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**Vliv termínu seče na kvetení *Euphrasia
rostkoviana* v Krkonoších**

Effect of mowing time on the flowering of
Euphrasia rostkoviana in the Krkonoše
(Giant) Mountains / Wpływ czasu
koszenia na rozkwitu *Euphrasia
rostkoviana* w Karkonoszach

Mgr. Jan Blahník

Euphrasia rostkoviana



Jan Blahník, Effect of mowing time on the flowering of *Euphrasia rostkoviana* in the Krkonoše (Giant) Mountains

Eyebrights

- Hemiparasitic plants – green plants, capable of photosynthesis, which at the same time parasite on host's roots, from which they obtain. Simultaneously, competition for light between the parasite and the host is going.
- Annual plants

Eyebrights in the Krkonoše (Giant) Mountains (marked in red were found)

C1: *Euphrasia frigida*

- *Euphrasia micrantha* CZ(PL:?), ČR C1
- *Euphrasia minima* PL(CZ:0)

C2: *Euphrasia coerulea*

- *Euphrasia curta* subsp. *glabrescens* [*E. nemorosa*] CZ(PL:?)
- *Euphrasia nemorosa* PL(CZ:0), ČR C3

C2 ČR: *Euphrasia rostkoviana* subsp. *montana*

Bez ohrožení: *Euphrasia rostkoviana* subsp. *rostkoviana*

Euphrasia stricta

(Štursa J., Kwiatkowski P., Harčarik J., Zahradníková J. et Krahulec F. 2009)

Hypothesis

The sooner the eyebright is mown, the larger number of flowering eyebright plants will be found on the particular surface.

Methods – Management tests

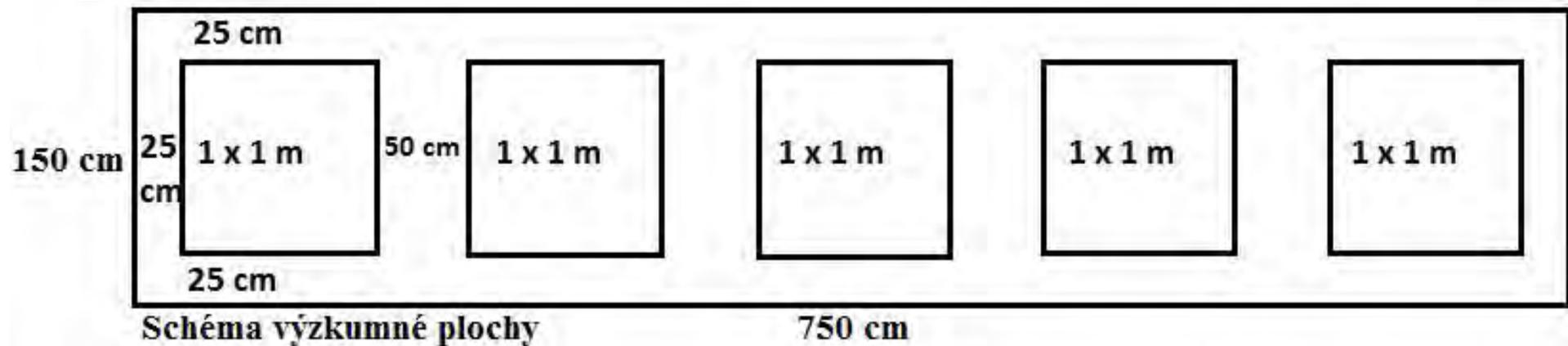
Altogether six localities, Albeřice, Sklenářovice, Pěnkavčí vrch hill and Braunovy louky meadows near Jana Cottage, in our work referred to as “Jana”, in the eastern part of the Krkonoše (Giant) Mountains, and two meadows on Levínek hill, on the borderline between the communities of Benecko and Vítkovice in the western part of the Krkonoše, were chosen for the management tests.

In each locality five research plots were set up, size 1x1 m.

The mowing times were: 14 June, 26 June, 5 July, 15 July and 25 July 2011. The flowering specimens on all the plots were counted in mid- to end-September 2011. After that all the plants were pulled out of the ground, counted and their number recorded. At the beginning of October all the localities were once again checked and the plants which flowered after the previous count were also included.

