



European Bison Conservation Newsletter Vol 11 (2018) pp: 19–24

Where wisents of Bieszczady spend their non-active periods?

Kajetan Perzanowski, Maciej Januszczak

Museum and Institute of Zoology, Polish Academy of Sciences, Ogrodowa ^{10, 38–700} Ustrzyki Dolne.
e-mail: StacjaKarpacka@miiz.waw.pl

Abstract: Analysed were habitat conditions (categories of ground cover according to Corine classification) of sites where wisents of Bieszczady were recorded during non-active periods of their time budget. Considered habitat categories included: forest, non-forested areas, as well as deciduous, coniferous and mixed forest stands. Data were collected between 2001–2017 separately for vegetative and winter seasons, within the home range of wisent population in Bieszczady. Absolute majority of such records (about 90%) came from forested areas. Outside of the forest, non-active wisents were observed twice more frequently in winter than in summer. Within the forest, the least frequently non-active wisents were recorded in deciduous stands (about 20%), and the most frequently in mixed stands (about 50%). Habitat preference estimated with Ivlev's coefficient shows, that the forested area was slightly preferred by wisents for their non-active periods while non forested area was strongly avoided then. Among categories of forest stands, most strongly preferred were coniferous stands in vegetative seasons and mixed stands in winter. Deciduous stands were slightly avoided in both seasons.

Key words: European bison, the Carpathians, activity, habitats

Introduction

Wisents (*Bison bonasus*), like all ruminants, consume daily large amounts of plant biomass – even over 30 kg in the case of an adult bull. Such forage, consisting mostly of polysaccharides like cellulose and lignin, is difficult to digest and require long time fermentation in the rumen. Additionally, since only food particles of proper size may pass through omasum, ingested biomass has to be chew out as the cud. Therefore, such animals after a foraging bout, have to spend considerable periods in activity limited to rumination and digestion (Meletti, Burton 2014).

Natural diet of wisents consists mostly (some 80%) of monocotyledonous species like grasses and sedges supplemented with herbs which are ingested through grazing, and in about 20% of browse and tree bark being respectively browsed and stripped. So far, data on the activity rhythm of this species were collected only at Białowieska Forest. There were observed four activity peaks during 24 hrs connected mostly with foraging, and non-active periods equalling to about 30% of their time budget



in summer and 60% in winter. For ruminating, wisents need sites where they could remain not disturbed for considerable periods of time (Krasińska, Krasiński 2017).

This study was supposed to provide data on habitat conditions preferred by wisents of Bieszczady during non-active parts of their time budget.

Study area, materials, methods

Data for this project were collected for animals from the population of Bieszczady wisents, inhabiting forest districts of Lesko, Baligród, Cisna, Komańcza and the part of Lutowiska District (so called Tworylne herd), over a period of 16 years (between 2001–2017), and were divided into two seasons: winter lasting from 1.11–31.03, and vegetative between 1.04–31.10 (Fig. 1).

