

Department of Grassland and Landscape Shaping, Faculty of Agrobioengineering,
University of Life Sciences in Lublin, Akademicka 15, 20-950 Lublin, Poland
e-mail: teresa.wylupek@up.lublin.pl

TERESA WYŁUPEK^{ORCID}, HANNA KLIKOCA,
MARIUSZ KULIK, HALINA LIPIŃSKA, ADAM GAWRYLUK

Floristic diversity and use value of phytocoenoses in a section of the Wieprz river valley in Roztocze National Park for feeding the konik polski horse

Różnorodność florystyczna oraz wartość użytkowa fitocenozy fragmentu doliny
Wieprza w Roztoczańskim Parku Narodowym w żywieniu konika polskiego

Summary. The paper describes the floristic diversity and specifies its use value in terms of feeding preferences of konik polski horses and their consumption of permanent grassland in a section of the Wieprz river valley in Roztocze National Park. The flora assessment was conducted by analyzing 79 phytosociological relevés using the Braun-Blanquet method. The results of phytosociological surveys made it possible to distinguish 7 complexes in the *Phragmitetea* class, 5 complexes and 1 plant community in the *Molinio-Arrhenatheretea* class, and 1 complex in the *Nardo-Callunetea* class. Natural values of the examined associations were described based on the total and average number of species in a phytosociological relevé, the Shannon-Wiener index, and the phytosociological structure of plant communities. The use value of dry weight of the analyzed meadows and pastures was estimated by means of the use value number (UVN) and taking into account the area and yield size. The phytocoenoses identified in the meadows in the section of the Wieprz river valley under study exhibited high natural values ($H' = 3.20-4.62$). The dry weight yields of the examined communities varied (from 1.32 to 5.37 t ha⁻¹), but their sward usually had poor and very poor use value (UVN = from -0.55 to 5.8). Furthermore, it should be noted that the sward of wet meadows is readily consumed by the grazing animals, which contributes to the improvement of the natural and use value of meadows.

Key words: plant communities, floristic diversity, natural values, use value, konik polski horse, river valley, konik polski horse grazing

INTRODUCTION

Permanent grasslands have an enormous production potential that considerably exceeds the forage crops. Meadows and pastures are the primary source of natural fodder

required for the appropriate feeding of horses. Meadow biomass is a valuable source of proteins, vitamins, mineral compounds and crude fiber – indispensable ingredients for the proper functioning of the alimentary tract of the konik polski horse [Warda and Rogalski 2004, Kotlarz et al. 2010, Chodkiewicz and Stypiński 2011]. It is believed that konik polski horses, due to their lower body weight, seem to be better adapted to pasturing on peat soils than other horse breeds or cattle [Bokdam and Van Braeckel 2002]. Bartoszek et al. [2001] note that in the marshes along the Biebrza river, konik polski horses forage for plant species that are usually avoided by other animal species or breeds.

According to Guziak and Lubaczewska [2001] as well as Warda and Rogalski [2004], pasturing on wet meadows determines the preservation of flora and fauna diversity of landscape. A considerable percentage of dicotyledons and legumes has a significant impact on the quality and quantity of the yield and the health of animals fed with this fodder [Kryszak et al. 2005, Zarzycki et al. 2005, Wyłupek 2006, Grzelak et al. 2008].

The literature indicates that the species diversity of meadow ecosystems depends on a set of several factors [Grzelak et al. 2008, Spsychalski et al. 2010, Trąba and Wolański 2011]. Both the unfavourable effect of environmental factors and the abandonment or excessive utilization of grasslands lead to changes in the floristic composition of meadow and rush phytocoenoses [Ławniczak 2011].

Besides their economic function, grasslands also play an important role in the shaping of the natural environment and landscape [Szozkiewicz 1996, Grzelak et al. 2003]. Furthermore, they have an aesthetic function by providing a number of positive emotional sensations, e.g. the soothing and relaxing sight of grazing horses [Warda and Rogalski 2004].

Recent years have seen an increased interest among farmers in the sustainable use of permanent grasslands, largely thanks to the incentives offered by agri-environmental schemes funded by the European Union [Zarzycki et al. 2005, Janowska-Huflejt 2007, Kryszak et al. 2010a, Żyszkowska and Paszkiewicz-Jasińska 2010, Czyż et al. 2011]. Therefore, the obtained study results fully correspond with the prime objective of the European Union and are innovative in Poland.

The study objective was to determine the floristic diversity of grassland phytocoenoses in a section of the Wieprz river valley in Roztocze National Park, and the suitability (use value) of the dry matter obtained from them as fodder for konik polski horses.

The assessment was carried out based on commonly used floristic diversity indicators, and the yielding and use value of the sward in the first regrowth.

MATERIAL AND METHODS

The permanent grasslands analyzed are located in the municipality of Zwierzyniec, Zamość region, within the Roztocze National Park in south-eastern Poland. Observations were conducted in the Wieprz river valley between the villages of Guciów and Obroc, within a study area covering approx. 27 ha (Fig. 1). The investigations lasted from May to June (before the harvesting of first-cut hay).

