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Food Preferences and Requirements of the European Bison

[With 4 Tables & 1 Fig.]

These studies were carried out in summer and winter in the breeding reserve of the Białowieża National Park, 8 European bison varying in age from 8 months to 5.5 years being used in 12 experiments. Fresh plants were fed in summer, and in winter plants gathered in autumn and air-dried. It was found that a very large number of plants are very readily eaten by European bison in relation to the number of plant species fed to the animals. The average amount of fresh food eaten per day in summer is 8.4 kg for a young bull 8 months old, 19.4—28.5 kg for animals 2—3 years old, 22.7 kg for a 4-year old cow and 32.2 kg for a 5-year old bull. In winter average daily consumption is distinctly lower, from 4.03 to 5.9 kg 2—3 year old animals and 7.19 kg in a bull 5.5. years old. The amount of dry mass of fodder eaten by European bison per 1 kg of body weight per day does not differ greatly over the course of one season, but differences between the two seasons examined may be as much as 50%. The maximum food intake (in calories) per 1 kg of body weight was found in a 2-year old bull in summer and 3-year old heifer in winter. After ascertaining the European bison's food requirements it was calculated that a free-living European bison head, 80% of which was concentrated in an area of 17,608 ha of the Białowieża Primeval Forest, consumed 0.21 kg per day of fresh plant mass from 1 ha in 1970. This figure included 0.069 kg of food consisting of shoots and 0.141 kg of herbs and grasses per hectare.

I. INTRODUCTION

In connection with the studies being carried out on the role of the European bison in forest ecosystems of the Białowieża Primeval Forest it was necessary to define the food requirements and preferences of this animal.

Up to the present the majority of the studies have been made on free-living herds, drawing up a list of the species eaten by these animals on the basis of bite marks and damage to herbs, trees and shrubs (B a š-

kirov, 1939; Borowski, Krasiński & Miłkowski, 1967; Koročkina, 1969a, b). Observations of this kind permit of drawing up a list of species eaten by the animals, and also, to a certain extent only, preferences for different species, but they do not permit of grasping preferences for different species from the quantitative aspect.

The question of ascertaining the amount of food eaten by European bison has hitherto been a little-known problem. Approximate data are to be found only in studies by Karcov (1903), Wróblewski (1927), Zablockaja (1957), Aleksandrov & Golgofskaja (1965), Koročkina (1966). It was therefore decided to measure the amount of food eaten by the European bison and to discover which species of plants form its favourite food. Measurement of these values must for obvious reasons be carried out on European bison in a breeding reserve, kept in relatively small enclosed areas, since only studies of this kind permit of calculating the amounts of food consumed per day and differentiation in these data depending on the animal's sex and age, and also on the season.

Under natural conditions the chief food of the European bison consists of herbs and the leaves and branches of trees and shrubs. In late autumn, winter and early spring this food is supplemented by the non-ligneous bark of trees (Krainova, 1951; Koročkina, 1966). All these foods are easy to find and both preferred and eaten by these animals. In forests, cultivated fields and forest glades almost all the plant species are accessible to the European bison, but the amount of food available varies with the season, and for this reason experiments on food preferences were carried out in two extreme periods — summer and winter.

II. MATERIAL AND METHODS

The experiments were made in the breeding reserve of the Białowieża National Park, using 8 individuals of both sexes varying in age from 8 months to 5.5 years. Four of them were examined twice and thus a total of 12 experiments were made.

These animals were kept in turn in a small experimental paddock measuring 20 × 20 m, equipped with a weighing platform and fodder racks. There was a wooden floor under the racks from which the food remains were collected. The observation holes in the boarding closely surrounding the paddock facilitated observations of the animals. Before the European bison were admitted into the paddock it was thoroughly cleaned to prevent the animals from eating additional food (such as grass or fallen branches of trees).

The animals were kept for 8—9 days in the paddock for the initial series of measurements, and from 12—14 days for the later series. The first two or three days constituted the preliminary period allowed for the animals to become accustomed to the paddock and food. In the final experiments the preliminary period was considered too short and was prolonged by 4 days. During each experi-

ment the European bison were weighed, although on account of the animals' wildness this was not always possible at the beginning and end of the experiment.