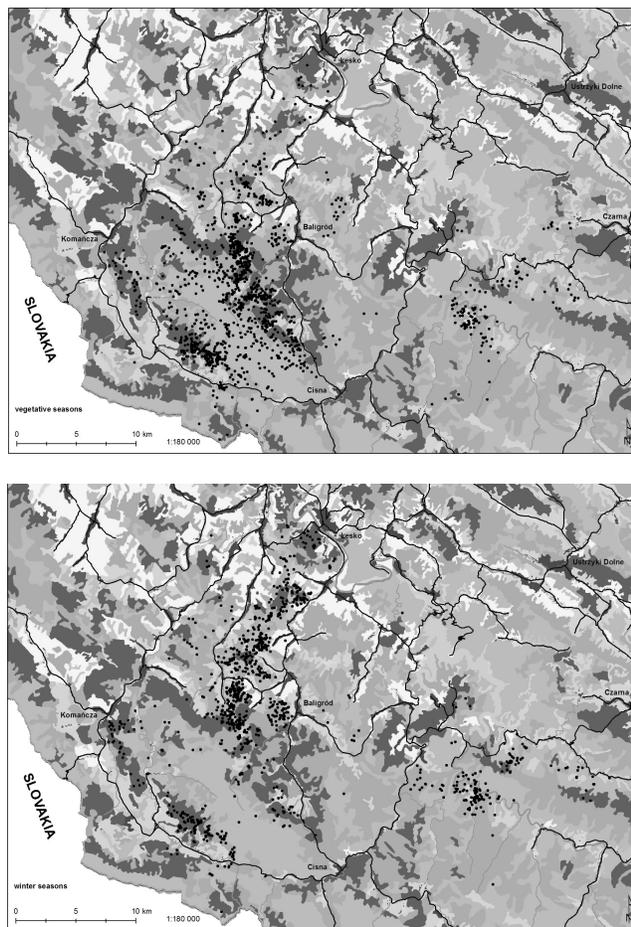


Figure 1. Distribution of records of non-active wisents from the western subpopulation of Bieszczady in vegetative and winter seasons, during the period between 2001–2017.

All data originate from observation cards that were filled up during these years by local foresters and the staff of Carpathian Wildlife Research Station. Recorded were all animals being observed while lying down (not standing), as well as their resting sites visible in the snow. There was no differentiation between animals only resting or sleeping and animals lying down and ruminating.

According to Corine classification, within the study area dominates the forest (almost 74%) with almost equal proportions of deciduous and mixed (both about 30%) and about 14% of coniferous stands (Tabl. 1).

Table 1. Percentage of study area covered by various types of forest stands and by non-forested area.

Ground cover	% of study area
Deciduous forest	31.05
Coniferous forest	14.02
Mixed forest	28.76
Forest in total	73.83
Non forested area	26,17

In total, 2557 localisations of non-active animals were available, 1399 from vegetative and 1159 from winter seasons. Maximal annual number of localisations from vegetative season was 1049, while minimal equalled to 371 (SD 103.2). In winter, those figures were 928 and 350 (SD 84.8) respectively.

Results

The analysis of presence of non-active wisents in various types of forest stands and within non forested area shows, that absolute majority of such records (about 90%) comes from forested areas, very similarly in summer and winter. Outside of the forest, non-active wisents were observed twice more frequently in winter. Within the forest, the least frequently non-active wisents were recorded in deciduous stands (about 20%), and the most frequently in mixed stands (about 50%) (Tabl. 2).

Table 2. Percentage of records of non-active wisents in various types of forest stands and within non forested area in vegetative and winter seasons obtained for population of Bieszczady wisents in years 2001–2017.

Ground cover	% of localisations	
	vegetative	winter
Deciduous forest	24.5	19.9
Coniferous forest	27.9	24.3
Mixed forest	47.6	55.8
Forest in total	92.6	87.0
Non forested area	7.4	13.0

The availability of identified categories of ground cover and the respective frequency of non-active wisents' presence were compared with Ivlev's coefficient. According to obtained values, the forested area was slightly preferred by wisents for non-active periods of their time budget, while non forested area was strongly avoided. Among categories of forest stands, most strongly preferred were coniferous stands in vegetative seasons and mixed stands in winter. Deciduous stands were slightly avoided in both seasons (Tabl. 3).

Table 3. Values of Ivlev's index for the preference of various types of forest stands and non forested areas by wisents for non-active periods of their time budget.

Ground cover	Values of Ivlev's index	
	vegetative	winter
Deciduous forest	-0.12	-0.22
Coniferous forest	0.33	0.15
Mixed forest	0.25	0.32
Forest in total	0.11	0.08
Non forested area	-0.56	-0.35

Discussion

The proportion of time dedicated by large herbivores for foraging and resting (ruminating) depends mostly on the availability of food and its quality. The less abundant are food resources, the more time wisents have to spend on foraging, while the poorer quality of forage (low digestibility) requires longer periods necessary for chewing and ruminating. During that time, animals seek for surroundings assuring safety and cover, protecting against unfavourable climatic conditions. This may explain why wisents prefer to spend non active periods of their time budget inside the forested area and favour coniferous and mixed stands (Bobek *et al.* 1992, Toweil D.E., McCabe R 2002).

