[1] Institute of Agricultural Sciences, State School of Higher Education in Chełm, Pocztowa 54,
22-100 Chełm, e-mail: ekrzaczek@pwsz.chelm.pl
[2] Department of Grassland and Landscape Forming, University of Life Sciences in Lublin,
Akademicka 15, 20-950 Lublin
[3] Department of Energy and Transportation, University of Live Sciences in Lublin, Głęboka 28,
20-612 Lublin

EWA STAMIROWSKA-KRZACZEK[1], HALINA LIPIŃSKA[2],
RAFAŁ KORNAS[1], MARIANNA WARDA[2], PAWEŁ KRZACZEK[3]

The diversity of chosen grass communities in the middle part of the Wieprz river valley in the sustainable development of rural areas

Różnorodność wybranych zbiorowisk trawiastych w środkowej części doliny rzeki Wieprz w zrównoważonym rozwoju obszarów wiejskich

Summary. Sustainable rural development is identified mainly by means of ecological solutions. At the moment, more and more attention is given to natural and sightseeing values of our environment, and hence, to biodiversity. The aim of the research conducted in the years 2005–2008 was to assess the floristic diversity of grass communities in the middle part of the Wieprz river valley (Lublin region) depending on the habitat and ways of use. The moisture of habitat and the use of sward influence the formation of grass communities *Molinio-Arrhenatheretea* and *Phragmitetea* classes, which were characterized by average floristic diversity and the presence of endangered and protected species. Grass communities in river valleys require preservation and protection not only for economic reasons but also because of the floristic diversity and ecological environmental functions, and thus for the sustainable development of rural areas.

Key words: *grasslands*, sustainable development, biodiversity, Nadwieprzański Landscape Park, middle part of the Wieprz river valley

INTRODUCTION

Sustainable rural development is identified mainly with the use of ecological solutions. It should be noted, however, that the environment is one of the three pillars of sustainable development and environmental education for sustainable development is one of the important elements of sustainable development and the knowledge economy [Palińska 2011].

Floristic richness in Polish of many years is included in the national system of protected areas, habitats are located primarily in rural and forest areas. At the present time

are turning more and more attention to the natural and touristic values of our environment, and hence, and on biodiversity [Stamirowska-Krzaczek 2008]. Contemporary knowledge of the state of biodiversity in relation to species and ecological systems in Poland is a large and steadily increasing. Maintenance of floristic diversity of grass communities largely tasks should take into account that these phytocenoses shall meet. Thanks to the wide-led environmental education of children, adolescents and adults can be implemented and the implementation of the principles of sustainable development. Education is provided by NGOs complements formal education and is a means to contribute to building an informed society of the future. From the data provided by the UNESCO [Education... 2014] shows that education for sustainable development develops and strengthens the ability to assess reality and decision-making for sustainable development of individuals, groups, communities, organizations and countries, and also affects the change in thinking. In addition, in the future, enable the creation of a safer, more prosperous world, and contribute to the quality of life, development of critical thinking, develop awareness, improve skills, which will affect the development of individual countries and societies [Palińska 2011]. There is a need for increased cooperation and partnership between stakeholders in the conduct of research and development, ranging from the determination of the issues by working based on the new knowledge, making it known and use. The results of research and development efforts should be made available to all interested parties at local, regional and global levels, and all trainee should have the appropriate knowledge, values and skills as active and responsible citizens able to participate in decisions that have local and global character, which in turn will lead to the conservation of biodiversity [Ustawa o systemie oświaty 1991]. An analysis of the bibliography shows that in the XXI century more than half of the world's ecosystems has been degraded by human [Kostecka *et al.* 2012]. Common sense dictates to take action to overcome their and species selfishness and adopt the attitude of a guardian of nature [Kostecka 2010]. The attitude of a guardian of nature leads in turn to promote sustainable development and retardation (slowing down) conversion of ecosystems [Kostecka 2013].

