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**Sheep pasturage as a factor of conservation
of Sudety pastures overgrowth in the example
of Sienna village and the Puchaczówka Saddle**

Wypas owiec jako element ochrony dziczejących pastwisk w Sudetach
na przykładzie wsi Sienna i przełęczy Puchaczówka

Summary. Sienna with a hamlet on the Puchaczówka Saddle (864 m) is a disappearing, mountain, farming village, although in the past it was an important center for sheep breeding and at the same time, a village with rich traditions of mining and tourism. The result of the collapse of agriculture and rural depopulation is the wilderness of mountain meadows and pastures, which may prevent even limited sheep grazing. The studies compared quantitative and species composition of 10 experimental fields grazed and non-grazed by animals. Test results indicate that even limited sheep grazing (400 sheep on the area of 300 ha) effectively stops the invasion of shrubs and trees, and it also has an influence on the botanical composition of pasture.

Key words: sheep grazing, landscape protection, mountain pastures

INTRODUCTION

Sienna village was founded in 1560 as one of mining centers in the Śnieżnik Kłodzki Massif. Because of favorable natural conditions, the village soon became a major center of sheep breeding. In addition, good snow conditions in winter and location of the village within the picturesque Puchaczówka Saddle (864 m) resulted that in the nineteenth century village and hamlet have become an important tourist center [Staffa *et al.* 1993]. Unfortunately, the post-war years in the twentieth century brought almost the complete depopulation of the village, because of the discovery in the vicinity and subsequent conduct in the deepest secret (years 1948–1953) the operation of uranium ores. The consequences of this situations were: the collapse of agriculture and more than 50-year-long degradation of mountain fields, meadows and pastures. They were of high culture, what can be recognized by long low walls, built of stone on the bulks by generations of hosts (Photo 1).



Photo 1. A stone wall made of the stones collected from the field (photo M. Chrząstek)
Fot. 1. Murek ułożony z zebranych kamieni polnych (fot. M. Chrząstek)

Currently, tourism and winter sports back to these areas, and also limited cattle and sheep grazing is returning. In particular, sheep grazing, although extensive, because of many hectares useless meadows and pastures, is the hope of stopping the process of further degradation. At present 400 sheep are grazed on 400 ha.

MATERIAL AND METHODS

The aim of these studies was to determine the effectiveness of mountain sheep grazing as a method of protecting the ecosystem of mountain meadows and pastures by comparing species composition and percentage of vegetation occurring in the plots grazed and non-grazed by sheep. The researches were conducted in July and August in 2008 on pastures located within the village Sienna and Puchaczówka Saddle. Species composition was analyzed on 10 randomly selected fields with an area of 1 m² (5 plots grazed and 5 plots non-grazed by sheep). Plots were selected randomly, however, the equal inclination of the slope, sunlight, humidity were taken into consideration, to exclude in the maximum their influence on the composition of pasture. At each plot the species composition of pasture was marked [Fabiszewski 1986, Grau *et al.* 1998, Rutkowska 1984]. The percentages of different plant species in the whole pasture was also estimated, generally according to the observations of grazed and non-grazed plots. The mow used meadows to prepare the feed for the sheep for winter were also assessed.

RESULTS AND DISCUSSION

The results of observations are presented in Table 1. They indicate that, in areas grazed by the sheep and mow used were no shrubs or trees. The exception was a few, but in far smaller numbers than on the non-grazed plots, 3–4 cm sprouts of Red Raspberry (*Rubus ideaus* L.). Except of Red Raspberry, on the non-grazed plots were also self-sown plant of Norway Maple (*Acer platanoides* L.) and Alpine Rose (*Rosa pendulina* L.). On the plots non-grazed by sheep plots there were no such plants as Alpine hawkweed (*Hieracium alpinum* L.), Canadian Thistle (*Cirsium arvense* L.), Dandelion (*Taraxacum officinale* F. H. Wigg) and certain species of grass, such as Red Fescue (*Festuca rubra* L.). Lack of Fescue on the grazed plots can be justified by its high sensitivity to sheep urine [Skrijka 1979]. Probably the regular tread the surface of the soil by sharp sheep hooves, modifying the water system in the soil, and also natural fertilization by grazing sheep caused the lack of moss (*Bryophyta*) and Clustered rush (*Juncus conglomeratus* L.) – plants characteristic of moist and poor in nutritional compounds areas, but quite numerous on the non-grazed areas.

Comparing the look of the grazed and non-grazed plots, it was found that growth of plants, thanks to grazing, is low cut, intensely green and strongly thicker, but with some number of „leavings” (Photo 2). It may be assumed that this is due to low grazing by sheep, as well as treading the front surface of the soil by their hooves, which facilitate the germination of seeds, and also allow for better water penetration into the soil profile. Undoubtedly, a positive effect has also the natural fertilization of grazing sheep, thanks to regular putting macro- and microelements in all parts of grazed pasture.



