Acta Agrobotanica

ORIGINAL RESEARCH PAPER Acta Agrobot 68(2):109–113 DOI: 10.5586/aa.2015.017
Received: 2014-10-16 Accepted: 2015-05-25 Published electronically: 2015-07-13

Floristic diversity and agricultural value of *Phalaridetum arundinaceae* (Koch 1926 n.n.) Lib. 1931 in the selected river valleys of the Zamość region

Teresa Grażyna Wyłupek[1]*, Marta Ziemińska-Smyk[2], Zbigniew Czarnecki[3]

[1] Department of Plant Biology, Faculty of Agricultural Sciences in Zamość, University of Life Sciences in Lublin, Szczebrzeska 102, 22-400 Zamość, Poland

[2] Department of Plant Production and Agribusiness, Faculty of Agricultural Sciences in Zamość, University of Life Sciences in Lublin, Szczebrzeska 102, 22-400 Zamość, Poland

[3] Department of Grassland and Landscape Forming, University of Life Sciences in Lublin, Akademicka 15, 20-950 Lublin, Poland

Abstract

The study presents the results of a floristic survey conducted using the Braun-Blanquet method (50 phytosociological relevés) in permanent grasslands in three river valleys of the Zamość region (Por, Huczwa, Wieprz). The goal of the survey was to determine the floristic diversity and fodder value of the *Phalaridetum arundinaceae* association (Koch 1926 n.n.) Lib. 1931.

A total of 93 plant species from 25 botanical families were identified in the areas under study. The species richness of the *Phalaridetum arundinaceae* differed among river valleys. It was observed that these are often transitional forms similar to the association of the *Molinio-Arrhenatheretea* class, *Molinietalia* order. Predominance of hemicryptophytes and a relatively large share of geophytes was recorded. Based on the fodder value score calculated for the dry matter of the association, the community under study can be classified as having a medium or poor nutritional value.

Keywords: *Phalaridetum arundinaceae*; floristic diversity; Ellenberg's indicator value; plant associations

Introduction

Semi-natural *Phalaridetum arundinaceae* (Koch 1926 n.n.) Lib. 1931 phytocoenoses have been recognized as valuable not only from the agricultural but also environmental perspective [1]. According to Grynia et al. [2], *Phalaris arundinacea* is associated with special habitats: it usually grows on very humid organic soils, in periodically flooded riparian habitats. Kozłowski et al. [3] observe that *Phalaris arundinacea* grass also grows in drier habitats, under heavy nitrogen fertilization, even though its persistence is reduced in such conditions. Grass rushes with the predominance of *Phalaris arundinacea* also grow in forest meadows [4] and appear at sites where trees have been removed [5].

Phalaridetum arundinaceae in the Ina valley in the Sowno area occurs on brown alluvial soils [6], while in the Ochoża and Bobrówka valleys it grows on peat-loam soils [7]. Grass communities with the predominance of *Phalaris arundinacea* have also developed on peat-muck soils (the Kuwasy peat-bog, drained in the 1950s), with medium phosphorus content [8]. Some researchers believe that *Phalaris arundinacea* has a broad range of tolerance to soil pH. It develops well at acidic and neutral sites, showing high persistence [3].

The recent literature on the subject [6,9,10] suggests a growing non-production role of *Phalaridetum arundinaceae*. The significance of this association in habitat conservation and management is appreciated, namely its role in the protection against soil erosion by wind and water and its role of an ecological filter absorbing considerable amounts of biogenic elements in the water of the streams flowing through this association. *Phalaris arundinacea* grass also has an enormous significance for avifauna and mammal fauna [11].

The goal of the survey was to determine the floristic diversity and fodder value of the *Phalaridetum arundinaceae* association (Koch 1926 n.n.) Lib. 1931 in three river valleys (Por, Huczwa and Wieprz) in the Zamość region.

Material and methods

Floristic surveys were conducted in permanent grasslands in the valleys of three rivers – the Por, Huczwa and Wieprz (Roztocze National Park) – within Zamość County in south-eastern Poland. Fifty phytosociological relevés were made using the commonly applied Braun-Blanquet method [12] in *Phalaridetum arundinaceae* meadows in late May/early

* Corresponding author. Email: teresawylupek@op.pl

Handling Editor: Elżbieta Weryszko-Chmielewska

June (before the first hay harvest). Floristic diversity was determined based on the mean number of species per relevé, the Shannon–Wiener index (H'), and the total number of species. The value of the Shannon–Wiener diversity index [13] is relatively stable for samples of varying size and is determined primarily by the value of the share of the species. The index is expressed by the following equation:

$$H = -\sum_{i=1}^{S}(p_i \, log_2 \, p_i)$$

where: S – number of species in sample; p_i – likelihood that a randomly selected specimen represents species i, where:

$$p_i = n_i/N$$

n_i – significance coefficient of a given species; N – sum of significance coefficients of all species.