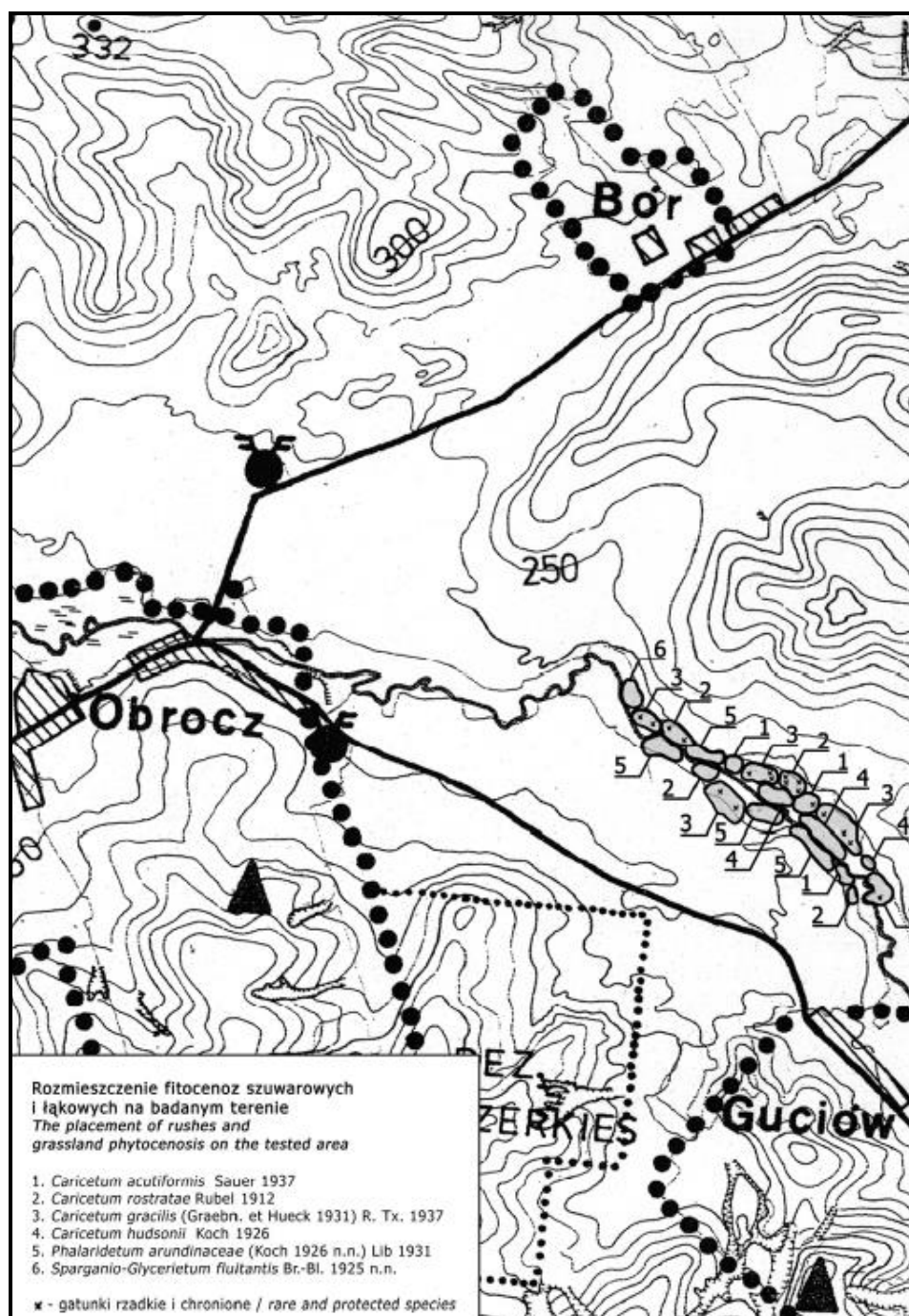


Fig. 1. The distribution of rushes and grassland phytocenosis in the study area

79 phytosociological relevés performed according to the Braun-Blanquet [1964] method were used in the study. The floristic lists encompassed vegetation covering an area of 100 m², except for vegetation occurring within a small acreage. Based on the phytosociological relevés, syntaxonomic units were distinguished and classified within the phytosociological system according to the guidelines of Matuszkiewicz [2012]. The names of vascular plant species are provided according to Mirek et al. [2002]. The analysis of diversity took into account the average number of species per relevé and the Shannon-Wiener diversity index [Shannon and Wiener 1949].

In order to determine the use value of dry weight, plant samples were collected from an area of 0.5 m², at sites where phytosociological relevés were made, and subjected to a botanical and gravimetric analysis. Based on the results of the analysis and the use value figures, the agricultural value of the dry weight of the sward was determined using Filipek's method [1973]. The hay yield (in t per ha) from the first cut was also calculated.

According to the 10-grade Filipek scale, the particular use value numbers (UVN) determine the agricultural value of meadow sward, where 8.1–10.0 denotes very good sward, 6.1–8.0 good sward, 3.1–6.0 poor sward, and less than 3.0 denotes very poor sward.

