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Morphological and chemical characteristics of wild growing populations of plantain (*Plantago lanceolata* L.)

INTRODUCTION

Plantain is a well known and valued medicinal plant. The raw material (leaves and occasionally seeds) are currently obtained from cultivation and from natural sites. It is known that wild growing plants show a great diversity in terms of morphological and chemical characteristics.

The aim of this study was to determine the range of morphological and chemical characteristics of plantain (*Plantago lanceolata* L.) growing in natural habitats in central and south-eastern Poland.

MATERIAL AND METHODS

The study was conducted in 2011. The object of the study was 15 populations of plantain (*Plantago lanceolata* L.) growing in the Lublin, Mazovia and Podlasie Provinces (five populations from each province). Plants were collected at the vegetative stage of development (6.06.2011).

The following parameters were defined:

- plant height
- number of leaves,
- length and width of leaves,
- air-dry weight of one plant,
- content of polyphenolic acids,
- content of flavonoids,
- content of iridoid glycosides.

RESULTS

Table 1. Morphological characteristics of investigated populations of plantain (*Plantago lanceolata* L.)

Province	Site	Plant heigth (cm)	Number of leaves	Lenght of leaves (cm)	Width of leaves (cm)
LUBLIN	L.1 Potok Stary	10.1 b	11 b	4.9 a	1.2 b
	L.2 Cisownik	7.2 a	12 c	3.9 a	0.7 a
	L.3 Nowodwory	10.9 b	11 b	5.7 b	1.4 c
	L.4 Żdżary	13.1 c	8 a	6.2 b	1.3 b
	L.5 Ernestynów	14.3 d	13 c	7.0 c	1.3 b
	Mean for province	**11.1 B**	**11 B**	**5.5 A**	**1.2 A**
MAZOVIA	M.1 Leoncin	15.6 d	12 b	8.4 c	1.0 b
	M.2 Elsnerów	8.2 a	27 d	4.5 a	0.9 a
	M.3 Zalesie Górne	8.2 a	9 a	4.5 a	1.3 c
	M.4 Żabieniec	12.8 c	11 b	6.4 b	1.2 b
	M.5 Zalesie Dolne	9.5 a	11 b	6.4 b	1.2 b
	Mean for province	**10.9 A**	**14 C**	**6.0 B**	**1.1 A**
PODLASIE	P.1 Ostrów Mazowiecka	12.4 c	17 cd	4.3 a	1.3 a
	P.2 Brok	11.5 b	9 a	6.2 b	1.5 c
	P.3 Głębocz Wielka	11.4 b	7 a	7.2 c	1.5 c
	P.4 Szumowo	11.0 b	8 a	7.4 c	1.3 b
	P.5 Srebrna	13.2 c	8 a	7.4 c	1.4 c
	Mean for province	**11.9 C**	**9.8 A**	**6.4 C**	**1.4 B**

Photo 1. Plantain on Żabieniec (site M.1).

Photo.2. Plantain on Brok (site P.2).

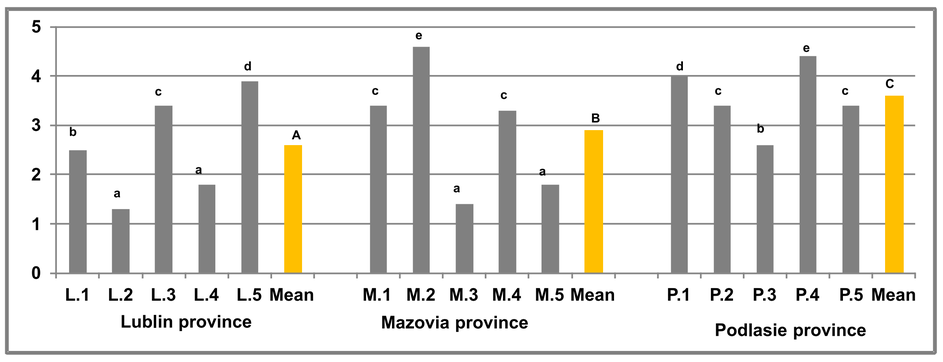

Fig. 1. Air-dry weight of one plant (g)