Being not active, does not necessarily mean that animal are ruminating or digesting the food. They may as well be asleep or just resting e.g. after a physical effort. Wisents of Białowieska Forest tend to rest between 6–9 p.m., and between midnight and early morning hours (Kraśńska, Kraśński 2017). Nevertheless, motionless animals do not generate additional body heat necessary to maintain proper body temperature. Therefore in such situation animals prefer conditions like dense vegetation or terrain features providing adequate cover to reduce effects of wind chill factor (Bobek *et al.* 1990, 1991, Parker 1987)

Therefore, the structure of time budget of free ranging wisents depends significantly upon the amount and quality of available forage which determines the length of time necessary for its ruminating and digesting. These constraints in turn influence habitat preferences of wisents for non-active periods of their time budget.

In this study analysed was only the proportion of records of wisents' presence during their non-active periods in non forested and forested areas. However to obtain a full picture of conditions required by these animals for rest and ruminating, necessary will be further analysis considering also terrain features (e.g. slope exposition, elevation above sea level), distances between resting sites and grazing grounds, as well as proximity of roads and settlements.

Acknowledgements

The study is based upon results of continuous monitoring program for wisents in Bieszczady Mountains, supported by Regional Directorate of State Forests in Krosno.

References

- Bobek B., Kosobucka M., Krzakiewicz H., Perzanowski K., Wolf R., 1990: Food, cover and human disturbance as the factors influencing antlers weight in red deer (*Cervus elaphus* L.). Proc. XIXth IUGB Congr., Trondheim 1989: 27–34.
- Bobek B., Morow K., Perzanowski K., Kosobucka M., 1992: Jeleń (*Cervus elaphus* L.) monografia przyrodniczo-łowiecka. Świat Press Kraków-Warszawa, 200 pp.
- Bobek B., Perzanowski K., Bielak M., 1991: Analysis of forest habitats for successful roe and red deer management in Central Europe. in: Wildlife Conservation – present trends and perspectives for the 21st century. N. Maruyama, B. Bobek, Y. Ono, W.L. Regelin, L. Bartoš and P.R. Ratcliffe (eds). Proc. Int. Symp. on Wildlife Conservation. Tsukuba and Yokohama 1990: 82–86.
- Krasińska M., Krasiński Z. (2017). Żubr monografia przyrodnicza. Chyra.pl, Białowieża, 448 pp.
- Meletti M., Burton J. (eds) 2014. Ecology, evolution and behaviour of wild cattle: implications for conservation. Cambridge University Press
- Parker K.L. 1987. Effects of heat, cold and rain on coastal black-tailed deer. Can. J. Zool. 66: 2475–2483.
- Toweil D.E., McCabe R. (eds) (2002). North American elk: ecology and management. Wildlife Management Institute, Washington DC, 962 pp.

Gdzie żubry bieszczadzkie przebywają gdy są nieaktywne

Streszczenie: Analizowane były warunki siedliskowe (w oparciu o kategorie pokrycia terenu wg. klasyfikacji Corine) miejsc, gdzie obecność bieszczadzkich żubrów była rejestrowana podczas nieaktywnych okresów ich budżetu czasowego. Uwzględniono następujące kategorie siedlisk: las, obszary otwarte oraz drzewostany liściaste, iglaste i mieszane. Dane pochodziły z okresu pomiędzy 2001–2017 osobno dla sezonów wegetacyjnych i zimowych, z arealu populacji bieszczadzkich żubrów obejmującego nadleśnictwa: Komańcza, Cisna, Baligród, Lesko i część nadleśnictwa Lutowiska (tzw. stado Tworylne). Absolutna większość takich stwierdzeń obecności żubrów (ok. 90%) pochodzi z obszarów leśnych. Poza lasem, nieaktywne żubry obserwowane były zimą dwa razy częściej niż latem. W obrębie lasu, najrzadziej nieaktywne żubry obserwowano w drzewostanach liściastych (ok. 20%), a najczęściej w drzewostanach mieszanych (ok. 50% obserwacji). Preferencje siedliskowe oszacowane na podstawie wskaźnika Ivleva wskazują, iż obszar zalesiony był nisko preferowany przez żubry, natomiast obszary otwarte były silnie unikane podczas nieaktywnych okresów ich budżetu czasowego. Wśród kategorii drzewostanów najsilniej preferowane były drzewostany iglaste w sezonach wegetacyjnych a mieszane zimą. Drzewostany liściaste były w niskim stopniu unikane w obu sezonach.