Methods – management tests

Chart of research plot



Mowing time 14.6., 26.6., 5.7., 15.7., 25.7. 2011

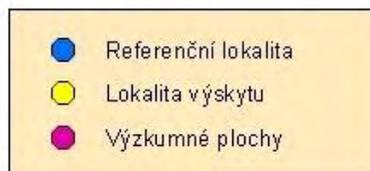
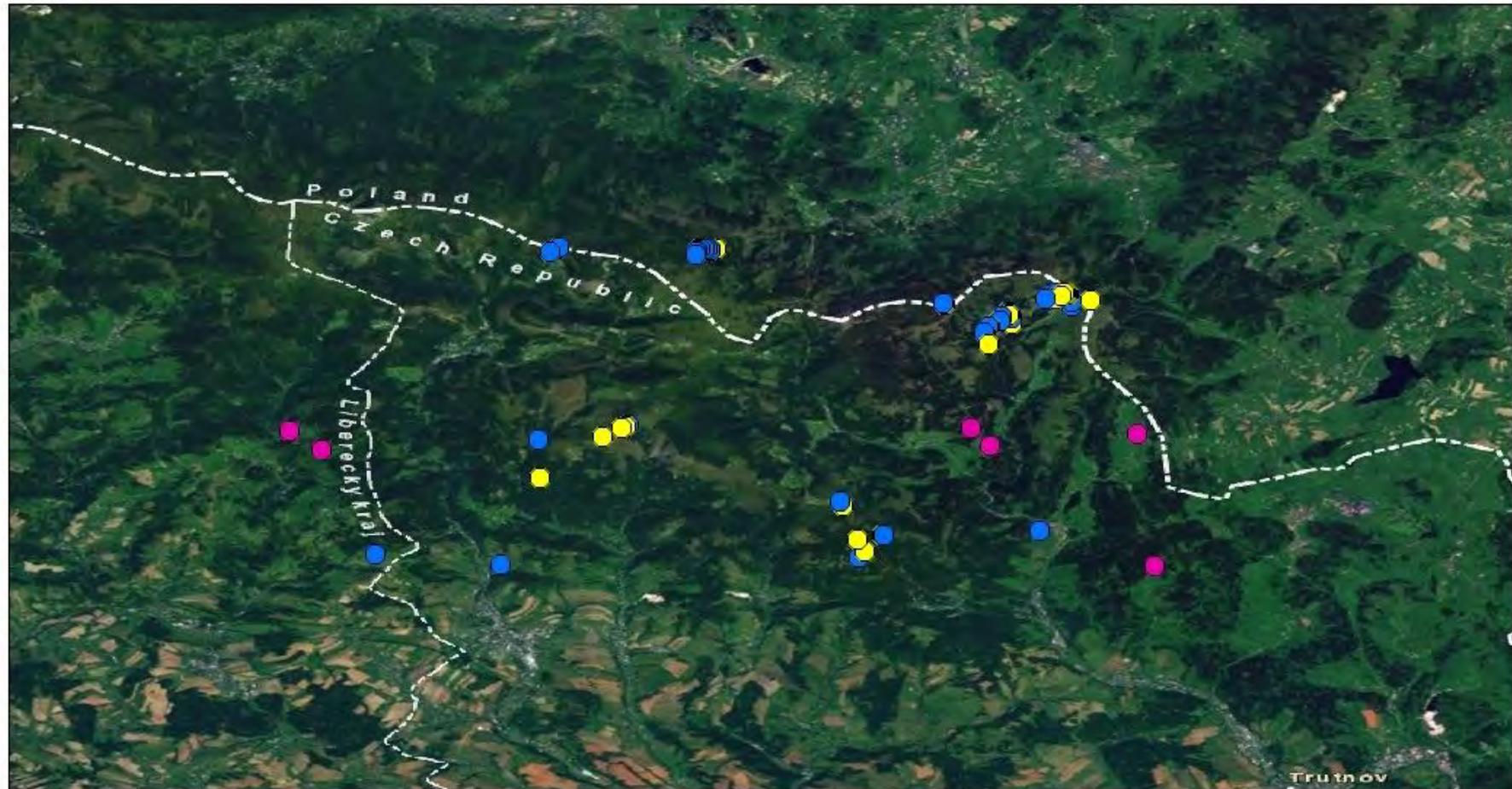
Count of Eyebrights 6., 10., 13., 14., 15., 16.9. 2011