The list of herb, shrub and tree species fed to the European bison was based on data from Borowski's observations (personal communication) on the food preferences of free-living European bison, choice being made of the species which were most often encountered in the Forest and those which occurred in the greatest numbers. The food supplied daily consisted of 5—6 different herb and tree species. In summer the European bison were given fresh plant food and in winter plants collected in late autumn and air-dried. In the second case the aim was to ensure that the fodder was as close as possible in quality to that found under natural conditions in winter (Borowski & Kossak, 1972). Except for one experiment the animals were not additionally fed concentrates. The various species of plants were weighed before being fed to the animals, tied in bundles and placed in the racks. A total of 30 herb species, 13 shrub species, 13 tree species and bark from 4 species of trees were used in the experiment.

Food was supplied about 9 a.m. having previously collected the remains of food left from the preceding day. After collection the uneaten remains of the food were sorted into species and at once weighed. The difference between the weight of the food supplied and that of the uneaten remains and loss due to drying defined the amount of food consumed. During the experiment observations were made of which parts of the plants were preferred by the European bison.

Food was always supplied *ad libitum*. In summer the animals were given 30—50 kg of fresh forest plants, and in winter about 10 kg of dried plants.

A sample consisting of 1 kg of fresh mass was taken from the plants supplied in the experiment, sent to the laboratory and dried in an oven to a constant weight for a period of 72 hours at a temperature of 80°C. It was next weighed with accuracy to 0.01 kg. The amount of dry mass present in the food and defined in this way was later used for further calculations. The caloric value of the food supplied were determined in a bomb calorimeter.

After ascertaining the degree of attractiveness to the animals of the given plant species a conventional scale was used, assuming that plants consumed from 50—100% are very readily eaten, from 20—50% readily, up to 20% reluctantly and 0 — not eaten at all.

III. RESULTS

1. Food Preferences

During the experiment the animals were fed on 30 herb, 13 tree and 13 shrub species and on bark from 4 species of trees (Table 1). The herb species most preferred by adult European bisons (wisents) in summer include: *Impatiens noli tangere* L., *Aegopodium podagraria* L., *Chaerophyllum hirsutum* L., *Agropyrum repens* Baev., *Stellaria nemorum* L., *Melampyrum nemorosum* L., *Trifolium repens* L., *Taraxacum officinale* Web., *Scripus silvaticus* L. and others. Of the tree and shrub species the leaves and twigs of: *Quercus robur* L., *Fraxinus excelsior* L., *Acer platanoides* L., *Salix caprea* L., *Malus silvestris* Mill., *Ulmus campestris* L., *Rubus idaeus* L. and *Evonymus europaea* L. are favourites (Table 1).

Table 1

Food preferences of European bison in different seasons.

Pedigree number of animals: 2115 — ♀ 8 months »Polga«, 2247 — ♂ 2 yrs »Podbiał«, 1987 — ♂ 2 yrs »Polo«, 1984 — ♀ 2 yrs »Pociągła«, 1862 — ♀ 3 yrs »Powolna«, 1864 — ♂ 5 yrs »Porter«, 2114 — ♀ 3 yrs »Pleola«, 1861 — ♂ 3 yrs »Pokrój«

No	Species	Summer							Winter				
		Pedigree number of animals											
		2115	2247	1987	1984	1862	1984	1864	2247	2114	1861*	1861**	1864
1	*Aegopodium podagraria* L.		100				88	74					
2	*Agropyron repens* Gaertn.		100				95	95					
3	*Calamagrostis arundinacea* Roth.		100				63						
4	*Chaerophyllum hirsutum* L.		100				98						
5	*Trifolium repens* L.		100	98	96		99	100					
6	*Taraxacum officinale* Web.		100				100	96					
8	*Lysimachia vulgaris* L.		100				88						
7	*Ornithopus sativus* L.		100										
9	*Dactylis glomerata* L.		100										
10	*Rumex obtusifolius* L.		98				20						
11	*Carex pilosa* Scop.		94						100	99			100
12	*Lathyrus silvestris* L.		94				17	100					
13	*Vicia cracca* L.		92					100					
14	*Stellaria nemorum* L.		92				98	93					
15	*Scirpus silvaticus* L.		77				86	100					
16	*Agrostis vulgaris* With.		57				62	71					
17	*Lupinus polyphyllos* L.		32	15	15			90					
18	*Juncus effusus* L.		29				51	50					
19	*Hypericum perforatum* L.		25				33	32					
20	*Chaenopodium album* L.		22					75					
21	*Athyrium filix femina* Rth.		22	0	0	0	23	30					
22	*Melampyrum nemorosum* L.		100				85	92					
23	*Cirsium arvense* Scop.		16					57					
24	*Urtica dioica* L.	0		37	45	20	24		30	7	37	26	63
25	*Cirsium oleraceum* Scop.	60		94	93	91					0		
26	*Phragmites communis* Trin.			0	20								
27	*Achillea millefolium* L.						90						
28	*Artemisia vulgaris* L.						57	41					
29	*Impatiens noli tangere* L.						54	97					