Photo 2. A part of the pasture grazed by sheep with an enclosure for them
(photo M. Chrząstek)

Fot. 2. Fragment pastwiska spasanego owcami z kozarem dla owiec (fot. M. Chrząstek)

It will be noted that improved growth of pasture prevents against the soil erosion and that pasture lands are the only sites that are not destroyed during the floods and thanks to their capacity of accumulation of water, they soften the effects of overflows [Mikołajczak *et al.* 1997]. On the non-grazed plots there were also no wild and quickly withering plants.

Year-long using and maintenance of sheep will lead to the need of getting the feed for the winter, when the mountain pastures are not available. In this conditions the feed is mainly a hay derived from mow used meadows. Mowing meadows also limits their degradation, because the lichen of grass plants is more balanced and free from aging and wooding plants, as well as free from self-sown plant of trees and shrubs (Photo 3).



Photo 3. A mountain meadow in the area of Puchaczówka Saddle used for grass cutting (photo M. Chrząstek)

Fot. 3. Łąka górską w rejonie przełęczy Puchaczówka użytkowana kośnie (fot. M. Chrząstek)

The potential of pasture in the area of Sienna village and Puchaczówka Saddle is not fully exploited, because extensively used pastures allow for grazing 7–10 sheep per hectare [Kowalski 1997]. Currently, there is only 1,3 sheep grazed on hectare of investigated pastures. The increasing number of sheep grazing on pastures certainly can contribute to even better protection of mountain pastures, the maintenance of their biological diversity, protection against forest succession. Of course, it must be remembered that the positive effects will be brought only by grazing conducted in rational way. With the proper number of animals, taking into account the soil type and growing season of plants, mountain sheep grazing has a positive effect on botanical composition of pasture [Kasperczyk *et al.* 1999, Rutkowska *et al.* 1999] and thus fulfills a special role in shaping and protecting the natural landscape. In addition, sheep grazing on natural pastures has a positive influence on health, fitness and resistance of animals, mainly because of, among others, providing animals the large quantities of movement and wide variety of eaten plants, in particular herbs.

Table 1. The percentage of different plant species on pastures grazed and non-grazed by sheep
 Tabela 1. Udział procentowy poszczególnych gatunków roślin na kwaterach spaszanych i niespaszanych przez owce

Plant species Gatunek	Grazed plots Kwaterny spaszane	Non-grazed plots Kwaterny niespaszane
Mountain arnica – Arnika górńska (<i>Arnica montana</i> L.)	1,2	1
Narrowleaved plantain – Babka lancetowata (<i>Plantago lanceolata</i> L.)	2	–
Mat-grass – Bliźniczka psia trawka (<i>Nardus stricta</i> L.)	4	3
Carline thistle – Dziewięsił bezłodygowy (<i>Carlina acaulis</i> L.)	–	4,4
St. John's wort – Dziurawiec zwyczajny (<i>Hypericum perforatum</i> L.)	5	7,2
Meadow bellflower – Dzwonek rozpierzchły (<i>Campanula patula</i> L.)	1,2	1,8
Alpine hawkweed – Jastrzębiec alpejski (<i>Hieracium alpinum</i> L.)	–	1
Norway maple – Klon zwyczajny (<i>Acer platanoides</i> L.)	–	2,6
Red clover – Koniczyna łąkowa (<i>Trifolium pratense</i> L.)	7	4
Yellow oat grass – Konietlica łąkowa (<i>Trisetum flavescens</i> Pers.)	30	29,6
Red fescue – Kostrzewa czerwona (<i>Festuca rubra</i> L.)	–	12,8
Common yarrow – Krwawnik pospolity (<i>Achillea millefolium</i> L.)	3,8	2
Orchard Grass – Kupkówka pospolita (<i>Dactylis glomerata</i> L.)	9,8	–
Common thyme – Macierzanka zwyczajna (<i>Thymus pulegioides</i> L.)	0,7	0,4
Red raspberry – Malina właściwa (<i>Rubus idaeus</i> L.)	0,8	7
Moss – Mchy (<i>Bryophyta</i>)	–	5
Common dandelion – Mniszek lekarski (<i>Taraxacum officinale</i> F. H. Wigg)	–	3
Canadian thistle – Ostrożeń polny (<i>Cirsium arvense</i> L.)	–	1,4
Goose potentil – Pięciornik gęsi (<i>Potentilla anserina</i> L.)	0,5	–
Gold potentil – Pięciornik złoty (<i>Potentilla aurea</i> L.)	2,2	–
Stinging nettle – Pokrzywa zwyczajna (<i>Urtica dioica</i> L.)	1,2	–
Hedge bedstraw – Przytulnia pospolita (<i>Galium mollugo</i> L.)	2,6	–
Hairy lady's mantle – Przywrotnik pospolity (<i>Alchemilla vulgaris</i> L.)	1,4	–
Alpine rose – Róża alpejska (<i>Rosa pendulina</i> L.)	–	1,8
Clustered rush – Sit skupiony (<i>Juncus conglomeratus</i> L.)	–	2,2
Common sorrel – Szczaw zwyczajny (<i>Rumex acetosa</i> L.)	6,6	2,4
Field knautia – Świerzbica polna (<i>Knautia arvensis</i> (L.) J. M. Coult.)	0,6	–
Meadow bluegrass – Wiechlina łąkowa (<i>Poa pratensis</i> L.)	9,4	4,2
Spignel – Wszewłoga górńska (<i>Meum athamanticum</i> Jacq.)	1	1,2
Meadow foxtail grass – Wyczyniec łąkowy (<i>Alopecurus pratensis</i> L.)	3,6	–
Tufted vetch – Wyka ptasia (<i>Vicia cracca</i> L.)	5,6	2