The landscape is a reflection of the natural elements and human activities, which increases the attractiveness due to the formation of protected areas. The open landscape background of river valleys are grassland, also referred to as grassy ecosystems. This is a typical agricultural landscape in which floristically rich grassland sward is the most important element shaping the landscape of the valley floor. The grass communities during the growing season to make a change of color, which is a consequence of entering sward species forming in the next development phase. The transformation of color making the grass communities of the land, together with the subsequent flowering of their components, which provides a variety of aesthetic experiences [Stamirowska-Krzaczek and Warda 2007], so covered with grass surfaces can be an ideal place for organizing educational activities in the field. Both natural wealth of Nadwieprzański Landscape Park and attractive cultural objects, embedded in the beautiful scenically, almost natural landscape provide an excellent basis for the development of various forms of ecological education. Few known the educational function area of Nadwieprzański Landscape Park was so inspired to undertake research to evaluate the floristic diversity of grass communities in the valley of the middle Wieprz river and their importance in education for sustainable rural development.

The aim of the research conducted in the years 2005−2008 − was to assess the floristic diversity of grass communities in the middle part of Wieprz river valley (Lublin region) depending on the habitat and ways of use.

MATERIAL AND METHODS

The surveys was conducted in the central part of the Wieprz river valley, between Klarów and Ciechanki Krzesimowskie, in the region of Nadwieprzański Landscape Park (province Lublin, Poland).

Plant cover floristic studies were carried out before harvesting the first cut in the 2005−2008 growing seasons. In the study area was determined transects along which was made phytosociological releves within homogeneous vegetable patches. The area surveyed patches ranged from 100−150 m². Assessment of the species composition of the sward was assessed using the Braun-Blanquet method [Szafer and Zarzycki 1977], specifying of abundance by the 5-point scale (Tab. 1). A total of 353 phytosociological releves were made, of which this study was based on 270. Other used to supplement the list of species of vascular plants found in grass communities in the study of the valley Wieprz river.

Table 1. The method of converting the degrees of abundance in the scale of Braun-Blanquet
on the participation of individual species [Szafer and Zarzycki 1977]
Tabela 1. Sposób przeliczania stopni ilościowości w skali Braun-Blanqueta
na udział poszczególnych gatunków [Szafer i Zarzycki 1977]

Degrees of abundance Stopnie ilościowości	The range of coverage as a percentage Granice pokrycia w procentach	The average percent coverage Przeciętny procent pokrycia
5	75−100	87.5
4	50−75	62.5
3	25−50	37.5
2	10−25*	17.5*
1	1−10*	5*
+	1*	0.5*
r	coverage negligible	−

* convention accepted/ przyjęte umownie

Analysis of the results of research and observation allowed the classification of the tested plant communities to the corresponding phytosociological units. To the study results was used, the package of specialized computer programs Profit II, who assured the group releves of the similarity factor. The nomenclature of species was adopted according to Mirek *et al.* [2002], while the taxonomy and nomenclature of communities according to Matuszkiewicz [2007]. Vascular flora of Nadwieprzański Landscape Park were characterized in terms of belonging to the botanical families [Szafer *et al.* 1986] and belonging to various forms of life, according to Raunkiaera for Rutkowski [2007].

To evaluate the floristic diversity of plant communities diversity used Shannon-Wiener index (H') [Krebs 1997]. The resulting index value H' were used to characterize the diversity of the various communities, including a 5-point scale, developed by Jurko [1986].

$$H' = -\sum \left(p_i \times log_2\ p_i \right)$$

where: p_i – participation of species in sward N.