Table 1 (continued)

	Pedigree number of animals	2115	2241	1987	1984	1862	1984	1864	2247	2114	1861*	1861**	1864
30	*Filipendula ulmaria* Maxim.										91		
31	*Quercus robur* L.	70	95	84	85	71	96	86	60	74			92
32	*Tilia cordata* Mill.	0	92	18	28	18	25	18	18	44		0	79
33	*Malus silvestris* Mill.		92				71	93					
34	*Acer platanoides* L.	40	90	63	63	56	74	100	64	29			95
35	*Carpinus betulus* L.	8	74	71	61	85		80	60	62	70	55	92
36	*Salix caprea* L.	62	67	80	78	82	95	100	63	61	57		85
37	*Populus tremula* L.	38	56	70	63	62	64	100	63	56	33	65	82
38	*Alnus glutinosa* Gaertn.		42	0	0	10	64	48	3	0	40	24	21
39	*Betula verrucosa* Ehrh.	0	75	8	10	0	42	71	40	14	9		60
40	*Pirus communis* L.		43				64	87					
41	*Ulmus campestris* L.		18					100	6	0			95
42	*Picea excelsa* L.		16	0	0	0		0					
43	*Pinus silvestris* L.	0	7	0	0	0	0	20	10	0			0
44	*Vaccinium myrtillus* L.		100				70	90	100	100			100
45	*Rubus idaeus* L.	0	92	70	69		82	100	50	76	41	14	76
46	*Sorbus aucuparia* L.	0	85	65	71		79	75	80	74			80
47	*Salix cinerea* L.		59				61		44	50	4	0	92
48	*Padus avium* Mill.		29	0	0	0	34	24	3	0			5
49	*Ribes nigrum* L.		22				66	45	44	13			100
50	*Corylus avellana* L.	0	20	14	6	3	62	44	50	15	31	17	48
51	*Fraxinus excelsior* L.	22		65	76		98	84	40	29			28
52	*Evonymus europaea* L.							100	49	11			36
53	*Rhamnus frangula* L.								15	0			50
54	*Rubus fruticosus* L.								42	61			33
55	*Calluna vulgaris* Sal.							0	84	13			98
56	*Sambucus nigra* L.												
57	*Picea excelsa* — bark								100	30			100
58	*Pinus silvestris* — bark								88	35			100
59	*Fraxinus excelsior* — bark								100	35			100
60	*Salix caprea* — bark								100	100			100

* Supplementary feeding with hay, and fooder beet, 100% of which were caten. ** Supplementary feeding with hay, 100% of which was eaten.

Young animals also readily eat *Cirsium oleraceum* Scop., *Rumex obtusifolius* L., *Dactylis glomerata* L., *Vicia cracca* L., and the leaves and twigs of *Rubus idaeus* and *Vaccinium myrtillus* L.

In winter the majority of the very readily eaten species are the same in the case of adult and young animals. Differences occur only in respect of such species as *Urtica dioica* L., *Rubus idaeus* L., *Tilia cordata* Mill.,

Table 2

Degree of food preferences (in %) in European bison depending on the animals'age and the season. Fresh plants were fed in summer and dried plants in winter.