Methods – Management tests



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Místa odběru půdních vzorků



Methods – soil properties

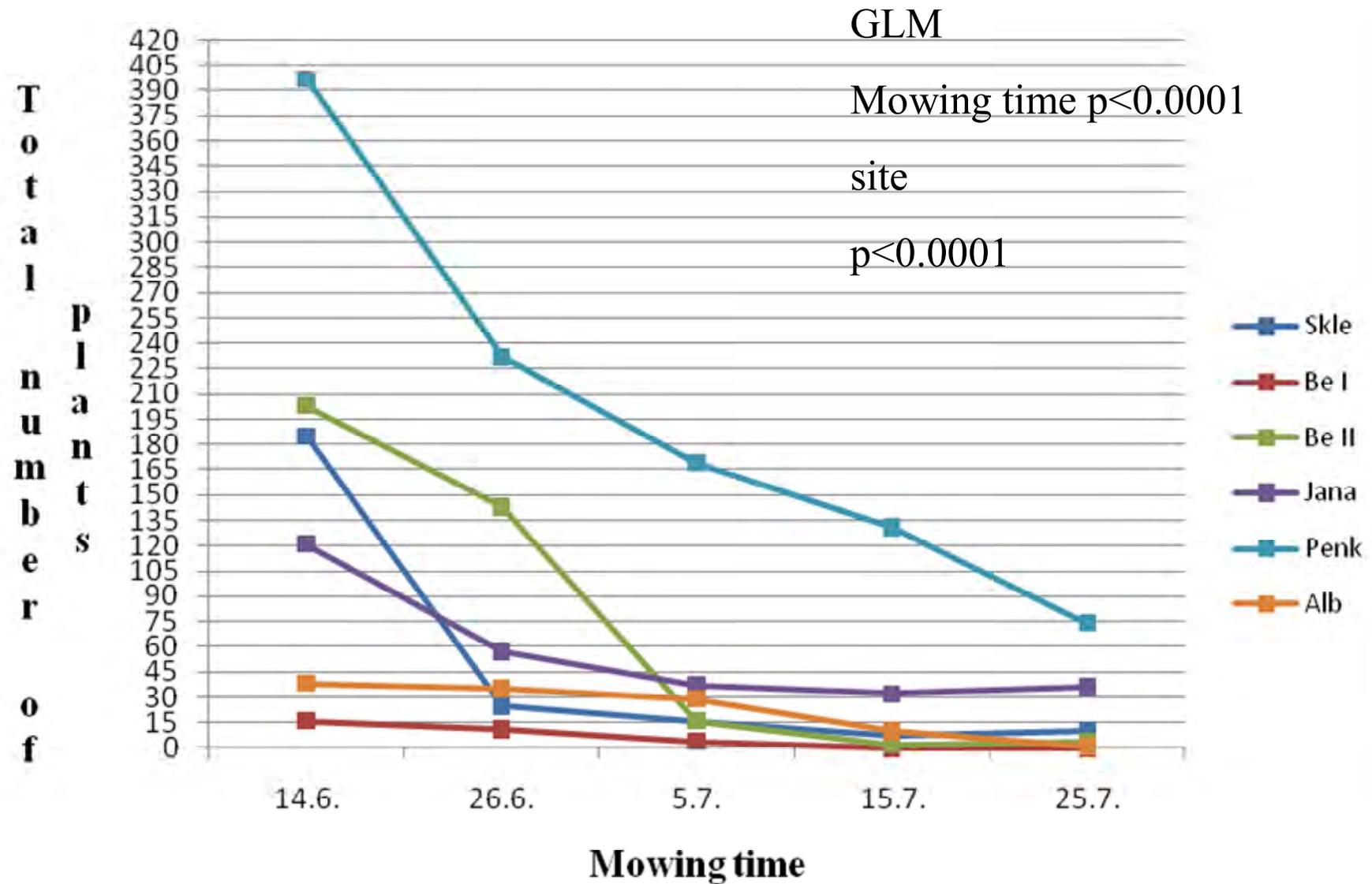
- From each research plot sized 1x1 m five soil specimens were collected, which means that 25 specimens were collected in each locality. The specimens then were dried, homogenised and divided into soil and skeletons. The soil was further examined for loss of organic matter by annealing with the aim of ascertaining the weight representation of carbon in the specimens. Another parameter that was examined was the total available phosphorus, which was established by the Mehlich 3 spectrophotometric method. The fourth soil parameter to be examined was pH, and the fifth conductivity.

Methods – soil properties



Results – Management tests

Total number of plants in relation to mowing time



Results – Management & Soil tests

Survey of parameters having significant influence on the number of eyebright plants

	Coefficient of the equation	SD of coefficient	p - value
parameter	627,221	165,262	0,0009
Date of mowing	-3,479	0,718	0,0001
Altitude in meters (m)	0,289	0,086	0,0026
Concentration of available phosphorus(mg/kg) *	13,513	4,563	0,0068
High of the growth (cm)	-2,808	0,944	0,0066
conductivity (μ S)	-0,275	0,166	0,1114

The model is significant (p – value 6,4E-06). Průkaznost i pro rozvětvené (p – hodnota 1,55E-06) a nerozvětvené světlíky (p – hodnota 6,17E-05).

Conclusion

The results of the experiments have shown that the abundance of flowering eyebright specimens is influenced by mowing time. On all the surfaces, which showed the largest number of flowering eyebright, the trend was absolutely identical: the later the mowing time, the lower the number of flowering eyebright plants. As this is the case of annual plants, their abundance depends on the number of seeds produced in the previous year, and possibly on their deposition in the soil seed bank.

Recommendation

If the management aim is to raise the population, it is suitable to choose the earliest possible time of mowing, at least in that part of the growth, where eyebright occurred more frequently, which will allow the largest number of flowering specimens and the largest number of seeds to develop. This, however, only applies to the later species, not the aestival (early) ones. Suitable mowing time supports not only eyebright, but also other hemiparasites (*Melampyrum*, *Rhinanthus* etc.). It has been proved that the occurrence of eyebright and other hemiparasites has a favourable influence on the diversity of meadow populations (competition for light), (Callaway & Pennings, 1998).

We therefore recommend earlier mowing of meadows with hemiparasites. In the Krkonoše Mountains preferably around mid-June.

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Thank you for your attention