

REGRESSION OF *LIPARIS LOESELII* POPULATION IN THE NATURE RESERVE
“MIELNO” (WIELKOPOLSKA)

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ABSTRACT. This paper presents the results of a 16 year (1995-2010) monitoring of *Liparis loeselii* population in the nature reserve “Mielno”. The observed changes in the population numbers had initially a character of natural fluctuation, but in the last few years an evident tendency to decreasing in population numbers has been noticeable. Now the population dynamic stage can be described as regression. It is the result of natural succession – an expansion of woody plants and high rushes of *Carex* species, which caused unfavourable changes in *L. loeselii* population environment.

KEY WORDS: *Liparis loeselii*, population dynamics, monitoring, threatened plants, nature reserve “Mielno”

INTRODUCTION

Liparis loeselii (L.) L.C.M. Rich. is one of the rarest orchid species in Poland. It is listed in Polish red book (KUCHARSKI 2001) as vulnerable species (VU) and in the newest Polish red list (ZARZYCKI and SZELĄG 2006) as critically endangered (E). The species is also covered by Bernen Convention and is listed in Annex II of the EU Habitats Directive.

The first information about occurrence of *Liparis loeselii* in the nature reserve “Mielno” near Konin comes from 1994 (KUŚWIK et AL. 1994). The population has been monitored since 1995 and some results of these observations have already been published (BEDNORZ 1999, 2003, 2008). The regular observation and recording of changes in status and dynamic trend of plant populations are especially important for the threatened species. The collected information should be the basis for undertaking of management actions aiming at preventing the species populations from extinction (KULL et AL. 2008).

This study shows the process of gradual regression of valuable population of *Liparis loeselii* as a result of natural succession.

STUDY AREA AND METHODS

The study area is situated in the nature reserve “Mielno”, which was established in 1957. The reserve is located in the eastern part of the Wielkopolska Lakeland about 10 km north from city of Konin within an interesting forest complex called the Bieniszewski Wilderness (Fig. 1). The reserve comprises the Lake Mielno surrounded by osier thickets, peat bogs, meadows and

woods. The population of *Liparis loeselii* population occurs in two patches of total area about 0.6 ha close to the lake in the peat bog zone. It is a component of the most valuable plant community within the reserve area – described as *Betulo-Salicetum repentis* (ŚLIWA et AL. 2007). The patches of this association also include other interesting and rare species belonging to phytosociological alliance *Caricion davalliane* and class *Scheuzerio-Caricetea fuscae*. The soils of this area represent peat-mud with pH 6.8-7.2 (in the top 10 cm), high content of calcium carbonate, humus, total nitrogen and available magnesium, and an average content of available potassium and phosphorus (BEDNORZ 1999).

Three permanent plots (5 × 5 m each) within *L. loeselii* population area were set up for study in July 1995. The position of individual plants of *L. loeselii* was mapped each year at blooming time (when flowers were fully open). The age structure of *L. loeselii* population was also determined each year (since 1998) in respect to frequency of plants in four development stages; I. juvenile plants with 1 leaf, II. immature (not developing) ones with 2 small leaves, III. grown up ones with 2 big, fully developed leaves, IV. generative (flowering) plants. In this study *L. loeselii* individuals are separated into generative (which had inflorescence) and vegetative (which did not produce an inflorescence). The changes in the plant cover within studied area were also observed.

RESULTS AND DISCUSSION

The changes in the number of *Liparis loeselii* plants recorded during 16 years of observation (Table 1, Fig. 2) are evident. It seems, that the observed changes in the population numbers had until 2001 a character