Age in years	Sex	No. *	Scale of preference ** 0	1	2	3
			Summer			
8 months	♀	14	50.0	7.2	21.4	21.4
2	♂	21	28.6	19.0	4.8	47,6
2	♀	21	23.8	14.3	14.3	47.6
2	♂	43	0	9.3	23.2	67.5
3	♀	15	33.3	20.0	6.6	40.0
4	♀	40	2.5	2.5	20.0	75.0
5	♂	40	5.0	2.5	20.0	72.5
			Winter			
2.5	♂	28	0	21.4	32.2	46.4
3	♀	28	17.7	25.0	25.0	32.3
3	♂	13	7.6	15.3	38.4	38.7
3	♂	9	22.2	22.2	22.2	33.4
5.5	♂	28	3.6	3.6	21.4	71.4

* Number of plant species examined. ** Scale of preference: 0 = not eaten, 1 = under 20%, 2 = 20—50%, 3 = 50—100%.

Betula verrucosa Ehrh., *Ribes nigrum* L., *Ulmus compestris* L. and *Salix cinerea* L. (Table 1). Observations showed that all the animals always first ate the bark of the trees fed to them, then leaves and herb species, and finally smaller and thicker twigs and branches.

It is also clear from the table that among the 55 plant species fed to the animals there are, generally speaking, no species not eaten at all by the wisents. This was due to the fact that plant were supplied which belonged to those occurring most numerously, and it was usually these plants which were usually fed to the animals in our experiment. Only *Sambucus nigra* was left untouched, but it was fed in one experiment only. Species least readily eaten by all the individuals were *Picea excelsa* L. and *Pinus silvestris* L.

The experiments also showed that the percentage of most readily eaten plants changes considerably in animals of different age (Table 2).

Young animals are far more fastidious than adults, as the latter eat the majority of the species from the combinations fed to them. In the case of young animals about 20% of such a combination may be unattractive. This fact was found in both summer and winter experiments.

2. Amount of Food Consumed

Only the results obtained in the true experiment were used for calculations, the preliminary period in which the amount of food supplied was small, and variations in the amount consumed considerable, has been omitted. The way in which the animals consumed the food during the course of the experiment, together with the preliminary period, is illustrated by Figure 1. The amount and kind of fodder eaten by wisents

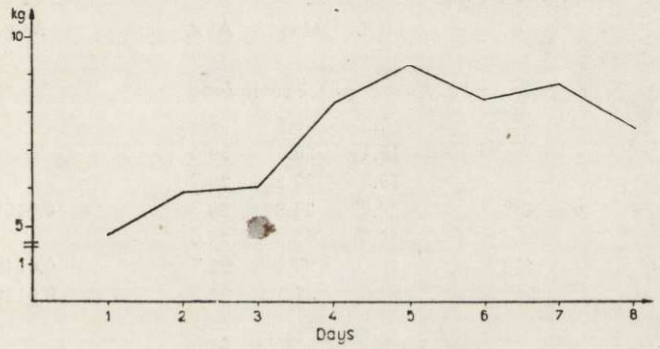

Fig. 1. Food consumption by an 8-months old heifer during consecutive days of experiments.

during the true experimental period, depending on the animal's age and the season, are given in table 3.

In winter the animals were fed dried plants, and average daily food consumption decreased markedly (Table 3). Differences in the amount of food eaten (Table 3) may depend on the different species used in the given combination. Two 2-year old wisents (male and female) which were supplied in summer with food consisting of a different set of plants than the third animal (»Podbiał«), ate on an average less than the latter. In winter, however, the 3-year old bull which was supplied with dry fodder, with the addition of root crop food, ate an average of 9.2 kg per day, but without the root crop food only 4.9 kg, which is respecively 5.74 kg and 3.51 kg dry mass.

The experiments we made justify the conclusion that differences in the average amount of food eaten in summer and winter by wisents

of different age are primarily connected with the lesser or greater weight of these animals and the growing season of plants. This is indicated by the conversion of the food eaten by the animals into dry mass per 1 kg of animal's body weight and per day (Table 3). It can be seen from this table that distinct differences of as much as 50% occur only between the two study seasons, whereas these differences are slight between animals tested within one season.

Table 3

Amount of food consumed by European bison depending on the animals'age, the kind of food and the season.