RESULTS AND DISCUSSION

Vegetation cover of grassland communities is one of the basic elements of the landscape, both in terms of floristic and phytosociological and is an important element of environmental education for sustainable development. Grassland are a valuable natural enclaves valleys and are the mainstay of biodiversity [Chmielewski 2008] to maintain the sustainable development of rural areas. Biodiversity of grass communities, especially habitats of river valleys and upland areas is closely related to their position in the landscape and soil moisture [Gacek-Grzesikiewicz 2000]. In the central part of the Wieprz river valley is a mosaic of terrestrial and aquatic environments, which creates favorable conditions for the occurrence of a variety of plant communities [Warda and Stamirowska-Krzaczek 2010] and provides opportunities for environmental education of children and youth. Grassland communities occur in Nadwieprzański Landscape Park were classified into two phytosociological classes: *Phragmitetea* and *Molinio--Arrhenatheretea*. Phytosociological classification of grass communities in the central part of the valley Wieprz river is as follows:

Class: *Phragmitetea* R. Tx. et Prsg 1942
Order: *Phragmitetalia* Koch 1926
Alliance: *Phragmition* Koch 1926
1. Association *Glycerietum maximae* Hueck 1931
Alliance: *Magnocaricion* Koch 1926
2. Association *Caricetum elatae* Koch 1926
3. Association *Phalaridetum arundinaceae* (Koch 1926 n.n.) Lib. 1931
Class: *Molinio-Arrhenatheretea* R. Tx. 1937
Order: *Molinietalia caeruleae* W. Koch 1926
Alliance: *Alopecurion pratensis* Pass. 1964
1. Association *Alopecuretum pratensis* (Regel 1925) Steffen 1931
Order: *Arrhenatheretalia* Pawł. 1928
Alliance: *Arrhenatherion elatioris* (Br.-Bl. 1925) Koch 1926
2. Association *Arrhenatheretum elatioris* Br.-Bl. ex Scherr. 1925
3. Community with *Poa pratensis-Festuca rubra* (= *Poo-Festucetum rubrae*) Fijałk. 1962
The oldest and most widely used measure of floristic diversity is the number of species. This is not a perfect indicator since all species are treated equally, irrespective of their quantitative participation in communities. Therefore, the introduction of other indicators, in order to more precisely determine the characteristics (including the Shannon-Wiener − H'). In addition, Jurko [1986] proposed a 5-point scale evaluation ranges of

values diversity index (H'). In recent years, to determine the floristic diversity of communities, in addition to the number of species takes into account the frequency of their occurrence. Given the number of species of vascular plants Kostuch [1995] divides grass communities into three groups: 1) communities with low floristic diversity − 20 species in the releves, 2) with an average diversity − 20−40 species, 3) communities of large variety − over 40 species in the releves. The research conducted in grasslands of Nadwieprzański Landscape Park shows that both the number of species in the sward of the association (communities), the average number in the releves, and the value of Shannon-Wiener diversity index were significantly different (Tab. 2) [Stamirowska-Krzaczek 2008]. Species diversity studied grass communities in the central part of the Wieprz river valley was a consequence of the impact of both the habitat conditions and the impact of anthropogenic factor (lack of use, changes in the intensity of use and fertilization) and zoonotic (grazing). A variety of meadow vegetation belts are located at equal distances from the river bed and are separate parcels belonging to different owners.

Table 2. Indicators floristic diversity of grass communities in the Wieprz valley
Tabela 2. Wskaźniki różnorodności florystycznej zbiorowisk trawiastych w dolinie Wieprza

Association Zespół	Total number of species Liczba gatunków ogółem	Average number of species in the plant communities Średnia liczba gatunków w zespole	Biodiversity index Shannon-Wiener (H') Wskaźnik bioróżnorodności Shannona-Wienera (H')
Class/ Klasa: *Phragmitetea*			
Phalaridetum arundinaceae	118	22.3	2.6
Glycerietum maximae	89	20.6	2.4
Caricetum elatae	57	16.4	2.3
Class/ Klasa: *Molinio-Arrhenatheretea*			
Order/ Rząd: *Molinietalia*			
Alopecuretum pratensis	148	25.4	3.0
Order/ Rząd: *Arrhenatheretalia*			
Arrhenatheretum elatioris typicum	144	27.4	3.3
Community/ Zbiorowisko *Poapratensis-Festuca rubra*	170	24.0	3.2
Arrhenatheretum elatioris var. Alopecurus pr.	61	23.9	2.7

