

## Taxonomic and chorologic revision of the *Polypodium vulgare* complex in Herbarium Croaticum and the Ivo and Marija Horvat Herbarium

VLADIMIR HRŠAK\*

University of Zagreb, Faculty of Science, Department of Botany, Marulićev trg 20,  
HR–10000 Zagreb, Croatia

Taxonomic and chorologic revision of specimens in the two largest public herbaria in Croatia was carried out on the basis of the most recent taxonomic treatment of the *Polypodium vulgare* L. complex. These data were used for the production of maps of the partial distribution of taxa from the *Polypodium vulgare* complex in Croatia.

**Key words:** *Polypodium*, ferns, flora, Croatia

### Introduction

The occurrences of *Polypodium interjectum* and *P. x mantoniae* in Croatia has been already listed by HRŠAK (2000). These taxa had been already recorded in neighbouring Slovenia (MAYER and HORVATIĆ 1967, MLAKAR 1987).

The herbarium specimens in the Herbarium Croaticum (ZA) and the Ivo and Marija Horvat Herbarium (ZAHO) in the Department of Botany in Zagreb are old and determined by different methodologies. The distribution area of these species in Croatia was not known previously. This was the reason for the revision of herbarium specimens in the two largest public herbaria in Croatia. The importance of these data is even greater if we take into consideration the circumstance that detailed floristic mapping has never been carried out in Croatia. It was for this reason that the publication of distribution data based on a revision of herbarium specimens was announced in HRŠAK (2000).

### Materials and methods

All specimens of the *Polypodium vulgare* L. complex in ZA and ZAHO were considered and redetermined. The redetermination was carried out primarily on the basis of micromorphological characteristics of the sori in the herbarium plants (JÄGER et al. 1994, NEUROTH 1996, HRŠAK 2000). Those characteristics are: the presence/absence of paraphyses, the number of indurated annulus cells, and the number of basal cells. On each

---

\* Corresponding address: Fax: +385 1 48 95 571, e-mail: vhrsak@lipa.botanic.hr

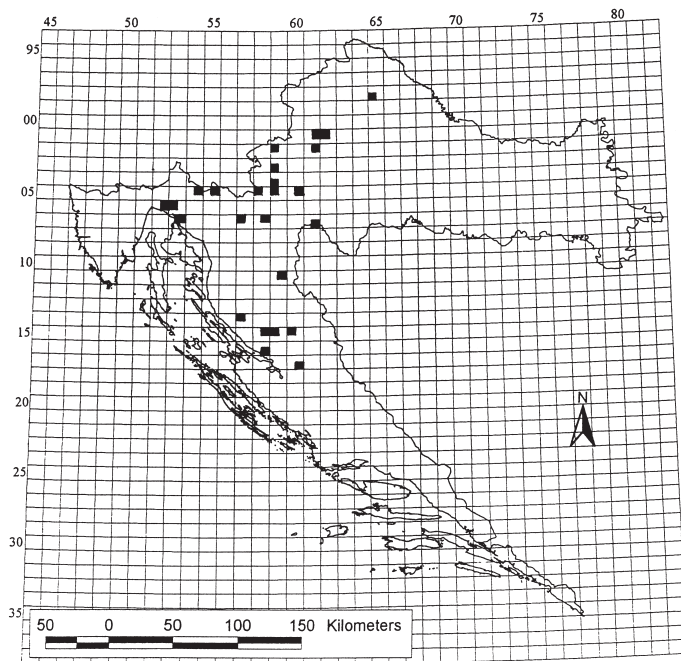
specimen an average of 20 sori were considered and the mean number of indurated and annulus cells was calculated. Identification was performed using standard keys (DOSTÁL and REICHSTEIN 1984, AKEROYD and JERMY 1993, PHILIPPI 1993, JERMY and CAMUS 1998).

On the basis of the data, geocoding in MTB coordinates according to the recommendations and standards in NIKOLIĆ et al. (1998) was made for each specimen. In addition, an analysis of herbarium specimens according to age was done, reflecting the intensity of the dynamics of floristic research in Croatia.