Furthermore, the percentage share of species from the particular botanical families was calculated, species were classified in terms of plant life-forms according to Raunkiær [14]. The ecological indicator values (EIV) were calculated for all the species recognized, using the Ellenberg system [15]. Six environmental variables related to ecological indicator values describing the most typical habitat conditions were calculated – light (L), temperature (T), continentality (K), humidity (F), soil/water pH (R), and nitrogen requirements (N).

The agricultural value of *Phalaridetum arundinaeae* hay was determined based on the fodder value score (FVS) [16]. For this purpose, meadow sward (from an area of 0.5 m^2) was sampled in the most representative patches of the association and botanical and gravimetric analyses were carried out. The hay yield (t ha^{-1}) from the first harvest was also determined.

The syntaxonomy of the association was identified according to Matuszkiewicz [17], while the nomenclature of vascular plants was adopted based on Mirek et al. [18].

Results

The *Phalaridetum arundinaceae* (Koch 1926 n.n.) Lib. 1931 association was distinguished in the grasslands of the Zamość region (SE Poland) in the valleys of three rivers: Por, Huczwa and Wieprz. The syntaxonomy is the following:
Class: *Phragmitetea* R. Tx. et PRSG 1942
Order: *Phragmitetalia* Koch 1926
Alliance: *Magnocaricion* Koch 1926
Association: *Phalaridetum arundinaceae* (Koch 1926 n.n.) Lib. 1931

In the analyzed river valleys of the Zamość region, 93 plant species were found to occur in the sward of *Phalaridetum arundinaceae* meadows, with the greatest number of taxa identified in the sward of *Phalaridetum arundinaceae* in the Por valley (68 taxa).

Similarly, it was here that the greatest mean number of species per phytosociological relevé was recorded – Tab. 1.

The research of the selected river valleys in the Zamość region revealed the encroachment of species characteristic of the *Molinio-Arrhenatheretea* class of the *Molinietalia* order, *Calthion* and *Filipendulion* complex (Tab. 2). Interestingly enough, this process occurred with the lowest intensity in the Huczwa River valley, which was reflected in the lowest species richness of the phytocoenoses. At the same time, the presence of the largest percentage of species representing the *Phragmitetea* class (40.91%) indicates that they developed in the most typical form in comparison to those examined in the other river valleys.

It was found that hemicryptophytes represented the highest proportion of plant life-forms according to the Raunkiær system in the valleys analyzed. Species categorized as geophytes, hydrophytes and helophytes were less numerous (Tab. 3).

The plant species recorded belong to 25 botanical families, among which the greatest number of Poaceae, Cyperaceae, Ranunculaceae and Asteraceae species were found (Tab. 4). Humid – but not wet – habitat species predominate in all the three river valleys. Furthermore, wet habitat species also grow in the Huczwa valley; hence the mean value of the F index is 8.21. A clear majority of taxa of the *Phalaridetum arundinaceae* association in all the river valleys under study prefer neutral or slightly alkaline soils (mean R value from 6.09 to 6.78). Most species require moderate and high nitrogen content in the soil (mean N value from 6.33 to 6.58) – Tab. 5.

The dry matter yield of the 1st harvest of the analyzed *Phalaridetum arundinaceae* sward was the highest in the Wieprz valley (mean 5.27 t ha^{-1}). A lower yield was observed for *Phalaris* grass in the Por valley (mean 3.9 t ha^{-1}) and the Huczwa valley (mean 5.81 t ha^{-1}). The FVS value of the dry matter of the *Phalaridetum arundinaceae* sward in the selected river valleys in the Zamość region indicates that the sward is of medium or poor nutritional value [16] – Tab. 6.