Pedigree number	Body weight in kg	Amount of food			
		Kg/animal/day			Kg/kg body wt./day
		Min.	Max.	Avg.	Avg.
		July — Sept.; Fresh food			
2115		7.5	9.2	8.4	
1984		18.4	20.2	19.4	
1987		19.3	22.1	20.7	
2247	453	25.0	34.8	28.5	0.0160
1862		19.5	23.8	22.6	
1984	432	16.1	28.9	22.7	0.0142
1864	550	24.6	37.0	32.2	0.0149
		Oct. — March; Dried food			
2247	467	4.8	8.1	5.9	0.0086
1861		5.6	11.9	9.2 *	
1861		4.2	5.9	4.9	
2114	365	3.9	7.3	5.7	0.0109
1864	573	4.6	9.0	4.2	0.0088

* This value includes 2 kg of fresh beet and about 3 kg of meadow hay.

3. Caloric Value of the Food Eaten

The caloric value of each tested herb, shrub and tree species and also leaves and bark was calculated in the laboratory for the two seasons. It was found that it comes within limits of 4.2 and 4.9 Kcal/g. Taking these values, and also data on average daily consumption of food by the experimental animals as a basis, calculation was made of the amount of calories contained in the consumed portion of food (Table 4). It is highest in the case of the adult bull in both summer and winter, but when the amount of calories is calculated per 1 kg of the animal's body weight it is found that the maximum values occur in the two-year old bull in

summer and the young three-year old heifer in winter. In summer also the caloric value of the food eaten is about 1/3 higher than in winter.

IV. DISCUSSION

The number of plant species very readily eaten by wisents is very large in relation to the number of species fed to them, which proves that the European bison is not a very fastidious species. This result is confirmed by the studies made by Kamenskaja (1965) carried out in the Prioksko-Terrasnyj Reserve. This authoress gives a list of 144 species of plants growing in the study area, 16 of which are very readily and

Table 4

Caloric value of food consumed.

	♀ »Pociągła« ♀ »Pleola« *	♂ »Podbiał«	♂ »Porter«
	Summer		
Kcal/day/animals	24895 ± 4896	33397 ± 7733	36648 ± 8017
Kcal/day/kg	57.6 ± 11.3	73.7 ± 17.0	66.6 ± 14.4
	Winter		
Kcal/day/animal	18020 ± 5092	18369 ± 3459	24062 ± 4872
Kcal/day/kg	49.3 ± 13.9	39.3 ± 7.3	41.9 ± 8.5

* Female »Pociągła« was used for experiments in summer, and »Pleola« in winter.

23 readily eaten. Zablockaja (1957), who carried out comparative studies in the same area and also in the Caucasus Mts. and the Białowieża Primeval Forest, found in each of the areas mentioned that 200—250 species are included in the list of plants eaten, the basic food being formed by 40—50 species together with tree species. The favourite food of wisents consists of juicy grasses up to the time of flowering, then young shoots and young leaves of trees. In summer leaves, shoots, bark and fruits form about 50% of the food, and even higher percentage during other seasons of the year. It is only during a period of severe frosts (below −15°C) that the animals ate less bark. In our experiments bark was completely consumed, and came first in order of preference, in winter. Koročkina (1966) made observations of a free-living herd of wisents in the Białowieża Primeval Forest. She found that among the 331 herb species eaten by wisents the basic food formed 25.6%, and supplementary food, also eaten very readily, but less often encountered, 26.2%.

The plants supplied in our experiments belonged to species generally most frequently and most numerously encountered in the forest, and were thus easily accessible to the animals. The studies made by Borowski & Kossak (1972) on the food of free-living wisents, based on an experimental plot, showed that the plants we used are also among those most readily eaten in a natural environment. For instance *Impatiens noli tangere*, eaten in the experiment in percentages from 50—90, formed as much as 8—16% of the herb food of free-living wisents, and similarly *Urtica dioica* eaten in a percentage of about 40 in the experiment, formed 19% of herb food of free-living wisents. On the other hand some species of plants very readily eaten in the paddock were consumed to a slight degree only by free-living wisents. Such species include *Chaerophyllum hirsutum, Lisymachia vulgaris, Stellaria nemorum* and *Acer platanoides*, while plants not eaten at all, or very reluctantly eaten in the paddock are also reluctantly eaten under natural conditions and form a negligible percentage of the food of wisents (*e.g. Picea excelsa, Pinus silvestris*)

So large a list of very readily and readily eaten species becomes understandable if the fact is borne in mind that the amount (mass) of different species of plants is not large in a forest, and that the food requirements of a wisent per day are considerable.