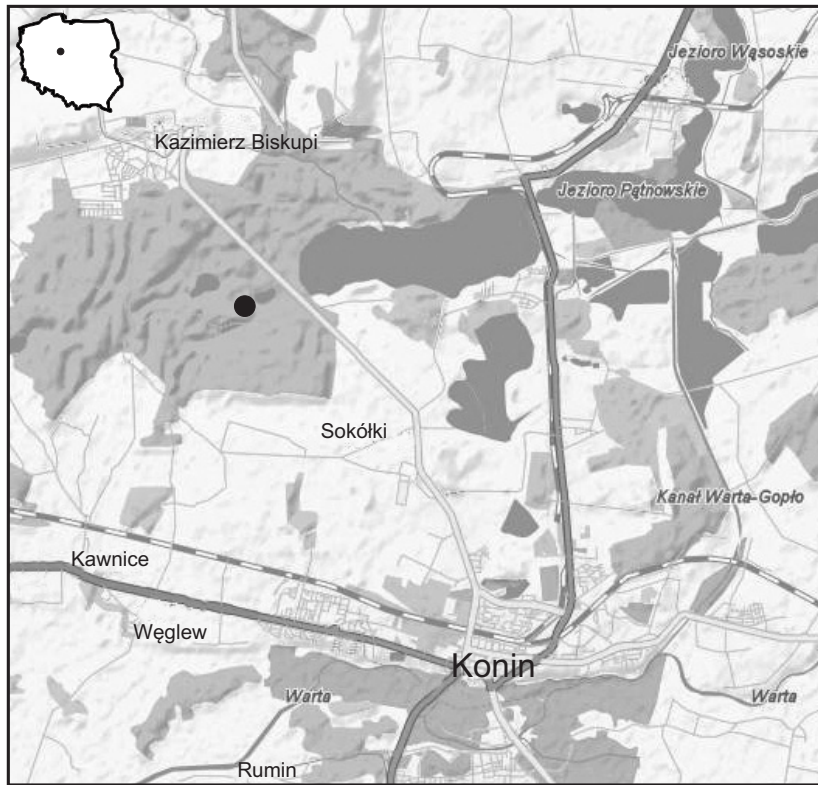


FIG. 1. Location of *Liparis loeselii* population

TABLE 1. Changes in *Liparis loeselii* population numbers in the years 1995-2010

Years	Vegetative plants	Generative plants	Total numbers
1995	28	45	73
1996	52	33	85
1997	53	53	106
1998	57	26	83
1999	55	15	70
2000	43	12	55
2001	42	24	66
2002	18	11	29
2003	36	9	45
2004	36	12	48
2005	39	9	48
2006	11	10	21
2007	19	5	24
2008	9	3	12
2009	7	3	10
2010	1	1	2

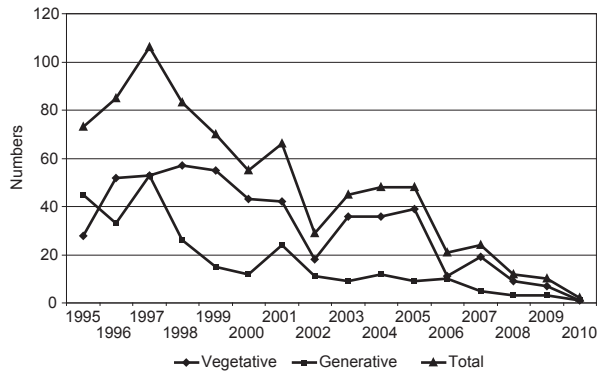


FIG. 2. Population dynamics of *Liparis loeselii* in the years 1995-2010

of natural fluctuation – the number of plants had initially increased reaching its maximum – 106 individuals in 1997, and then had decreased to 55-66 individuals in years 2000-2001. Decreasing in the population numbers in the subsequent years to its minimum (2 individuals) in 2010 indicates without any doubt that the monitored population of *L. loeselii* is in the regression stage.

At the same time unfavourable changes in the population environment have been observed. These changes concern the structure and floristic composition of phytocoenoses with *L. loeselii* and consisting in overgrowing the paths of peat bog by woody species – mainly *Salix cinerea* and *Alnus glutinosa*, and high rushes of *Carex* species representing the alliance *Magnocaricion*.

Close proximity of these species increased the shadow and competition which *L. loeselii* could not tolerate (VAKHRAMEEVA and TATARENKO 2001). The overgrowing of peat bog area, which is the habitat of *L. loeselii*, was the direct cause of declining of this rare orchid species population in the nature reserve "Mielno". The observed changes have a character of a natural succession and they are irreversible in nature without human interference.

In 2007 the new Protection Plan for the nature reserve "Mielno" was prepared (ŚLIWA et al. 2007). In this study the necessity of implementation of active protection, aiming at saving the population of *L. loeselii* and the most valuable plant community of the reserve with other plant species typical for transition peat bogs was written down. However, it was finally decided not to interfere with the processes of natural succession. Such decision was explained on the grounds of the disturbances in the remaining parts of the reserve, it is difficult and it means the protection of temporary succession stage. That however, stands in contradiction to the idea of strict protection that motivates the entire reserve. In this situation the fate of the population of *L. loeselii* in the nature reserve "Mielno" seems to be definitively settled.

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