Discussion

The investigations conducted by the author and other researchers [4,6,10,19,20] show that *Phalaridetum arundinaceae* meadows are floristically diverse. In comparison with the studied river valleys of the Zamość region, the greatest mean number of species per phytosociological relevé was found in the patches of the Por valley and the lowest one in the Huczwa valley. A smaller number of species per relevé was found in an analogous association in the Ochoża valley (5 to 8) and the Bobrówka valley (4) [7]. *Phalaridetum arundinaceae* meadow patches show greater species richness in more humid habitats than in the sward of phytocoenoses in periodically dry habitats [10]. The mean Shannon–Wiener diversity index (H') calculated for *Phalaridetum arundinaceae* was $H' = 3.8$ in the Por valley, $H' = 3.6$ in the Huczwa valley, and $H' = 3.2$ in the Wieprz valley. *Phalaridetum arundinaceae* meadows in the Barycz valley showed a greater number of species and a higher floristic diversity index ($H' > 4.0$) [19]. The diversity index calculated for the *Phalaridetum arundinaceae* association in the Barycz valley was lower, $H' = 1.57$ [21], while for Wielkopolska $H' = 1.11$ [22].

Some researchers believe that the environmental and fodder value of the *Phalaridetum arundinaceae* association can improve as a result of changes in hydrologic conditions and the consequent reduction in soil humidity. Under

Tab. 1 Floristic diversity of *Phalaridetum arundinaceae* in the river valleys of the Zamość region.

River valley	No. of relevés	No. of species			*H'* Shanon–Wiener index
		Total	Mean No. of species in relevés	From–to	
Por	20	68	19.7	10–24	3.8
Huczwa	15	22	14.0	13–19	3.6
Wieprz	15	33	18.0	16–20	3.2

Tab. 2 Phytosociological diversity of *Phalaridetum arundinaceae* in the river valleys of the Zamość region.

	Share of characteristic species in the river valleys					
	Por		Huczwa		Wieprz	
	No. of species	%	No. of species		No. of species	%
Ch. Cl. *Phragmitetea* R. Tx. et PRSG 1942						
Ch. All. *Phragmition* Koch 1926	-	-	1	4.55	2	6.06
Ch. All. *Magnocaricion* Koch 1926	9	13.24	7	31.81	5	15.15
Ch. All. *Sparganio-Glycerion fluitantis* Br.-Bl. et Siss in Boer 1942	2	2.94	-	-	-	-
Other	3	4.42	1	4.55	1	3.03
Ch. Cl. *Molinio-Arrhenatheretea* R. Tx. 1937						
Ch. O. *Trifolio fragiferae-Agrostietalia stoloniferae* R. Tx. 1970	7	10.29	1	4.55	-	-
Ch. O. *Molinietalia caeruleae* W. Koch 1926	5	7.35	-	-	5	15.15
Ch. All. *Filipendulion ulmariae* Segal 1926	4	5.88	1	4.55	3	9.10
Ch. All. *Calthion palustris* R. Tx. 1936 em. Oberd. 1957	8	11.76	2	9.09	5	15.15
Ch. All. *Alopecurion pratensis* Pass. 1964	1	1.47	-	-	-	-
Ch. O. *Arrhenatheretalia* Pawł. 1928	4	5.88	-	-	1	3.03
Ch. All. *Arrhenatherion elatioris* (Br.-Bl. 1925) Koch 1926	1	1.47	1	4.55	1	3.03
Ch. Cl. *Scheuchzerio-Caricetea nigrae* (Nordh. 1937) R. Tx 1937	2	2.94	-	-	-	-
Other	10	14.71	2	9.09	1	3.03
Accompanying	12	17.65	6	27.26	9	27.27

Tab. 3 Plant life-forms in the study areas (in pieces) according to the Raunkiær system.

Category	Number of species in the river valleys analyzed		
	Por	Huczwa	Wieprz
H – hemicryptophyte	44	11	22
G – geophyte	12	7	8
Hy – hydrophyte and helophytes	10	7	6
C – herbaceous chamaephyte	4	-	-
T – therophyte	-	1	3
M – megaphanerophyte	-	-	1
li – liana	-	-	1
N – nanophanerophyte	-	-	1

Tab. 4 Botanical structure of *Phalaridetum arundinaceae* in the river valleys of the Zamość region.

