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Fen orchid *Liparis loeselii* (L.) Rich. in abandoned gravel-pit in Dąbrówka Stany near Siedlce (Poland)

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Abstract: The aim of the study was to characterise some individual and group features of the *Liparis loeselii* population occurring in a gravel-pit in Dąbrówka Stany. 20 specimens of *L. loeselii* including 5 flowering plants were observed in the area of 56 m^2 in 2005. In 2003 there was a population of 12 specimens also with 5 flowering stems. Therefore the increase in the population number in the last two years shows the relatively good condition of the population. It is confirmed by high percentage of plants in vegetative stage (75%) as well. The state of risk of the population, indicated by the number of flower per inflorescence as well as length and breadth of leaves as compared with those in 2003, is probably caused by stronger competition of light-seeded phanerophytes and shaded positions.

Key words: *Liparis loeselii*, protected species, population, gravel-pits, Siedlce Plateau, Poland

1. Introduction

The fen orchid (*Liparis loeselii*) is a species representing the circumboreal subelement (Meusel *et al*. 1965). In Poland it most often occurs in the area covered by late glacial deposits where it is a component of the turf of lowland heath of the *Scheuchzerio-Caricetea nigrae* class. Due to the low number of sites (Zając & Zając 2001) the species is close to extinction (V) in the country as a whole (Zarzycki & Szeląg 2006). It has been also placed on the list of the EU Habitat and Species Directive (Liro *et al*. 2002). The decline of natural habitat sites directly results from human activity (land improvement, marsh drainage). Anthropopressure and secondary habitats however can also be a favourable factor for propagation of *Liparis loeselii* and other orchids (Faliński 1986).

The aim of the study was to characterise some individual and group features of the *L. loeselii* population occurring in a gravel-pit in Dąbrówka Stany (Poland).

2. Material and methods

The object of the study was a small population of *Liparis loeselii* occurring in an abandoned part of a gravel-pit in Dąbrówka Stany on the Siedlce Plateau (Fig. 1). The measurement of all the specimens was carried out on living plants in August 2005. The measured features were: height of the plant, length of inflorescence, number of flowers in the inflorescence and length and breadth of leaves. The results of the measurement of generative specimens were compared with those from 2003. Due to the low number of plants in the population, traditional statistical analysis of

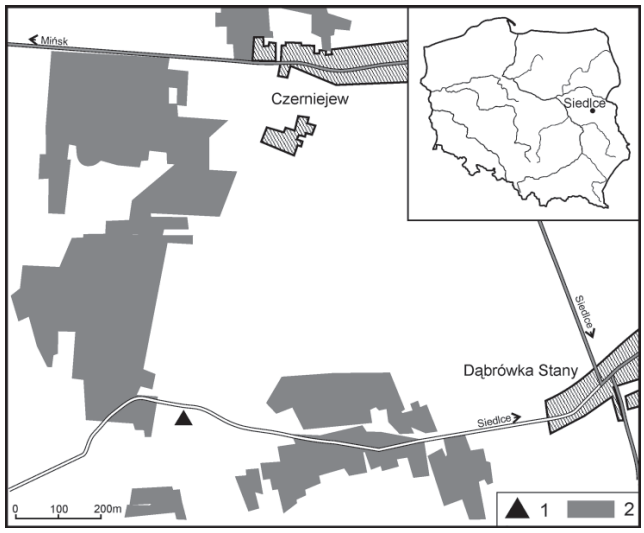

Fig. 1. Location of the site of *Liparis loeselii* (L.) Rich. in Dąbrówka Stany near Siedlce
Explanations: 1 – the site of *Liparis loesellii*, 2 – forests

biometric data was not used. Spatial distribution of plants was determined using the closest neighbour method (Kwiatkowska & Symonides 1978). Age distribution was based on the presence of plants in four development stages (Ziegenspeck 1936).

3. Results and discussion

The gravel-pit where the population of *Liparis loeselii* was found has not been in use for several years. The plant layer b (density 60%) consists of *Populus tremula* and *Salix sp*. Ground cover is dominated by *Potentilla anserina* and *Equisetum variegatum* as well as rush species: *Phragmites australis* and *Equisetum palustre* and alder carr species: seedlings of *Alnus glutinosa* and *Lycopus europaeus*. Protected and endangered species such as *Dactylorhiza incarnata* and *Equisetum variegatum* also occur there.

The population under study covers an area of 56 m^2. Spatial distribution of the population is characterised by clusters. The specimens grow in three clusters with 6-7 plants in each (Fig. 1). The population is characterised by low real density (N=0.35 plant per m^2). 20 specimens including 5 flowering plants were observed in the site under study in 2005. In 2003 the population consisted of 12 specimens also including 5 generative plants. The studied population can be described as progressive. Vegetative specimens are dominating (i.e. 75.0%). Juvenile specimens are 26.67 % of the vegetative ones.

Flowering plants are 11.8 to 15.8 cm tall (Table 1). The average height is 13.3 cm and is lower than the average height of generative specimens observed in 2003 (17.6 cm). The height of generative plants of the population in Dąbrówka Stany falls in the range given by Rutkowski (2004) and Szlachetko & Skakuj (1996). The value is slightly higher than in the specimens in the Augustowska Forest where it was 11 cm (Sarosiek *et al*. 1995). The length of inflorescence is from 2.2 cm to 3.4 cm (average 2.9 cm). The result is slightly higher than in population in the Augustowska Forest, which was 2.43 cm (Sarosiek *et al*. 1995). The number of flowers in the inflorescence was 3 in 4 specimens and 2 in the other. It is distinctly lower than in 2003 when it was 6-8 flowers. The results of measurement of leaf features of generative specimens are: length from 5.6 to 9.2 cm, breadth from 1.7 to 2.4 cm (Table 1). In 2003 the results were from 7.6 cm to 15.2 cm and from 1.0 cm to 3.3 cm respectively.