Grass communities occurring in the examined middle part of the Wieprz river valley reflect the diverse intensity of use, which plays a crucial role in determining the floristic diversity of meadows and pastures [Kostuch 1995] and affects the sustainable development of these areas. In addition, it was observed that adjacent parcels of land showed absolutely different structure of plants, as well as the alternation of colors and timbre, which is related to the occurrence in the area of many different plant species. On the grasslands studied the occurrence of 138 species of vascular plants belonging to 32 botanical families, among which was dominated by plants of the family *Poaceae* (20%), *Asteraceae* and *Fabaceae* (11−12%). Analysis of grassland flora surveyed the central part of the valley Wieprz, in terms of belonging to the forms of life by Raunkiaera

showed that among the vegetation is dominated by herbaceous absolutely hemikryptofity (72%) [Warda and Stamirowska-Krzaczek 2010].

These are mostly perennials that overwinter as an evergreen leaves or buds embedded in the neck of the root, near the surface of the substrate. In the studied grasslands, geophytes accounted for 9.4% of the sword. These were mainly perennial rhizome, tuber and bulb (*Agropyron repens*, *Oleraceum allium*, *Carex flacca*, *C. paniculatae*, *Eleocharis palustris*, *Glechoma hederacea*, *Glyceria maxima*, *Linaria vulgaris*, *Orchis military*, *Phragmites australia*) whose buds overwinter in the soil surface, which enables them to survive in adverse environmental conditions. Participation in the grassland sward group of plants geophytes is largely a consequence of the extensive use of grass communities sward. Quite abundance of stand out as therophytes, ie annual and biennial plants, surviving as seeds (7.9%). Species of the group therophytes mastered muddy, but drying up in the summer the river banks creating a short-lived communities. Similar relationships occurrence therophytes on valleys grassland observed Trąba *et al.* [2006], studying plant communities in the San valley. Grassland in the Wieprz river valley are exposed to the yearly spring floods of the river, and in their follow-on periodically excessive wetting out of the habitat. This favors the occurrence of hydrophytes (*Alisma plantago-aquatica*, *Carex gracilis*, *C. rostrata*, *Equisetum fluviatile*, *E. palustre*, *Iris pseudacorus*, *Lemia gibba*, *Polygonum amphibium*, *Polygonum bistora*, *Typha lapatifolia*) that dominate small ponds, as well as local depressions, flooded in the spring, which also concluded Wolanski [2006] examining communities of Dynowskie Foothills.

The diversity of grass communities studied was evident in location in relationship to the river bed, moist places of habitat typically marshy overgrown vegetation class *Phragmitetea*. Slightly elevated areas and areas on the borders of the valley were dominated by communities of class *Molinio-Arrhenatheretea*, in average moist habitat in a order *Molinietalia*, in moderately moist and periodically dry − meadow-pasture communities in a order *Arrhenatheretalia*. Most numerous assemblage is *Arrhenatheretum elatioris typicum* with a large share of natural vegetation mainly grasses, *Fabaceae* plants, herbs and weeds [Warda and Stamirowska-Krzaczek 2010].

The greatest richness of flora (Tab. 2), and thus the highest average number of species (27.4) in the patch marked by association of fresh meadows − *Arrhenatheretum elatioris typicum* (H' = 3.3) in class *Molinio-Arrhenatheretea*. Moreover, among phytocoenoses of class *Molinio-Arrhenatheretea*, within the order *Arrhenatheretalia* − community with *Poa pratensis* and *Festuca rubra* (H' = 3.2), and within the order *Molinietalia*, a large diversity distinguished by a association *Alopecuretum pratensis* (H' = 3.0), (Fig. 1).