RESULTS AND DISCUSSION

In the studied section of the Wieprz river valley in Roztocze National Park, 13 plant associations and 1 plant community were distinguished. The phytosociological classification was as follows:

CLASS: *Phragmitetea* R. Tx. et Prsg 1942

Order: *Phragmitetalia* Koch 1926

Alliance: *Magnocaricion* Koch 1926

Association: *Iridetum pseudacori* Egger 1933

Caricetum ripariae Soó 1928

Caricetum acutiformis Sauer 1937

Caricetum rostratae Rübel 1912

Caricetum gracilis (Graebn. et Hueck 1937) R. Tx. 1937

Phalaridetum arundinaceae (Koch 1926 n.n.) Lib 1931

Alliance : *Sparganio-Glycerion fluitantis* Br.-Br. et Siss. in Boer 1942

Association: *Sparganio-Glycerietum fluitantis* Br.-Bl. 1925 n.n.

CLASS: *Molinio-Arrhenatheretea* R. Tx. 1937

Order: *Molinetalia caeruleae* W. Koch 1926

Alliance: *Molinion caeruleae* W. Koch 1926

Association: *Junco-Molinetum* Prsg 1951

Alliance: *Calthion palustris* R. Tx. 1936 em. Oberd. 1957

Association: *Scirpetum silvatici* Ralski 1931

Caricetum caespitosae (Steffen 1931) Klika et Šmarda 1940

Community: *Deschampsia caespitosa* (Horvatić 1930) Grynia 1961

Alliance: *Alopecurion pratensis* Pass. 1964

Association: *Alopecuretum pratensis* (Regel 1925) Steffen 1931

Order: *Arrhenatheretalia* Pawł. 1928

Alliance: *Arrhenatherion elatioris* (Br.-Bl. 1925) Koch 1926

Association: *Arrhenatheretum elatioris* Br.-Bl. ex Scherr. 1925

CLASS: Nardo-Callunetea Prsg 1949

Order: *Nardetalia* Prsg 1949

Alliance: *Violion caninae* Schwick. 1944

Association: *Polygalo-Nardetum* Prsg 1953

The *Caricetum rostratae* and *Caricetum gracilis* communities occupied the largest portion of the area. In many places, they definitely prevailed in very large areas. *Sparganio-Glycerietum fluitantis*, on the other hand, covered the smallest area.

The floristic composition of the distinguished plant associations depended primarily on the moisture level and type of substratum, which is confirmed in the literature [Kryszak, et. al. 2007, Kryszak et. al. 2009, Kryszak et. al. 2011]. The largest number of species was found in the *Caricetum gracilis* (62) and *Caricetum rostratae* (56) associations. The smallest number of taxa was found in *Phalaridetum arundinaceae* (18) and *Sparganio-Glycerietum fluitantis* (15). Among the analysed phytocoenoses, the greatest floristic variety was found for *Polygalo-Nardetum* (an average of 27 species per relevé) and *Arrhenatheretum elatioris* (an average of 24 species per relevé). The poorest association among the analyzed vegetation patches was *Sparganio-Glycerietum fluitantis*, where 10 species per relevé were observed.

Table 1. Natural values of the identified plant communities

Plant community	Number of relevés	Number of plant species		Floristic diversity H'
		Total	Mean in relevés (from-to)	
<i>Phragmitetea</i> class				
<i>Iridetum pseudacori</i>	3	15	13.3 (12–14)	3.24
<i>Caricetum ripariae</i>	3	14	14.0 (12–18)	3.20
<i>Caricetum acutiformis</i>	6	34	17.7 (11–26)	3.92
<i>Caricetum rostratae</i>	14	56	17.0 (12–27)	3.92
<i>Caricetum gracilis</i>	12	62	20.6 (14–29)	4.20
<i>Phalaridetum arundinaceae</i>	4	24	18.0 (16–20)	3.78
<i>Sparganio-Glycerietum fluitantis</i>	3	14	10.0 (9–11)	3.30
<i>Molinio-Arrhenatheretea</i> class				
<i>Junco-Molinietum</i>	9	30	19.0 (18–20)	4.13
<i>Scirpetum silvatici</i>	6	54	19.0 (17–22)	3.86
<i>Caricetum caespitosae</i>	5	38	16.5 (13–22)	4.28
<i>Deschampsia caespitosa</i>	3	37	22.0 (20–23)	4.31
<i>Alopecuretum pratensis</i>	5	26	20.0 (19–23)	4.32
<i>Arrhenatheretum elatioris</i>	3	34	24.0 (21–25)	4.42
<i>Nardo-Callunetea</i> class				
<i>Polygalo-Nardetum</i>	3	27	27.0 (20–32)	4.62

The greatest floristic diversity occurred in the following phytocoenoses: *Polygalo-Nardetum* ($H' = 4.69$), *Alopecuretum pratensis* ($H' = 4.32$) and *Caricetum caespitosae* ($H' = 4.28$) – (Tab. 1). The results of the author's studies on the biodiversity of meadow phytocoenoses, expressed by the Shannon-Wiener index, were much higher in comparison with the results of studies by other authors dealing with identical associations [Kryszak et. al. 2004, Trąba et. al. 2006, Kryszak et. al. 2009, Kryszak et. al. 2010a, Kryszak et. al. 2010b, Spsychalski et.al. 2010, Żyszkowska and Paszkiewicz-Jasińska 2010]. This attests to the high environmental value of the study area.