Table 1. Individual characteristics of flowering plants of the population of *Liparis loeselii* in Dąbrówka Stany

Characteristic	2003						2005					
	Number of specimens (Based on Fig. 2.)					Mean	Number of specimens (Based on Fig. 2.)					Mean
	1	2	3	4	5		1	2	6	7	12	
Height of plants (cm)	17.1	16.2	17.2	19.1	18.2	17.6	11.8	15.8	14.8	12.3	12.6	13.3
Length of inflorescence (cm)	-	-	-	-	-	-	3.0	3.4	2.8	2.2	3.1	2.9
Number of flowers (cm)	8	6	7	6	7	6.8	3	3	3	2	3	2.8
Length of the first leaf (cm)	12.1	12.4	9.8	15.2	14.3	12.8	6.0	8.7	9.2	7.3	6.2	7.5
Length of the second leaf (cm)	9.2	10.2	7.6	13.5	14.0	10.9	5.8	7.9	8.7	6.8	5.6	7.0
Breadth of the first leaf (cm)	2.4	1.1	2.2	3.3	3.0	2.9	1.7	2.1	2.4	2.0	1.8	2.0
Breadth of the second leaf (cm)	1.8	1.0	2.1	3.1	2.9	2.2	1.7	2.3	2.3	1.8	1.9	2.0

Table 2. Individual characteristics of vegetative specimens in 2005

Characteristic	Number of specimens (Based on Fig. 2)															Mean
	3	4	5	8	9	10	11	13	14	15	16	17	18	19	20	
Height of plants (cm)	3.0	3.2	4.0	5.5	3.2	3.1	3.3	5.2	3.4	3.2	3.8	3.8	3.0	3.4	4.6	3.7
Length of the first leaf (cm)	4.0	4.1	6.1	5.5	4.2	4.3	4.7	7.1	4.8	4.7	4.4	5.8	3.8	4.4	6.2	4.9
Length of the second leaf (cm)	3.2	3.5	5.4	5.0	3.4	-	-	6.4	3.1	3.6	2.9	5.2	-	-	5.8	4.3
Breadth of the first leaf (cm)	1.7	1.3	1.8	1.8	1.4	1.4	1.6	1.9	1.2	1.8	1.5	2.1	1.3	1.6	1.9	1.6
Breadth of the second leaf (cm)	2.0	1.6	2.1	1.6	1.1	-	-	1.9	1.3	1.6	1.2	1.8	-	-	2.0	1.7

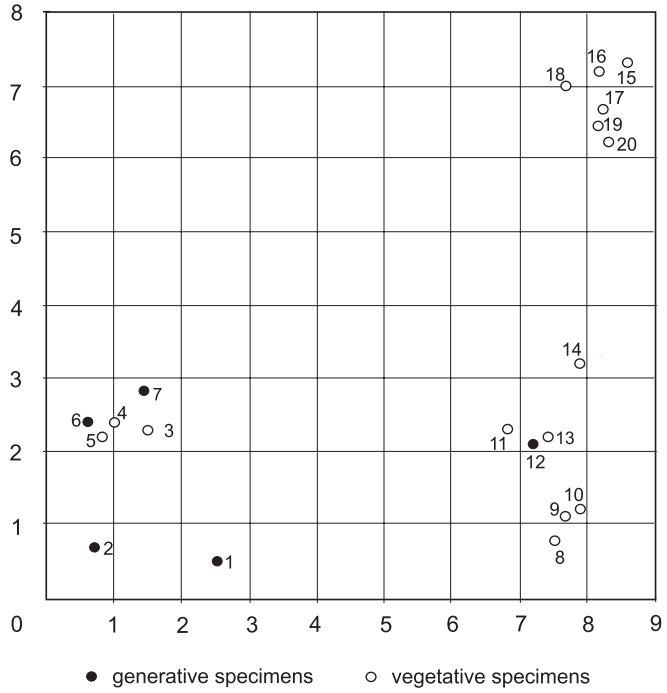

Fig. 2. Spatial distribution of population of *Liparis loeselii* (L.) Rich.

Individual characteristics of vegetative plants: height of plants, length and breadth of leaves (Table 2) are comparable to the data reported for the population in the Augustowska Forest (Sarosiek *et al*. 1995).

4. Conclusions

The population of *Liparis loeselii* in the gravel-pit in Dąbrówka Stany remains in relatively good condition. It is indicated by increase in the number of plants in the population in the last two years and the distinctive percentage of plants in the vegetative stage.

The existing endangered state of the population of *Liparis loeselii* is indicated by lower values of the individual characteristics of generative specimens as compared to the data from 2003 and low percentage of juvenile plants. This may result from the expansion of light-seeded phanerophytes causing excessive shading of the site.

The studied population of *Liparis loeselii* should be protected, for example, as an area of ecological importance. Monitoring should be undertaken to examine the influence of succession or selective tree and bush clearance on the population.

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