Family	Percentage share of species in the river valleys		
	Por	Huczwa	Wieprz
Poaceae	34.21	28.57	12.13
Cyperaceae	7.89	14.29	9.09
Ranunculaceae	7.89	9.53	6.06
Asteraceae	7.89	4.76	6.06
Equisetaceae	2.63	-	9.09
Primulaceae	5.27	9.53	6.06
Apiaceae	5.27	-	9.09
Caryophyllaceae	5.27	4.76	3.03
Boraginaceae	5.27	-	3.03
Rubiaceae	2.63	4.76	6.06
Iridaceae, Urticaceae	each 2.63	each 4.76	each 3.03
Rosaceae	2.63	-	3.03
Lythraceae	2.63	-	3.03
Polygonaceae, Orchidaceae,	each 2.63	-	-
Brassicaceae, Liliaceae,	-	each 4.76	-
Geraniaceae	-	each 4.76	-
Campanulaceae, Solanaceae,	-	-	each 3.03
Balsaminaceae, Onagraceae,	-	-	each 3.03
Salicaceae, Amaranthaceae	-	-	each 3.03

Number of families – 25

similar humidity conditions, patches of the *Phalaridetum arundinaceae* association in the Barycz valley usually occurred in transitional form similar to communities of the *Molinio-Arrhenatheretea* class, *Molinietalia* order [19,23,24].

In all the three valleys analyzed, species from the Poaceae family had the highest percentage share, namely: 34.21% in the Por valley, 28.57% in the Huczwa valley, and 12.10% in the Wieprz valley. Grasses also had the greatest share (37.8%) in the *Phalaridetum arundinaceae* typicum association in the selected valleys of the Warta valley [20]. Taxa of the Cyperaceae family had a lower percentage share (from 7.89% in the Por valley to 14.28% in the Huczwa valley). The Ranunculaceae and Asteraceae families were the most frequently represented among dicotyledonous species (Tab. 4). In the *Phalaridetum arundinaceae* meadows of the Great Wetlands of the Obra River (Wielki Łęg Obrzański), dicotyledons predominated (44 to 77%) but had a low abundance (coverage) [10].

Tab. 6 Yield (t ha^{-1}) and agricultural value (FVS) of *Phalaridetum arundinaceae* in the river valleys of the Zamość region.

River valley	Yield of hay (t ha^{-1})	FVS
	From–to; mean	
Por	3.7–4.2; 3.9	3.8–3.9; 3.85
Huczwa	3.1–4.3; 3.81	1.6–4.2; 3.10
Wieprz	2.8–6.2; 5.27	1.8–4.06; 2.74

FVS – fodder value score according to Filipek [16].

In the Zamość region, the *Phalaridetum arundinaceae* meadows of the selected river valleys revealed a varied fodder value for livestock (FVS from 1.60 to 4.06) – Tab. 6. The dry matter of *Phalaridetum aruindinaceae* typicum in the river valleys of the Wielkopolska region [25] had a distinctly higher fodder value score (FVS = 7.1) and higher yields than in the analyzed river valleys of the Zamość region. According to Kryszak et al. [19], a decrease in the yields and fodder value of the *Phalaris arundinacea* grass sward results in the recession of rush species, loosening up of the turf, appearance of empty areas, and encroachment of low creeping grass or dicotyledonous plant species.

Conclusions

The *Phalaridetum arundinaceae* meadows in the river valleys of the Zamość region are floristically diverse. The highest species richness is characteristic for patches that correspond to the *Molinio-Arrhenatheretea* class, while the poorest species richness is observed in patches of the *Phragmitetea* class.

The *Phalaridetum arundinaceae* association occurs mainly on nitrogen-rich soils with a pH of 7–8. Soil humidity is the main determinant of its floristic diversity.

Based on the fodder value score, the *Phalaridetum arundinaceae* association can be regarded as having a poor or medium nutritional value for animals, with the dry matter yield ranging 3.78–5.27 ha^{-1}.

Tab. 5 Mean values and value range of Ellenberg indices [15] of *Phalaridetum arundinaceae* in the river valleys of the Zamość region.

River valley	Indicator					
	L*	T	K	F	R	N
	From–to; mean					
Por	5.22–7.82; 6.84	4.99–5.30; 5.11	3.00–6.24; 4.34	6.94–7.96; 7.52	6.01–7.15; 6.78	5.67–6.87; 6.43
Huczwa	6.89–7.09; 7.01	5.01–5.09; 5.06	3.61–4.09; 3.83	7.98–8.41; 8.21	6.10–6.99; 6.67	5.86–6.65; 6.33
Wieprz	5.76–6.97; 6.41	3.93–5.18; 4.59	1.20–4.96; 3.28	7.60–8.22; 7.83	5.14–6.78; 6.09	5.94–7.52; 6.58

Index of: L – light; T – temperature value; K – continentality; F – soil moisture; R – soil/water pH; N – nitrogen content in soil.