In the majority of the analyzed associations in the *Phragmitetea* class, there was a very high percentage of species from the *Cyperaceae* and *Juncaceae* group. The *Phalaridetum arundinaceae*, *Sparganio-Glycerietum fluitantis* and *Iridetum pseudacori* associations were exceptions. Taxa from the so-called herb and weed group also constituted a considerable percentage: in the *Iridetum pseudacori* association, they accounted for 80% of the crop dry weight, whereas the lowest number of plants from this group were found in rushes with the predominance of *Carex riparia*. The *Phalaridetum arundinaceae*, *Sparganio-Glycerietum fluitantis* phytocoenoses were characterized by a considerable content of species from the grass family. The botanical and gravimetric analysis showed that the percentage content of legumes in the dry weight was low (Fig. 2).

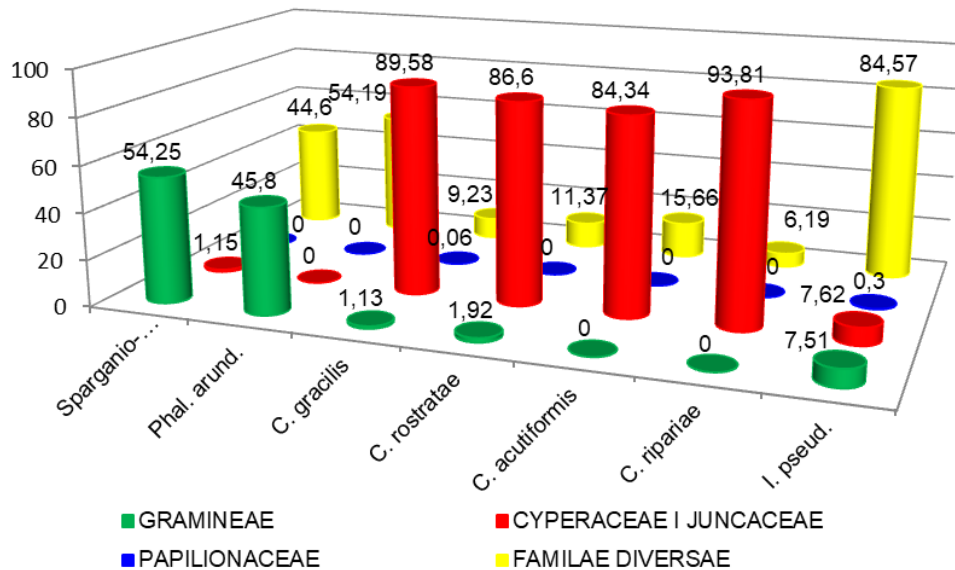


Fig. 2. Percentage content of individual plant groups in associations of the *Phragmitetea* class

Species in the grass family (except for the *Caricetum caespitosae* and *Scirpetum silvatici* associations) represented a considerable percentage in the dry weight of the studied phytocoenoses from the *Molinio-Arrhenatheretea* class. The percentage content of legumes was low in all associations. Taxa from the so-called herb and weed group accounted for an average of 28.31% of the crop dry weight (Fig. 3).

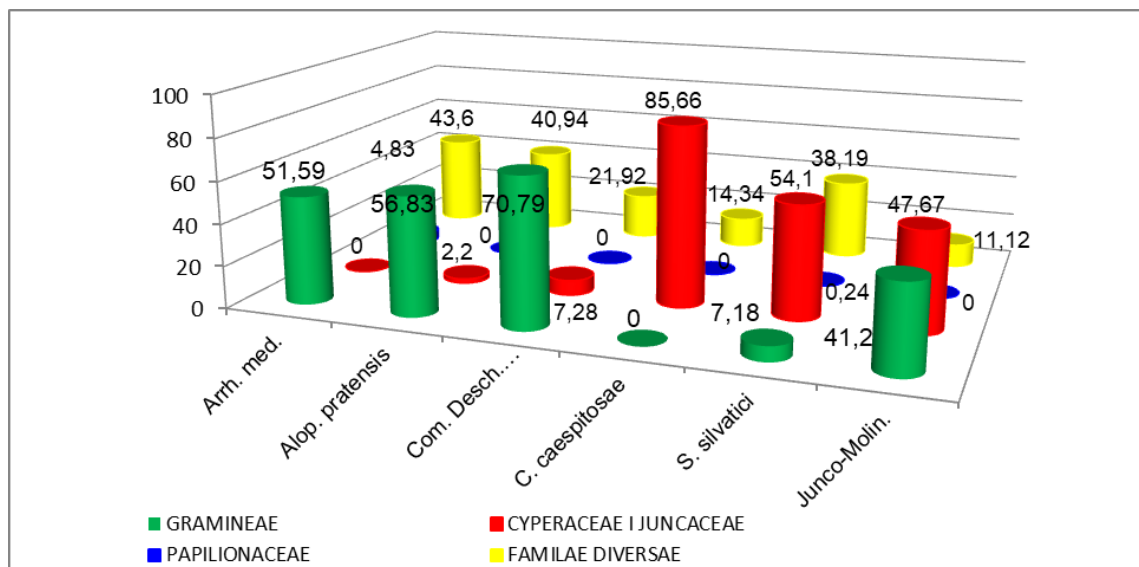


Fig. 3. Percentage content of individual plant groups in associations and communities of the *Molinio-Arrhenatheretea* class