CONCLUSIONS

1. The botanical composition of pasture grazed and non-grazed by sheep differed from each other. For the plots grazed no self-sown plants of trees such as Norway Maple (*Acer platanoides* L.) and significantly smaller number of shrub plants were observed.

2. On the grazed plots, thanks to the distortion of the surface by animal hooves, modifying the water system in soil profile and regular fertilising, plants such as mosses and clustered rush – plants typical for moist habitats, and poor nutritional compounds, were eliminated.

3. Even the extensive sheep grazing, at 1.3 animals/ha, had a beneficial influence on the formation of the botanical composition of pasture, protecting them from degradation and wilderness.

REFERENCES

- Fabiszewski J., 1986. Rośliny Sudetów. Atlas, PZWS Warszawa.
- Grau, Kremer, Moseler, Rambold, Triebel. 1998. Trawy. Leksykon przyrodniczy, GeoCenter Warszawa.
- Kasperczyk M., Szewczyk W., 1999. Skład florystyczny runi górskich użytków zielonych po zaprzestaniu użytkowania, Fol. Univ. Agric. Stetin, Agricultura, 75, 163–165.
- Kowalski Z.M., 1997. Owca a środowisko w aspekcie żywienia owiec górskich, [in:] Rola owczarstwa górskiego w realizacji krajowych programów hodowlanych dla owiec. Materiały Międzynarodowej Konferencji Naukowej w Balicach.
- Mikołajczak Z., Wolski K., Bartmański A., Gawęcki J., 1997. Proekologiczna technologia produkcji pasz na obszarze Sudetów z uwzględnieniem metod odnawiania zdegradowanych użytków zielonych oraz roli terenów zadarnionych w ochronie środowiska naturalnego, MRiGŻ, Katedra Uprawy Łąk i Pastwisk AR we Wrocławiu, WODR w Jeleniej Górze, 77.
- Rutkowska B., Janicka M., Szymczak R., Ślusarek A., 1999. Wpływ warunków siedliskowych i zaniedbania pratotechniki na zmiany florystyczne runi łąkowej, Fol. Univ. Agric. Stetin, Agricultura, 75, 271–278.
- Rutkowska B., 1984. Atlas roślin łąkowych i pastwiskowych, PWRiL Warszawa.
- Skrijka P., 1979. Badania nad wartością nawozową odchodów owczych pozostawionych na pastwisku górskim, Zesz. Nauk. WSR Kraków, skrót rozprawy habilitacyjnej, 65.
- Staffa M. (red.), 1993. Słownik geografii turystycznej Sudetów, 16, Masyw Śnieżnika i Góry Bialskie. I-Bis Wrocław.

Streszczenie. Sienna wraz z przysiółkiem na przełęczy Puchaczówka (864 m n.p.m.) jest zanikającą, górską wsią rolniczą, chociaż w przeszłości była znaczącym ośrodkiem hodowli owiec, a przy tym wsią o bogatych tradycjach górniczych i turystycznych. Następnym upadku rolnictwa i wyludniania się wsi jest dziczenie rozległych łąk i pastwisk górskich, któremu może przeciwdziałać nawet ograniczony wypas owiec. W badaniach porównano skład gatunkowy i ilościowy 10 poletek doświadczalnych wyznaczonych na spasnym i odłogowanym częściach pastwiska. Wyniki badań wskazują, że nawet ograniczony wypas owiec (400 szt. owiec na pastwisku o pow. 300 ha) skutecznie hamuje inwazję roślin krzewiastych oraz drzew, a także wpływa na zmianę składu botanicznego runi pastwiskowej.

Słowa kluczowe: wypas owiec, ochrona krajobrazu, pastwiska górskie