In addition, fresh meadows communities, characterized by higher diversity than phytocoenoses rushes of *Phragmitetea* class. Typical association, appearing in optimal habitat conditions characterized by a greater floristic diversity than variants with clear dominance of one species (*Arrhenatheretum elatioris var. Alopecurus pratensis* with), which is consistent with the results of Kryszak and Grynia [1999, 2005].

In phytocoenoses of *Phragmitetea* class highest floristic diversity characterized by *Phalaridetum arundinaceae* association (H' = 2.6). Lowest value of the Shannon-Wiener index (H') and the smallest average number of species found in the *Caricetum elatae* association (Fig. 2).
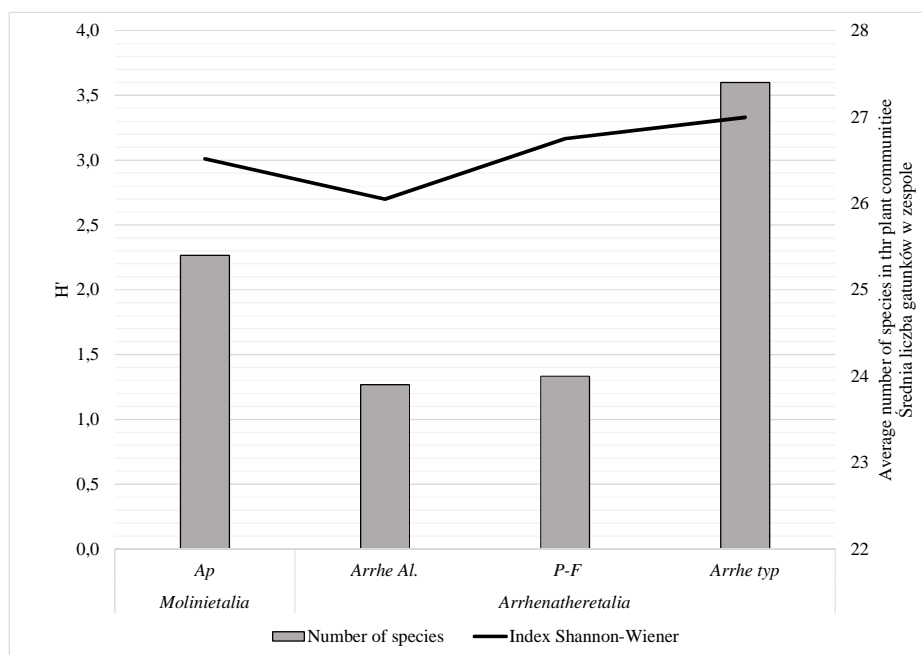
Explanations: *Ap – Alopecuretum pratensis; Arrhe Al – Arrhenatheretum elatioris var. with Alopecurus pratensis; P-F – ass. with Poa pratensis-Festuca rubra; Arrhe typ – Arrhenatheretum elatioris typicum; Molinietalia; Arrhenatheretalia – Arrhenatheretalia*

Fig. 1. Relationships between number of species and biodiversity Shannon-Wiener index (H')
in the grass communities of class *Molinio-Arrhenatheretea*
Rys. 1. Zależności między liczbą gatunków a wskaźnikiem bioróżnorodności
Shannona-Wienera (H') w zbiorowiskach trawiastych z klasy *Molinio-Arrhenatheretea*

Given the scale ranges given by Jurko [1986] for the Shannon-Wiener index (H'), it was found that the grass communities of the class *Molinio-Arrhenatheretea*, occurring in the central part of the Wieprz river valley characterized by medium-, and within the class *Phragmitetea* low-grade floristic diversity. It was also found that there are directly proportional relationship between the number of species in the communities, and index value H'.