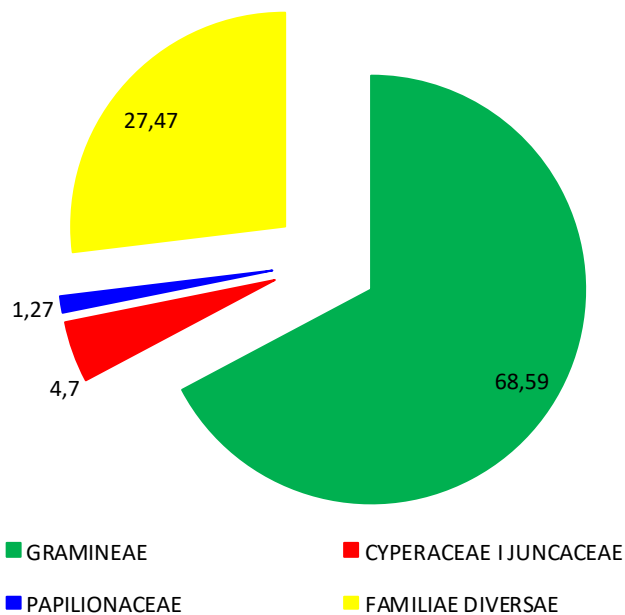


Fig. 4. Percentage content of individual plant groups in the association of the *Nardo-Callumetea* class

The *Polygalo-Nardetum* association of the *Nardo-Callunetea* class in the Wieprz river valley showed a considerable prevalence of grasses over other plant groups. The content of herbs and weeds in the crop dry weight was considerable, on average 27%, in comparison with communities from the *Phragmitetea* class. Similarly to the other plant groups, the percentage content of legumes was low (Fig. 4).

According to Chodkiewicz and Stypiński [2011], plant communities characteristic of wet meadows are preferred by konik polski horses. The results of field studies in the Biebrza National Park showed that the animals are very discriminating in their selection of sward species: they willingly consume monocotyledons, particularly *Carex* plants, but they avoid dicotyledons. According to Warda and Rogalski [2004], the nutritional preferences of konik polski horses contributes to the development of a mosaic of communities and gives the less numerous species a chance to develop, thus increasing the number of dicotyledons and the Shannon-Wiener index (Fig. 4).

In the *Phragmitetea* class, the largest yield of phytomass was obtained from the *Phalaridetum arundinaceae* association: 5.27 t ha⁻¹. It was also characterized by the highest use value (UVN = 4.06). The smallest yield from the first-cut harvesting was obtained from the *Caricetum gracilis* (2.00 t ha⁻¹) and *Sparganio-Glycerietum fluitantis* (1.74 t ha⁻¹) associations. Literature on the subject shows that the production capacity of both associations can be higher [Wyłupek 2006, Kryszak et al. 2007a, Mosek and Mizzga 2008, Grzelak et al. 2014, Wyłupek 2018]. Within the habitat Natura 2000 Dolina Wolicy PLH060058, the agricultural value (UVN) of hay in the *Phragmitetea* class phytocoenoses was also usually very poor. Among them, the highest use value number (4.90-5.75) was found for hay in the *Phalaridetum arundinaceae* association, while the lowest – in *Caricetum appropinquatae* (0.74-1.12). A similar nutritional value of hay with the prevalence of *Phalaris arundinacea* was found in the river valleys of the Wielkopolska region [Kryszak and Grynia 2005, Kryszak et al. 2007b, Grzelak et al. 2008, 2014] and Zamość region [Wyłupek and Trąba 1997]. Furthermore, the hay in two associations, *Iridetum pseudacori* (UVN = -0.55) and *Caricetum ripariae* (UVN = -0.06), was found to have a very low, even harmful nutritional value; see Fig. 5.

Among the communities of the *Molinietalia caeruleae* order, the highest yield was obtained from the vegetation patch representing *Alopecuretum pratensis* (3.82 t ha⁻¹); at the same time it had the highest use value (UVN = 5.80). Fodder from *Alopecuretum* meadows in the Huczwa [Wyłupek 2006] and Pokojówka valleys [Grygierzec 2012] has similar yields. Higher dry weight yields of *Alopecuretum pratensis*, were found in the Noteć Bystra valley [Grzelak et al. 2014], and lower yields in the Środkowa Mogilnica valley [Kryszak et al. 2007a]. The smallest yield was obtained from the *Junco-Molinietum* association (1.76 t ha⁻¹). The hay of *Caricetum caespitosae* showed the lowest use value (UVN = 0.31).