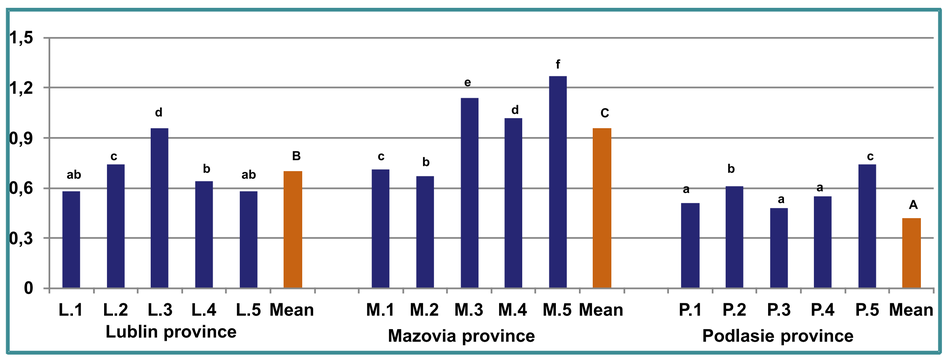

Fig. 2. Content of polyphenolic acids (%)

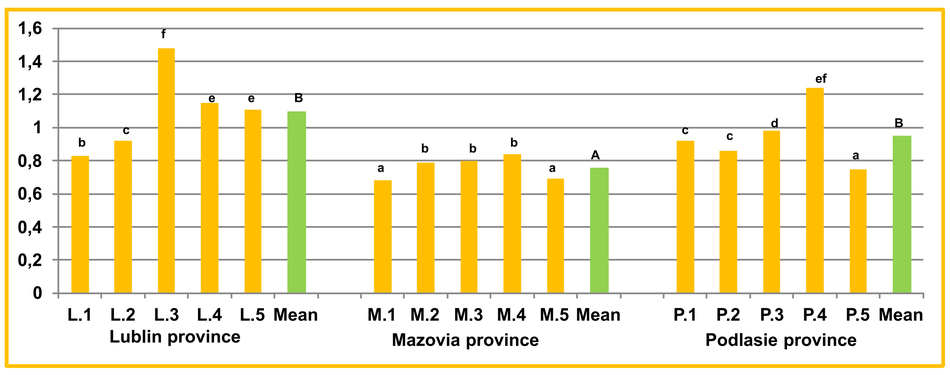

Fig. 3. Content of flavonoids (%)

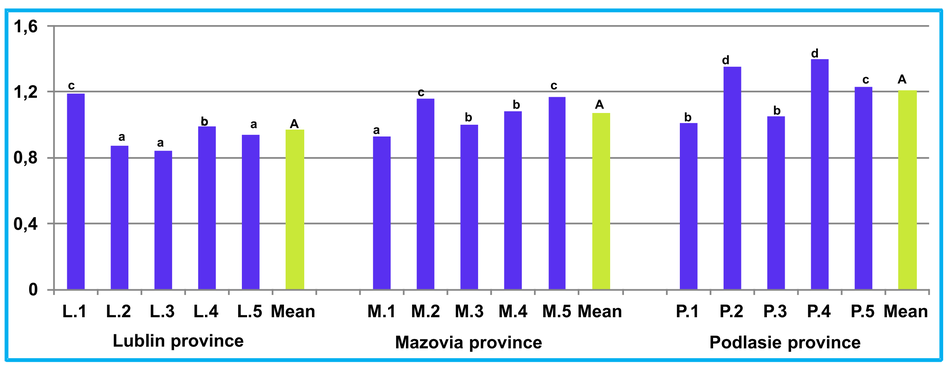

Fig. 4. Content of iridoid glycosides (%)

CONCLUSIONS

1. Investigated populations showed a significant variation in respect of the morphological traits such as plant heigth, number of leaves, length and width of the leaf blade and the weiht of one plant.
2. Plants growing in the Podlasie Province were the highest, but produced the least number of leaves. In the Mazovia province inverse relationship was observesd.
3. Investigated populations differ in respect of content of polyphenolic acids, flavonoids and irydoid glycosides

   The highest content of polyphenolic acids was characteristic for the population M.2 from Mazovia Province

   Population L.3 from Lublin Provice was characterised by the highest content of flavonoid, and populations M.1 (Mazovia province) by the lowes one.
4. There were no significant differences in the content of irydoid glycosides between raw material collected from the investigated provinces.