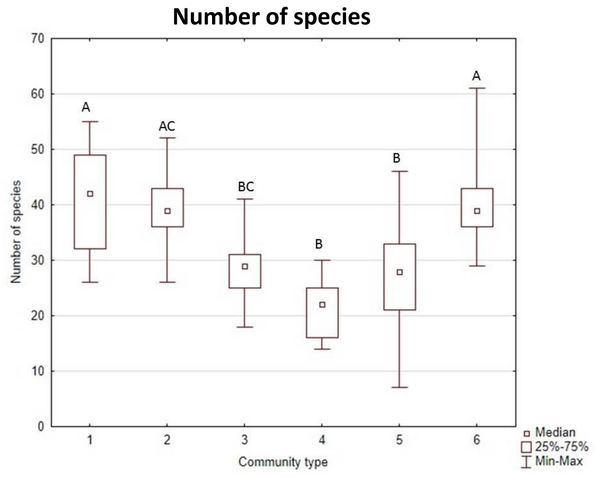
Number of cluster	Assotiation	Number of relevès	Total number of species	Herbage height, mean ± s.e., cm	Presence and character of disturbance	Current state	Management pattern
1	***Filipendulo ulmariae-Geranietum palustris***	11	103	97±10	-	Abandoned	Former hayfields and pastures
2	***Polygono bistortae-Cirsietum heterophylli***	17	108	100±11	-	Abandoned	Former hayfields and pastures
3	***Epilobio-Juncetum effusi***	10	92	86±9	Soil disturbance by cows	Partly managed	Former pastures
4	***Convolvulo arvensis-Elytrigietum repentis***	13	64	140±8	-	Abandoned	Former kitchen gardens and arable lands
5	***Calamagrostietum epigeji***	31	107	126±5	Spring fires	Abandoned	Former hayfields and arable lands
6	***Antoxantho odorati-Agrostietum tenuis***	62	156	67±5	Soil disturbance by cows	Managed	Mowing, grazing