The *Arrhenatheretalia* order was represented in the study area by the *Arrhenatheretum elatioris* association. The yield obtained from this association was small as it amounted to 1.32 t ha⁻¹, and the use value number of the hay (UVN = 4.49) indicates its very poor nutritional value. In the Natura 2000 area Dolina Wolicy PLH060058, associations and communities of the *Molinio-Arrhenatheretea* class showed a varied use value (UVN) of hay (from very poor to good) [Wyłupek 2018].

Only one association, i.e. *Polygalo-Nardetum*, was distinguished in the *Nardo-Callunetea* class. The yield obtained from this association was low (an average of 1.59 t ha⁻¹), and its use value number was very poor (an average of UVN = 2.81).

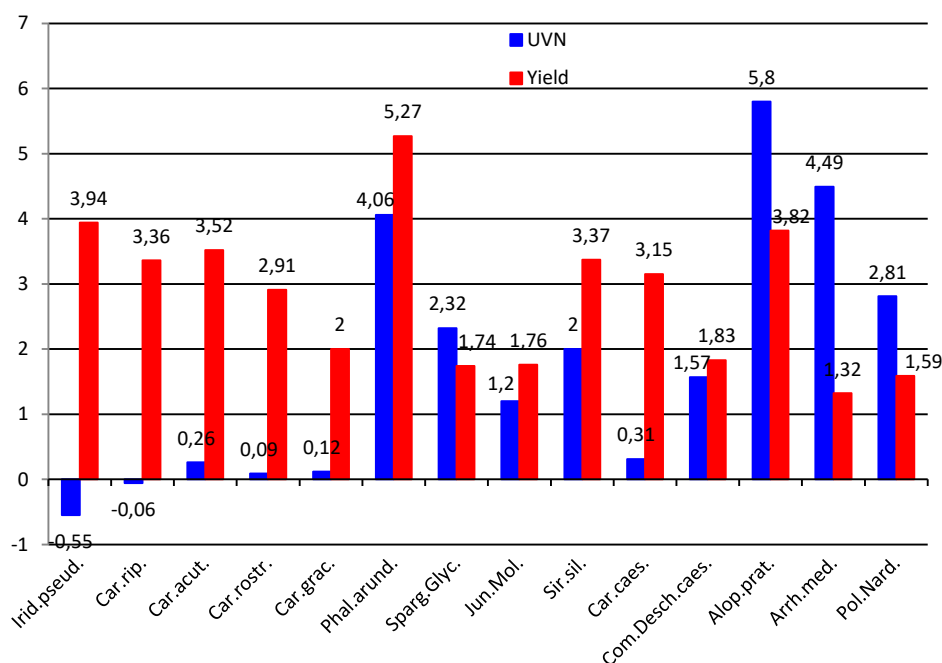


Fig 5. Use value number (UVN) and first-cut hay yield (in t·ha⁻¹) of individual plant associations

In the literature on the subject, *Carex* communities are commonly believed to have a poor nutritional value. Hence, sedge meadows are treated as wasteland. A rational utilization for cutting is impossible due to the high level of groundwater. Late cutting considerably lowers the use value of hay. The subject was widely discussed in the author's study [Wyłupek 1999].

Chodkiewicz and Stypiński [2011] note that the late cutting of meadows is necessary in order to prevent succession; extensive grazing has a stabilizing effect and is conducive to sward diversity. Based on the observations made by the authors above, it must be stressed that further studies are needed to better understand the alimentary preferences of konik polski horses and determine whether the fodder they consume fully satisfies their dietary needs.

CONCLUSIONS

1. Rushes of the *Phragmitetea* class dominate among the plant communities of the Wieprz river valley in Roztocze National Park.

2. The analyzed section of the Wieprz river valley is recognized as an area of high environmental value, taking into account the Shannon-Wiener diversity index, the total number of species as well as their mean number per relevé.

3. The communities that have developed in the valley are usually characterized by a low use value number and by varying yields.

4. The highest dry weight yield was obtained from the *Phalaridetum arundinaceae* association (5.27 t ha⁻¹), and the lowest from the *Arrhenatheretum medioeuropaeum* association (1.32 t ha⁻¹). The highest use value (UVN = 5.8) was obtained from the vegetation patch representing *Alopecuretum pratensis*, while a harmful use value was found in the case of two associations: *Iridetum pseudacori* (UVN = -0.55) and *Caricetum ripariae* (UVN = -0.06).