The low diversity index of the rushes communities of *Phragmitetea* class in the Wieprz valley confirm the test results Szoszkiewicz and Szoszkiewicz [1999] and Trąba *et al.* [2006]. Habitat strongly moist are poorer in species, because they are largely controlled by a few dominant plants. In contrast, communities of the medium wet and periodically dry habitats within class *Molinio-Arrhenatheretea* characterized by a similar biodiversity Stamirowska-Krzaczek [2015]. Communities of meadow-pasture of class *Molinio-Arrhenatheretea* of the Wieprz river valley stand out a greater floristic diversity than communities described by Kryszak [2001] from Wielkopolska. Research of Grynia and Kryszak [1996] shows that the index of diversity of meadow associations are higher in the mountains and in the foothills than in the lowlands.
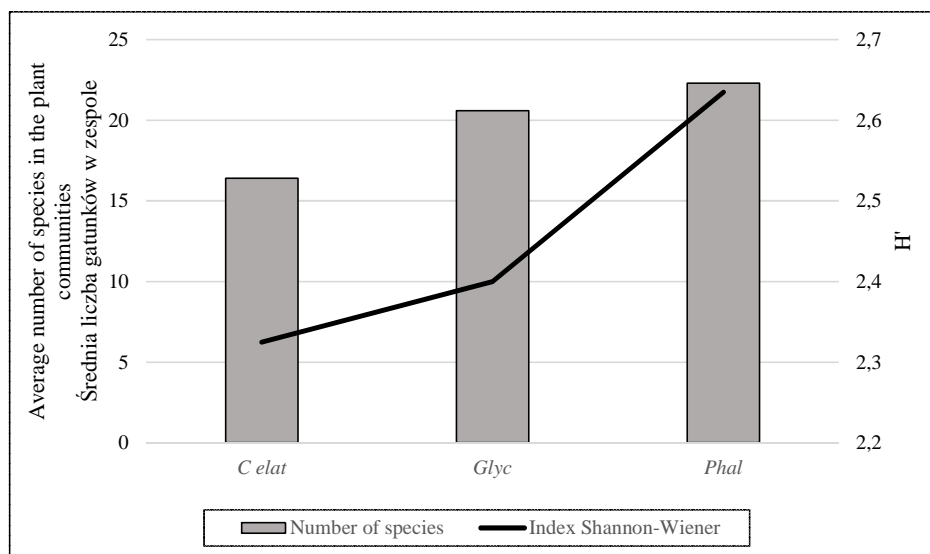
Explanations: *C elat – Caricetum elatae; Phal – Phalaridetum arundinaceae; Glyc – Glycerietum maximae*

Fig. 2. Relationships between number of species and biodiversity Shannon-Wiener index (H')
in the grass communities of class *Phragmitetea*
Rys. 2. Zależności między liczbą gatunków a wskaźnikiem bioróżnorodności
Shannona-Wienera (H') w zbiorowiskach trawiastych z klasy *Phragmitetea*

Species-rich meadows and pastures in Nadwieprzański Landscape Park is character-ized by medium floristic diversity, mainly due to the numerous participation in the sward dicotyledonous plants. However, constant changes in grass communities habitat condi-tions occur in Wieprz river valley in the past (intensive drying meadows and associated with mineralization process of organic soils, replacing extensive forms by intensive forms), and now the abandonment of certain land area, leading to the loss of many spe-cies, and consequently to reduce the floristic diversity of grassland. Similar observations regarding changes in the diversity of grass comunities noted Kostuch and Janeczko [1981] and Trąba *et al.* [2006]. Therefore, the continuation of floristic diversity of grass communities largely should tasks take into account that these phytocoenoses will meet in environmental education. Research conducted by Kryszak [2001] shows that both the number of species and biodiversity index decreases when the soil increases the phospho-rus and nitrogen content (as a result of the intensity of use). Communities occurring in habitats with optimum content of these components in the soil are characterized by the highest number of species and the highest values of Shannon-Wiener biodiversity index (H'). In contrast, Kucharski [2012] states that the floristic diversity of the same associa-tion and communities varies in different regions of Polish. Therefore, a very important element is to recognize the role of local communities, which should be partners in the development of educational programs, including elements of nature.