The amounts of food eaten by wisents per day, obtained in our experiments, are slightly lower than the amounts given by other authors. According to Kalugin (1958) in summer wisents eat from 30—45 kg of grass, 2.4—3.2 kg of leaves and shoots and 0.9—1.4 kg of tree branches. Aleksandrov & Golgovskaja (1965), on the basis of experiments they carried out, find that an adult female wisent eats from 39—60 kg of fresh mown grass per day in summer (which corresponds to 10.0—15.2 kg of air-dry mass), and in winter 7—8 kg of dry mass of blackberry (leaves and shoots) and bark and branches, and also 2 kg of oats. Koročkina (1966) established that in the case of an wisent living in a reserve the daily food requirements in winter for tree species are from 1.7—2.7 kg and from 6.3—10.1 kg in spring after which they decrease from 8.0 kg in summer to 4.0 kg in autumn. This author does not, however, state whether these figures refer to fresh or to dry mass. It must also be added that during the experiments made by Koročkina (1966) the wisent was kept additionally supplied with hay and could eat the grass growing in the enclosures, the amount of this consumption not being measured.

Far higher values are given by Zablockaja (1957). According to this author, under the conditions in the Prioksko-Terrasnyj Reserve adult bulls were continuously given from 3—7 kg of supplementary concentrated fodder, from 8—10 kg of hay and 3—8 kg of beets, in addition to the

tree species food. Also Wróblewski (1927) gives higher values for the food requirements of adult and juvenile animals. The data given by this author, however, apply only to foods not natural to the wisent (meadow hay, clover, oats, carrot, potatoes, peas) which in the author's opinion should be supplied to free-living wisents in doses similar to those given to cattle of similar age, similar weight and similar physiological condition.

Food requirements estimated on the basis of the plant species supplied gives a relatively picture of the wisent's food preferences. Although these studies were made on a fairly large number of wisents, they would appear still to be insufficiently accurate as they do not permit of calculating energy budgets. They only form a basis for reaching conclusions as to food preferences and requirements of individuals depending on age, sex and season.

Using studies on the dynamics and age and sex structure of a free--living herd of wisents in the Białowieża Primeval Forest (Krasiński, 1972) and the results obtained in our experiment, an attempt was made at calculating the amount of natural food consumed by this herd. At the end of 1970 there were 197 wisents in the Forest, this figure including 28 juveniles below one year old 50 from 2—3 years old and 119 animals over 4 years old. During the summer growing season (May 1st to Oct. 31st) the herd consumed about 832,232.0 kg of fresh green mass (4523.0 kg/day). As about 80% of the herd was concentrated in an area of 17,608.0 hectares, the amount of food used in this area during this same period was 663,135.0 kg (3604.0 kg/day), which gives 0.21 kg/day/ha. The experiments carried out in the paddock show that 39% of the natural food eaten consisted of the branches and leaves of trees and shrubs, the remainder being made up by herbs and grasses. Under natural conditions, however, Borowski & Kossak (1972) found that tree species food forms 33%, and grasses and herb species 67% of the whole of the food. From this it is easy to calculate that a herd of European bison eats 0.069 kg of shoots and 0.141 kg of herbs and grasses per hectare per day during the summer period.

We have no complete data relating to all age groups for the winter period. During the period from Nov. 1st to April 31st the herd, omitting juveniles below one year old, consumes 174,597.0 kg (1025.4 kg/day) of dried fodder. This does not give a true picture of the amount of food consumed by wisents in the Białowieża Primeval Forest, on account of intensive supplementary feeding them with hay in winter. During the period from Nov. 15th 1970 to April 14th 1971 wisents under natural conditions received 263,700.0 kg of hay, losses of which were at least

10%. It would therefore appear that the amount of fodder put out in feeding places is appropriate to the actual food requirements of wisents during this period.