Species richness of herbaceous communities

Herbage height

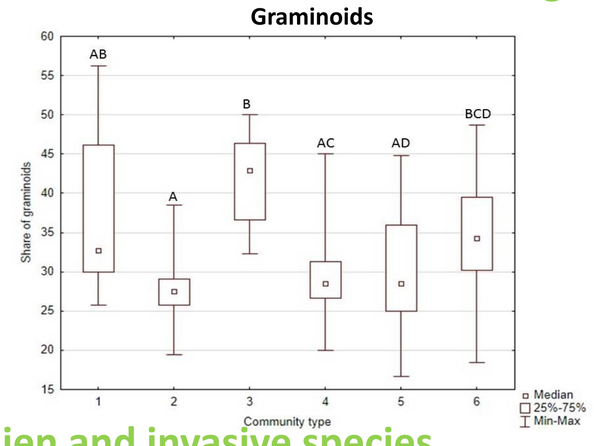


Number of species

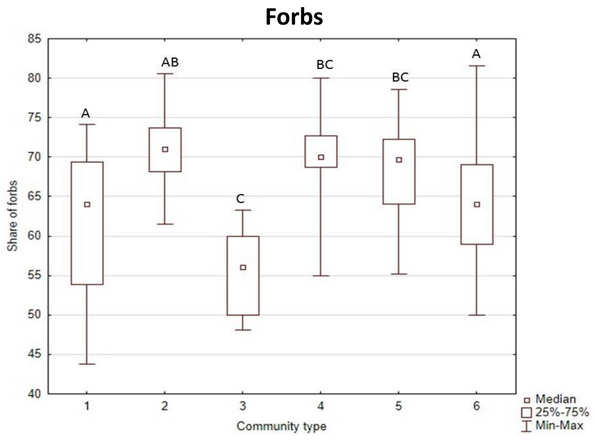


Ratio between graminoids and forbs

Graminoids

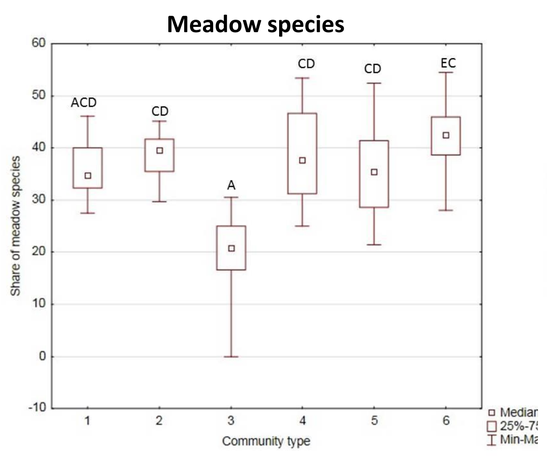


Forbs

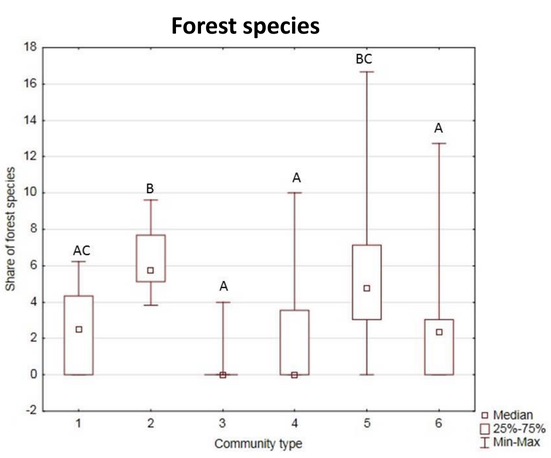


Ratio of coenotic groups

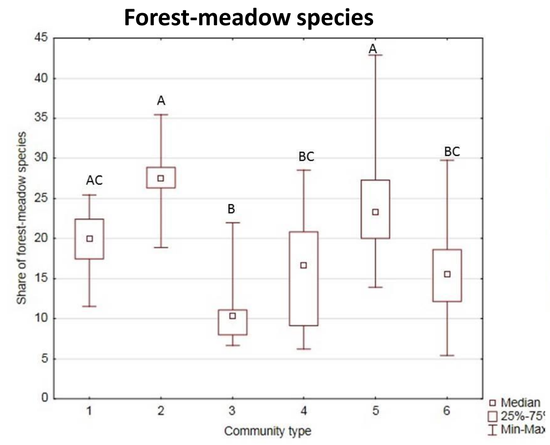
Meadow species



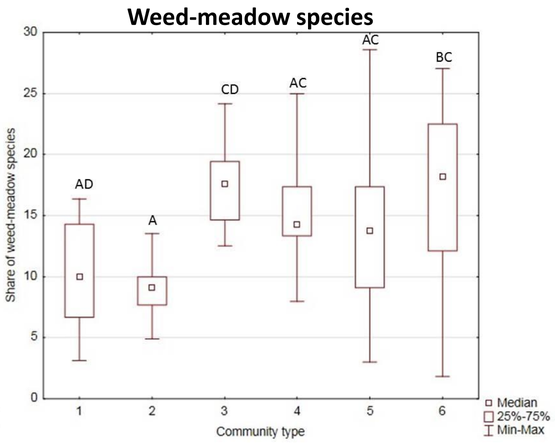
Forest species



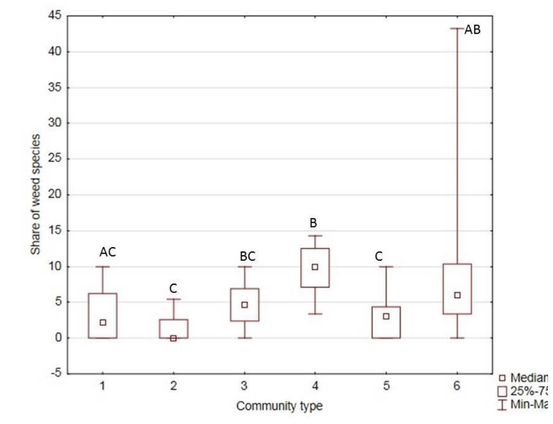
Forest-meadow species



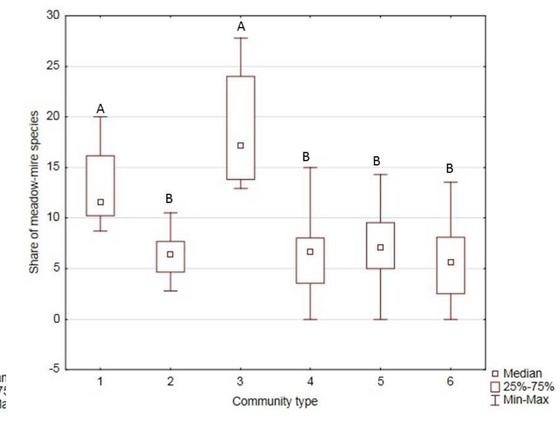
Weed-meadow species



Weed species



Meadow-mire species



Alien and invasive species

We identified 7 alien and invasive species.
The largest number was found in ***Antoxantho odorati-Agrostietum tenuis*** communities.

Frequency (%) of alien species in the community types

Species	1	2	3	4	5	6
Epilobium adenocaulon	9	12	-	-	-	12
Festuca arundinacea	27	-	20	8	3	61
Juncus tenuis	-	-	10	-	-	8
Calystegia inflata	-	-	-	8	-	-
Spiraea rosalba	-	-	-	8	-	-
Inula helenium	-	-	-	-	2	-
Malus domestica	-	-	-	-	-	2
Total number of species	**2**	**1**	**2**	**3**	**2**	**4**

Festuca arundinacea

Gladiolus imbricatus на

Red list species

We identified 3 red list species included in regional protection list.
Red list species were connected with ***Filipendulo ulmariae-Geranietum palustris, Polygono bistortae-Cirsietum heterophylli, Epilobio-Juncetum effusi***, ***Calamagrostietum epigeji.***
communities.

Frequency (%) of red list species in the community types

Species	1	2	3	5
Gladiolus imbricatus	18	29	-	3
Ophioglossum vulgatum	-	6	-	-
Senecio paludosus	-	-	10	-
Total number of species	**1**	**2**	**1**	**1**

Conclusion

The most valuable communities are ***Filipendulo ulmariae-Geranietum palustri, Polygono bistortae-Cirsietum heterophylli, Antoxantho odorati-Agrostietum tenuis.*** These communities have the highest species richness and are habitats of red list species. However, in conditions of abandonment these communities are under threat and constant monitoring and development of protection system is necessary.

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