REFERENCES

- Bartoszuk H., Dembek W., Jezierski T., Kamiński J., Kupis J., 2001. Spasanie podmokłych łąk w dolinach Narwi i Biebrzy jako metoda ochrony ich walorów przyrodniczych. Biblioteczka Wiadomości IMUZ, Falenty, 98, 146.
- Bokdam J., Van Braeckel A., 2002. Habitat selection of cattle and horses in the Lower Basin of the Biebrza National Park. In: J. Bokdam, A. van Braeckel, C. Werpachowski, M. Znaniecka, Grazing as a conservation management tool in peatland. Red Report of a Workshop held 22–26 April 2002 in Goniadz, <https://purews.inbo.be/ws/files/6809702/ReportGrazingPeatland2002.pdf> [access 08.08.2019].
- Braun-Blanquet J., 1964. Pflanzensoziologie, Grundzüge der Vegetationskunde, 3 Aufl. Springer, Wien–New York.
- Chodkiewicz A., Stypiński P., 2011. Preferencje pokarmowe koników polskich wypasanych w Biebrzańskim Parku Narodowym. Woda Środ. Obsz. Wiejs. 11, 2(34), 33–42.
- Czyż H., Kitzczak T., Sarnowski A., Karasiuk T., 2011. Użytkowe, przyrodnicze i energetyczne walory przymorskich użytków zielonych. Roczn. Ochr. Środ. 13, 1055–1068.
- Filipek J., 1973. Projekt klasyfikacji roślin łąkowych i pastwiskowych na podstawie liczb wartości użytkowej. Post. Nauk Roln. 4, 59–68.
- Grygierzec B., 2012. Zawartość podstawowych składników pokarmowych i frakcje włókna w sianie z ekstensywnie użytkowanych zbiorowisk *Alopecuretum pratensis* i *Holcetum lanati*. Łąk. Pol. 15, 53–65.
- Grzelak M., Kryszak A., Spychalski W., 2003. Charakterystyka geobotaniczna zbiorowisk szuwarowych związku *Phragmition* w wybranych dolinach rzecznych Wielkopolski. Roczn. Akad. Roln. Pozn. 62, 15–23.
- Grzelak M., Janyszek M., Kaczmarek Z., Bocian T., 2008. Kształtowanie się różnorodności zbiorowisk szuwarowych z klasy *Phragmitetea* pod wpływem warunków siedliskowych. Woda Środ. Obsz. Wiejs. 8, 1(22), 99–108.
- Grzelak M., Murawski M., Kniola A., 2014. Geobotanical and economic valuation of meadow and pasture communities and their use. J. Res. Applic. Agric. Eng. 59(3), 76–79.
- Guziak R., Lubaszewska S., 2001. Ochrona przyrody w praktyce. Podmokłe łąki i pastwiska. Polskie Towarzystwo Przyjaciół Przyrody „pro Natura”, Wrocław, ss. 150.
- Jankowska-Huflejt H., 2007. Rolno-środowiskowe znaczenie trwałych użytków zielonych. Probl. Inż. Roln. 1, 23–34.
- Kotlarz A., Stankiewicz S., Biel W., 2010. Skład botaniczny i chemiczny siana z półnaturalnej łąki oraz jego wartość pokarmowa dla koni. Acta Sci. Pol. Zootechnica 9(4), 119–128.
- Kryszak A., Grynia M., Kryszak J., Budziński M., Grzelak M., 2004. Zmiany różnorodności florystycznej nadwarciańskich łąk zalewanych. Woda Środ. Obsz. Wiejs. 4, 1(10), 209–218.
- Kryszak J., Kryszak A., Grynia M., 2005. Zmiany w siedliskach i zbiorowiskach łąkowych w górnym odcinku Baryczy. Annales UMCS, Lublin, sec. E, Agricultura 60, 41–48.
- Kryszak A., Kryszak J., Klarzyńska A., 2007a. Walory przyrodniczo-użytkowe łąk doliny Środkowej Mogilnicy. Acta Sci. Pol. Agricultura 6(4), 15–24.