Acknowledgments
This work was financially supported by the Chair of Grassland and Landscape Forming, Faculty of Agrobioengineering, University of Life Sciences in Lublin.

Authors' contributions
The following declarations about authors' contributions to the research have been made: study conception and design: TGW, MZS, ZC; acquisition of data: TGW; analysis and interpretation of data: TGW, ZC; drafting of manuscript: TGW.

Competing interests
No competing interests have been declared.

References
1. Golińska B, Kozłowski S. Zmienność w występowaniu składników organicznych i mineralnych w *Phalaris arundinacea*. Ann UMCS E. 2006;59:353–360.
2. Grynia M, Kryszak A, Ogrodowczyk T. Analiza flory łąk w dolinie Mogielnicy. Ann UMCS E. 1995;50:259–262.
3. Kozłowski S, Goliński P, Swędrzyński A. Trawy w barwnej fotografii i zwięzłym opisie ich specyficznych cech. Inowrocław: Wydawnictwo Literackie PARNAS; 1998.
4. Szydłowska J. Charakterystyka florystyczna runi oraz ocena fitoindykacyjna warunków siedliskowych wybranych łąk śródleśnych. Rocznik Ochrona Środowiska. 2010;12:299–312.
5. Lorens B. Przemiany roślinności doliny Wieprza w Roztoczańskim Parku Narodowym. Inżynieria Ekologiczna. 2012;29:76–86.
6. Gamrat R, Kochanowska R, Niedźwiecki E. Zróżnicowanie warunków siedliskowych i zbiorowisk roślinnych w dolinie Iny w okolicach Sowna. Część III. Zróżnicowanie zbiorowisk łąkowych na tle warunków glebowych. Woda – Środowisko – Obszary Wiejskie. 2010;10(1):157–165.
7. Grzywna A, Urban D. Zróżnicowanie florystyczne i fitosocjologiczne zbiorowisk szuwarowych dolin Ochoży i Bobrówki. Woda – Środowisko – Obszary Wiejskie. 2008;8(1):109–116.
8. Kamiński J, Chrzanowski S. Zróżnicowanie florystyczne i walory przyrodnicze łąk na tle zasobności gleb torfowo-murszowych w fosfor. Woda – Środowisko – Obszary Wiejskie. 2009;9(3):77–88.
9. Gamrat R, Burczyk P. Zbiorowiska roślinne doliny Warty na odcinku Santok–Stare Polichno. Woda – Środowisko – Obszary Wiejskie. 2007;7(2a):127–136.
10. Kryszak A, Strychalska A, Kryszak J, Klarzyńska A. Synantropizacja a walory przyrodnicze *Phalaridetum arundinaceae* (Koch 1926 n.n.) Libb. 1931 Wielkiego Łęgu Obrzańskiego. Acta Botanica Silesiaca. 2011;7:49–62.
11. Gacka-Grzesikiewicz E, Cichocki Z. Program ochrony dolin rzecznych w Polsce. Warszawa: Instytut Ochrony Środowiska; 2001.
12. Braun-Blanquet J. Pflanzensociologie. Grundzüge der Vegetationskunde. 3. Aufl. Wien: Springer; 1964.
13. Shannon CE, Wiener W. The mathematical theory of communication. Urbana, IL: University of Illinois Press; 1949.
14. Raunkiær C. The life forms of plants and statistical plant geography. Oxford: Oxford University Press; 1934.
15. Ellenberg H, Weber HE, Düll R, Wirth V, Werner W, Paulißen D. Zeigerwerte von Pflanzen in Mitteleuropa. Scripta Geobotanica. 1992;18;1–258.
16. Filipek J. Projekt klasyfikacji roślin łąkowych i pastwiskowych na podstawie liczb wartości użytkowej. Post Nauk Rol. 1973;4:59–68.
17. Matuszkiewicz W. Przewodnik do oznaczania zbiorowisk roślinnych Polski. Warszawa: Wydawnictwo Naukowe PWN; 2012.
18. Mirek Z, Piękoś-Mirek H, Zając A, Zając M, editors. Flowering plants and pteridophytes of Poland – a checklist. Kraków: W. Szafer Institute of Botany, Polish. Academy of Sciences; 2002. (Biodiversity of Poland; vol 1).
19. Kryszak J, Kryszak A, Klarzyńska A. Łąki mozgowe (*Phalaridetum arundinaceae*) w dolinie Baryczy. Woda – Środowisko – Obszary Wiejskie. 2007;7(2a):209–218.
20. Grzelak M. Zróżnicowanie fitosocjologiczne szuwaru mozgowego *Phalaridetum arundinaceae* (Koch 1926 n.n.) Libb. 1931 na tle warunków siedliskowych w wybranych dolinach rzecznych Wielkopolski. Poznań: Wydaw. AR im. Augusta Cieszkowskiego; 2004. (Roczniki Akademii Rolniczej w Poznaniu. Rozprawy Naukowe; 354).
21. Grynia M, Kryszak A. Zmiany florystyczne łąk w dolinie Baryczy w okresie ostatniego trzydziestolecia. Prace z Zakresu Nauk Rolniczych, PTPN. 2001;91:59–66.
22. Szoszkiewicz K, Szoszkiewicz J. Ocena różnorodności gatunkowej pratocenoz na przykładzie wybranych zbiorowisk. Prace z Zakresu Nauk Rolniczych, PTPN. 1998;85:47–52.
23. Kryszak A, Grynia M. Osobliwości florystyczne zbiorowisk łąkowo-pastwiskowych doliny Baryczy. Prace z Zakresu Nauk Rolniczych, PTPN. 2003;95:85–90.
24. Kryszak J, Kryszak A, Grynia M. Zmiany w siedliskach i zbiorowiskach łąkowych w górnym odcinku Baryczy. Ann UMCS E. 2005;60:41–48.
25. Grzelak M. Plonowanie szuwaru mozgowego oraz skład chemiczny i wartość energetyczna mozgi trzcinowatej. Fragm Agron. 2009;26(4):38–45.