CONCLUSIONS

1. Grass communities occurring in the middle part of Wieprz river valley belong to *Molinio-Arrhenatheretea* and *Phragmitetea* class and characterized by medium floristic diversity (H' = 2,7−3,3) in the within *Molinio-Arrhenatheretea* class and the low (H' = 2,3−2,6) in the *Phragmitetea*.

2. It was found that there are directly proportional relationship between the number of species in the communities, and index value H'. The greatest richness of flora and thus the highest average number of species (27.4) in the patch marked by association of fresh meadows − *Arrhenatheretum elatioris typicum* (H' = 3.3).

3. Floristic diversity and species richness the grass communities in the Nadwieprzański Landscape Park yields delightful esthetic sensations and emphasizes the importance of grassland in organizing educational activities in the field various forms of ecological education in the sustainable development of rural areas.

REFERENCES

Chmielewski T.J., 2008. Landscape and Protected Areas – Polish Experiences. In: M. Schmidt, J. Glasson, L. Emmelin, H. Helbron (eds.), Standards and thresholds for impact assessment, ser. Environmental Protection in the European Union, vol. 3. Springer Publ., Berlin–Heidelberg.

Education for Sustainable Development (ESD), 2014. Education for Sustainable Development at UNESCO, http://www.unesco.org/new/en/education/themes/leading-the-international-agenda/ education-for-sustainable development/climate-change-education: 23.09.2014).

Gacek-Grześkiewicz E., 2000. Różnorodność biologiczna dolin rzecznych. Przyr. Pol. 10, 7.

Grynia M., Kryszak A., 1996. Ocena geobotaniczna i gospodarcza zbiorowisk łąkowych Obniżenia Dusznickiego oraz Gór Bystrzyckich. Zesz. Prob. Post. Nauk. Rol. 442, 97−104.

Jurko A., 1986. Plant communities and some questions of their taxonomical diversity. Ekologia 5 (1), 3−31.

Kostecka J., 2010. Retardacja przekształcania zasobów przyrodniczych jako element zrównoważonego rozwoju. Biul. Pol. Akad. Nauk Kom. Przestrz. Zagosp. Kraju 242, 27−49.

Kostecka J., Mazur-Pączka A., Jasińska T., Batóg K., 2012. Pojęcie „świadczenie ekosystemowi” i jego rola w edukacji dla zrównoważonego rozwoju (na przykładzie bzu czarnego *Sambucus nigra* L.). Inż. Ochr. Środ. 15 (4), 405−417.

Kostecka J., 2013. Retardacja tempa życia i przekształcania zasobów przyrody – wybrane implikacje obywatelskie. Inż. Ekol. 34, 38−52.

Kostuch R., 1995. Przyczyny występowania różnorodności florystycznej ekosystemów trawiastych. Annales UMCS, sec. E, Agricultura 50, 23−33.

Kostuch R., Janeczko A., 1981. Znaczenie różnorodności florystycznej runi użytków zielonych. Prz. Hod. 8, 18−20.

Krebs Ch. J., 1997. Ekologia. PWN, Warszawa, ss. 736.

Kryszak A., 2001. Różnorodność florystyczna zespołów łąk i pastwisk klasy *Molinio-Arrhenatheretea* R. Tx. 1937 w Wielkopolsce w aspekcie ich wartości gospodarczej. Rocz. AR. Pozn., Rozpr. Nauk. 314, ss. 182.

Kryszak A., Grynia M., 1999. Zmiany różnorodności florystycznej w obrębie zbiorowisk łąkowych pradoliny Warty w gminie Kramsk. Fol. Univ. Agric. Stein. 197, Agricultura 75, 197−202.

Kryszak A., Grynia M., 2005. Zbiorowiska trawiaste siedlisk nadmiernie uwilgotnionych w dolinach rzecznych. Łąk. Pol. 8, 97–106.

Kucharski L., 2012. Roślinność łąkowa środkowej Polski na przełomie XX i XXI wieku – jej stan, kierunki zmian i ochrona. Ekol. Tech. 20, 19–25.