The theoretical calculations given here may be of use in forecasting the maximum numbers of wisents in the Białowieża Primeval Forest.

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WYBIÓRCZOŚĆ I ZAPOTRZEBOWANIE POKARMOWE ŻUBRA

Streszczenie

Badania prowadzono w dwu ekstremalnych sezonach wegetacyjnych: latem i zimą, w rezerwacie hodowlanym Ośrodka Hodowli Zwierząt Rzadkich przy Białowieskim Parku Narodowym. Wykorzystano w nich łącznie 8 żubrów obu płci w wieku od 8 miesięcy do 5,5 lat w 12 eksperymentach. Zwierzęta trzymano kolejno w niewielkiej zagrodzie dokładnie zbronowanej i wygrabionej, zaopatrzonej w drabinki do zadawania pokarmu z podłogą pod nimi oraz w wagę wozową. Podawany pokarm składał się codziennie z innych 5—6 gatunków roślin zielnych i drzewiastych, uprzednio odważonych i powiązanych w pęczki. Latem podawano żubrom świeże rośliny, a zimą rośliny zebrane późną jesienią i wysuszone na powietrzu. Z wyjątkiem jednego doświadczenia zwierzęta nie otrzymywały paszy treściwej. Pokarm podawany był w nadmiarze. W celu ustalenia kaloryczności podawanej paszy, pobierano z niej próbki, które następnie spalano w bombie kalorymetrycznej.

W doświadczeniu skarmiono 30 gatunków roślin zielnych, 13 gatunków krzewów i 13 gatunków drzew (Tabela 1). Stwierdzono, że ilość gatunków roślin zjadanych bardzo chętnie przez żubry jest bardzo duża w stosunku do ilości gatunków podawanych, co sugeruje, że żubr jest zwierzęciem mało wybrednym. Procent roślin najchętniej zjadanych zmienia się znacznie u zwierząt w różnym wieku (Tabela 2). Zwierzęta młode są znacznie bardziej wybredne niż osobniki dorosłe.

Średnia ilość paszy pobieranej wynosi u 8 miesięcznego żubra 8,4 kg na dobę, u młodzieży 2—3 letniej od 19,4—28,0 kg na dobę, 22,7 kg u czteroletniej krowy i 32,2 kg u 5,5 letniego byka. Zimą średnia dobowa konsumpcja uległa znacznemu zmniejszeniu (Tabela 3).

Zróżnicowanie w średniej ilości pobieranego pokarmu przez żubry w różnym wieku w lecie i w zimie wiąże się z ciężarem tych zwierząt oraz z sezonem wegetacyjnym roślin. Wskazują na to przeliczenia pobranej przez zwierzęta paszy na suchą masę, na 1 kg ciężaru zwierzęcia i na dobę. Różnice sięgające około 50% występują tylko między dwoma badanymi sezonami, natomiast między testowanymi żubrami w obrębie jednego sezonu są niewielkie.

Opierając się na oznaczeniach kaloryczności podawnych pasz oraz na ich średniej dobowej konsumpcji obliczono ilość kalorii zawartych w zjedzonej porcji pokarmu (Tabela 4). Jest ona najwyższa u dorosłego byka w obu sezonach. Natomiast przy przeliczeniu ilości kalorii na 1 kg ciężaru ciała zwierzęcia okazuje się, że najwyższe wartości występują u dwuletniego byczka w lecie i trzyletniej jałówki w zimie.

W oparciu o poznane zapotrzebowanie pokarmowe wyliczono, że stado żubrów koncentrujące się w 80% na przestrzeni 17.608 ha Puszczy Białowieskiej konsumowało w 1970 roku 0,21 kg/dobę/ha paszy naturalnej w letnim sezonie wegetacyjnym, w tym zjadło w ciągu doby 0,069 kg żeru pędowego i 0,141 kg ziół i traw z hektara. Wyniki naszych badań nad zapotrzebowaniem pokarmowych żubrów w okresie zimowym wykazują, że ilość wykładanego siana dla żubrów w paśnikach jest zgodna z ich faktycznym zapotrzebowaniem pokarmowym w tym okresie.