Różnorodność florystyczna oraz wartość rolnicza *Phalaridetum arundinaceae* (Koch 1926 n.n.) Lib. 1931 w wybranych dolinach rzecznych Zamojszczyzny

Streszczenie
Celem przeprowadzonych badań było określenie różnorodności florystycznej oraz wartości rolniczej *Phalaridetum arundinaceae* w dolinach rzek na Zamojszczyźnie (południowo-wschodnia Polska). Na łąkach mozgowych w dolinach trzech rzek (Por, Huczwa, Wieprz) wykonano metodą Brauna-Blanqueta zdjęcia fitosocjologiczne. Na ich podstawie określono różnorodność florystyczną uwzględniając następujące wskaźniki: Shannona–Wienera (*H'*), ogólna i średnia liczba gatunków w zdjęciu florystycznym. Ponadto obliczono procentowy udział gatunków z poszczególnych rodzin botanicznych, sklasyfikowano gatunki ze względu na formy życiowe roślin według Raunkiaera oraz określono wskaźniki ekologiczne: L (wskaźnik świetlny), T (w. termiczny), K (w. kontynentalizmu), F (wymagania w stosunku do uwilgotnienia siedliska), R (wskaźnik kwasowości gleby), N (wymagania w stosunku do azotu). Wartość rolniczą siana *Phalaridetum arundinaeae* oceniono na podstawie liczby wartości użytkowej runi (LWU). Określono również plon siana z pierwszego pokosu w tonach z hektara (t ha^{-1}).
Na podstawie obliczonych wskaźników Ellenberga R i N można zauważyć, że zespół *Phalaridetum arundinaceae* porasta w większości gleby zasobne w azot o obojętnym lub słabo zasadowym odczynie. Na analizowanych obszarach zidentyfikowano łącznie 93 gatunki z 25 rodzin botanicznych. Między badanymi obszarami stwierdzono różnicę w ogólnej liczbie gatunków oraz średniej liczbie gatunków przypadających na jedno zdjęcie fitosocjologiczne. Natomiast wskaźnik różnorodności Shannona–Wienera *H'* dla *Phalaridetum arundinaceae* badanych dolin rzecznych był zbliżony. Analiza spektrum biologicznego flory *Phalaridetum arundinaceae* wyrażona udziałem form życiowych, wskazuje na dominację hemikryptofitów. Zauważono także stosunkowo wysoki udział geofitów. LWU zespołu *Phalaridetum arundinaceae* z analizowanych dolin rzecznych kwalifikuje badaną suchą masę pod względem przydatności dla zwierząt jako średnią lub ubogą. Najwyższy plon suchej masy badanego zespołu uzyskano z łąk położonych w dolinie Wieprza, niższy w dolinie Poru i Huczwy.