- Kryszak J., Kryszak A., Klarzyńska A., 2007b. Łąki mozgowe (*Phalaridetum arundinaceae*) w dolinie Baryczy. Woda Środ. Obsz. Wiejs. 7, 2a(20), 209–218.
- Kryszak A., Deszczyków K., Kryszak J., Klarzyńska A., 2009. Walory przyrodnicze i rekreacyjne zbiorowisk trawiastych doliny Bogdanki. Nauka Przyr. Technol. 3, 1(1), 7.
- Kryszak J., Kryszak A., Klarzyńska A., Strychalska A., 2010a. Różnorodność florystyczna i wartość użytkowa wybranych zbiorowisk trawiastych wielkopolski w zależności od poziomu gospodarowania. Fragm. Agron. 27(4), 68–75.
- Kryszak J., Kryszak A., Klarzyńska A., Strychalska A., 2010b. Zmienność siedliskowa i florystyczna wybranych zbiorowisk szuwarowych doliny warty na odcinku Konin-Rogalin. Woda Środ. Obsz. Wiejs. 10, 1(29), 51–58.
- Kryszak A., Klarzyńska A., Kryszak J., Strychalska A., Szymańczyk J., 2011. Zbiorowiska roślinne skarp kanałów i rowów melioracyjnych Wielkiego Łęgu Obrzańskiego. Woda Środ. Obsz. Wiejs. 11, 1(33), 159–177.
- Ławniczak A.E., 2011. Wpływ wilgotności siedliska i zasobowości w składniki biogenne na bioróżnorodność flory obszarów podmokłych. Nauka Przyr. Technol. 5, 5(88), 18.
- Matuszkiewicz W., 2012. Przewodnik do oznaczania zbiorowisk roślinnych Polski. Wyd. Nauk. PWN, Warszawa, ss. 540.
- Mirek Z., Piękoś-Mirkowa H., Zając A., Zając M., 2002. Flowering plants and pteridiophytes of Poland. A checklist. Instytut Botaniki PAN, Kraków, ss. 442.
- Mosek B., Miazga S. 2008. Zbiorowiska szuwarowe w dolinie rzeki Urzędówki. Łąk. Pol. 11, 127–138.
- Spychalski W., Kryszak J., Kryszak A., 2010. Zawartość fosforu w glebach a zróżnicowanie florystyczne zbiorowisk łąkowych. Woda Środ. Obsz. Wiejs. 10, 4(32), 237–247.
- Shannon C.E., Wiener W., 1949. The Mathematical Theory of Communication. University of Illinois Press, Urbana, ss. 125, <http://dx.doi.org/10.4236/ojf.2014.45051>
- Szozkiewicz K., 1996. Zróżnicowanie geobotaniczne szuwarów klasy *Phragmitetea* w dolinie środkowej Noteci. Pr. Kom. Nauk Roln. Kom. Nauk Leśn. Pozn. Tow. Przyj. Nauk 81, 157–164.
- Trąba Cz., Wolański P., Oklejewicz K., 2006. Różnorodność florystyczna wybranych zbiorowisk nieleśnych doliny Sanu. Annales UMCS, sec. E, Agricultura 61, 267–275.
- Trąba Cz., Wolański P., 2011. Zróżnicowanie florystyczne łąk związków *Calthion* i *Alopecurion* w Polsce – zagrożenia i ochrona. Woda Środ. Obsz. Wiejs. 11, 1(33), 299–313.
- Warda M., Rogalski M., 2004. Zwierzęta na pastwisku jako element krajobrazu przyrodniczego. Annales UMCS, sec. E, Agricultura 59, 1985–1991.
- Wyłupek T., 1999. Florystyczna i rolnicza charakterystyka łąk i pastwisk w dolinie Poru. Praca doktorska. Akademia Rolnicza, Lublin, Instytut Nauk Rolniczych, Zamość, ss. 137.
- Wyłupek T., 2006. Wartość gospodarcza zbiorowisk roślinnych w dolinie Huczwy. Annales UMCS, sec. E, Agricultura 61, 215–223.
- Wyłupek T., 2018. Ocena florystyczno-siedliskowa fitocenozy trwałych użytków zielonych obszaru Natura 2000 Dolina Wolicy PLH060058 oraz ich wartość przyrodnicza i paszowa. Rozpr. Nauk. UP w Lublinie, 391, pp.145.
- Zarzycki J., Gałka A., Góra-Drożdż E., 2005. Wartość paszowa runi łąk Pienińskiego Parku narodowego użytkowanych zgodnie z wymogami ochrony przyrody. Acta Sci. Pol. Zootechnica 4(2), 119–132.
- Żyszkowska M., Paszkiewicz-Jasińska A., 2010. Różnorodność florystyczna zbiorowisk użytków zielonych i gruntów ornych Pogórza złotoryjskiego. Woda Środ. Obsz. Wiejs. 10, 4(32), 30–318.

Financing source: The research was funded by the Ministry of Science and Higher Education for the dissemination of science (766/P-DUN/2019).

Streszczenie. W pracy scharakteryzowano różnorodność florystyczną oraz określono wartość użytkową trwałych użytków zielonych części doliny Wieprza w Roztoczańskim Parku Narodowym pod względem preferencji pokarmowych konika polskiego. Ocenę florystyczną przeprowadzono na podstawie analizy 79 zdjęć fitosocjologicznych, wykonanych metodą Braun-Blanqueta. Analiza wyników badań fitosocjologicznych pozwoliła wyróżnić 7 zespołów w klasie *Phragmitetea*, 5 zespołów i 1 zbiorowisko w klasie *Molinio-Arrhenatheretea* oraz 1 zespół w klasie *Nardo-Callunetea*. Walory przyrodnicze badanych asocjacji określono na podstawie całkowitej i średniej liczby gatunków w zdjęciu fitosocjologicznym, wskaźnika Shannona-Wienera oraz struktury fitosocjologicznej zbiorowisk. Wartość użytkową suchej masy analizowanych łąk i pastwisk oceniono, korzystając z liczb wartości użytkowej (LWU) oraz z uwzględnieniem wielkości plonu. Łąki analizowanego odcinka doliny Wieprza odznaczały się dużymi walorami przyrodniczymi badanych fitocenoz ($H' = 3,20-4,62$). Plony suchej masy z badanych zbiorowisk były zróżnicowane ($1,32-5,37 \text{ t ha}^{-1}$), jednakże ich ruń miała najczęściej ubogą i mierną wartość użytkową (LWU = od $-0,55$ do $5,80$). Ponadto należy zauważyć, że ruń łąk wilgotnych jest chętnie skarmiana przez pasące się zwierzęta, które przyczyniają się do poprawy jej wartości przyrodniczej i użytkowej.

Słowa kluczowe: zbiorowiska roślinne, różnorodność florystyczna, walory przyrodnicze, wartość użytkowa, koniki polskie, dolina rzeczna, wypas konika polskiego

Received: 14.08.2019

Accepted: 18.12.2019