Matuszkiewicz W., 2007. Przewodnik do oznaczania zbiorowisk roślinnych Polski. PWN, Warszawa, ss. 540.

Mirek Z., Piękoś-Mirkowa H., Zając A., Zając M., 2002. Flowering plants and pteridophytes of Poland: a checklist. W. Szafer Institute of Botany Polish Academy of Sciences, Kraków, ss. 442.

Palińska M., 2011. Edukacja na rzecz zrównoważonego rozwoju na obszarach przyrodniczo cennych na przykładzie Włocławskiego Centrum Edukacji Ekologicznej. Zrównoważony rozwój obszarów przyrodniczo cennych, t. 1, 297–302.

Rutkowski L., 2007. Klucz do oznaczania roślin naczyniowych Polski niżowej. Wyd. Nauk. PWN, Warszawa, ss. 814.

Stamirowska-Krzaczek E., 2008. Różnorodność zbiorowisk trawiastych w środkowej części doliny Wieprza i ich walory krajobrazowe. Praca doktorska, Lublin, ss. 186.

Stamirowska-Krzaczek E., 2015. Występowanie zbiorowiska *Poa pratensis-Festuca rubra* w warunkach zaniedbań w użytkowaniu łąk. Annales UMCS, sec. E, Agricultura 70(1), 61–72.

Szafer W., Kulczyński S., Pawłowski B., 1986. Rośliny polskie. PAN, Warszawa, ss. 1019.

Szafer W., Zarzycki K., 1977. Szata roślinna Polski. PWN, Warszawa, ss. 615.

Szoszkiewicz K., Szoszkiewicz J., 1999. Ocena różnorodności gatunkowej wybranych fitocenoz łąkowych o zróżnicowanej wartości rolniczej. Fol. Univ. Agric. Stein. 197, Agricultura 75, 307–312.

Trąba Cz., Wolański P., Oklejewicz K., 2006. Różnorodność florystyczna wybranych zbiorowisk nieleśnych doliny Sanu. Annales UMCS, sec. E, Agricultura 61, 267–275.

Ustawa o systemie oświaty, 1991. Dz.U. 1991 nr 95 poz. 425.

Warda M., Stamirowska-Krzaczek E., 2010. Ocena wartości runi oraz wilgotności i trofizmu siedlisk wybranych zbiorowisk trawiastych z klasy *Molinio-Arrhenatheretea*. Łąk. Pol. 13, 183–195.

Wolański P., 2006. Przyrodnicza i rolnicza waloryzacja łąk i pastwisk Pogórza Dynowskiego. Praca doktorska, mps, ss. 165.

Streszczenie. Zrównoważony rozwój obszarów wiejskich jest identyfikowany głównie ze stosowaniem rozwiązań proekologicznych. W obecnej chwili zwraca się coraz większą uwagę na walory przyrodnicze i krajobrazowe naszego otoczenia, a co za tym idzie również na bioróżnorodność. Celem badań prowadzonych w latach 2005–2008 była ocena różnorodności florystycznej zbiorowisk trawiastych w dolinie środkowego Wieprza (województwo lubelskie) w zależności od warunków siedliskowych i sposobów użytkowania. Uwilgotnienie siedliska oraz użytkowanie runi wpływają na wykształcenia zbiorowisk trawiastych z klas *Molinio-Arrhenatheretea* i *Phragmitetea*, które odznaczały się średnią różnorodnością florystyczną oraz występowaniem gatunków zagrożonych i chronionych. Zbiorowiska trawiaste w dolinach rzecznych wymagają więc ich zachowania i ochrony nie tylko ze względów gospodarczych, ale także ze względu na różnorodność florystyczną oraz funkcje ekologiczne, jakie pełnią w środowisku, a tym samym w zrównoważonym rozwoju obszarów wiejskich.

Słowa kluczowe: użytki zielone, zrównoważony rozwój, bioróżnorodność, Nadwieprzański Park Krajobrazowy, środkowa część doliny Wieprza