## Results and Discussion

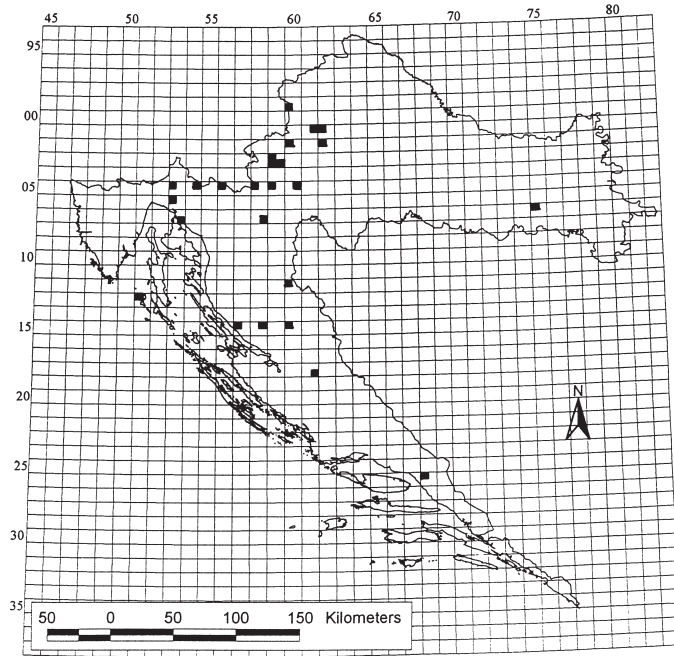
The total number of specimens from the *Polypodium vulgare* L. complex in the Herbarium Croaticum was 1352. Of them, 638 specimens were determined to be *P. vulgare* L., 383 specimens *P. interjectum*, 270 specimens to be hybrid *P. x mantoniae*, and 44 specimens *P. cambricum*. Due to the absence of sori it was not possible to identify 17 specimens.

In the Ivo and Marija Horvat Herbarium there was a total of 65 specimens.

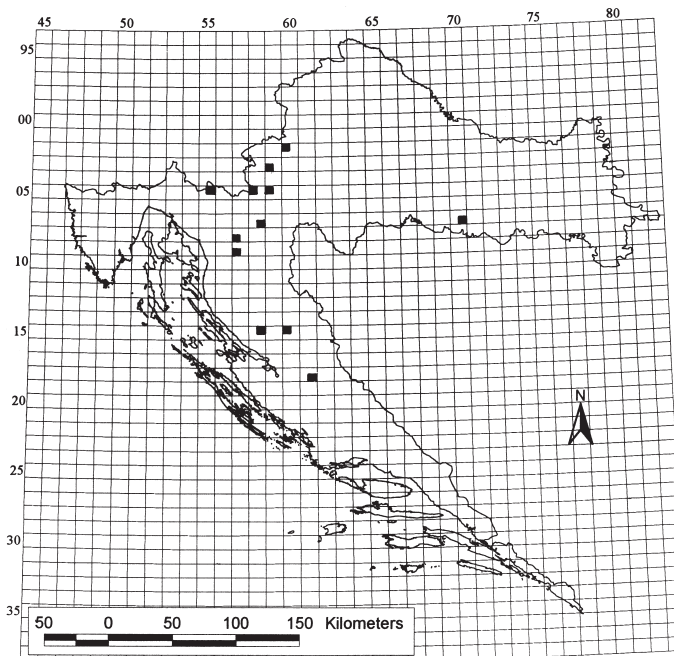


**Fig. 1.** Distribution of the *Polypodium vulgare* L. s. on the basis of the herbarium specimens.

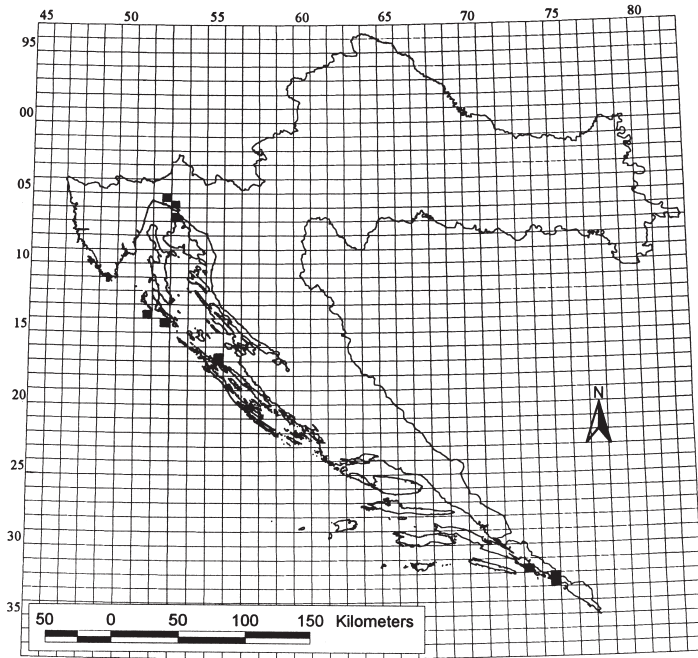
Of them, 13 were identified as *P. vulgare*, 37 as *P. interjectum*, 9 specimens as *P. x mantoniae*, while 6 specimens could not be identified with any certainty. Figures 1–4 depict the distribution areas of all four taxa found in those collections. Of the total number of specimens (1417) geocoding was impossible in 92 of them due to insufficiently precise citing of the location on the specimen label. Such specimens could not be shown on the distribution maps.



**Fig. 2.** Distribution of the *Polypodium interjectum* Shivas on the basis of the herbarium specimens.



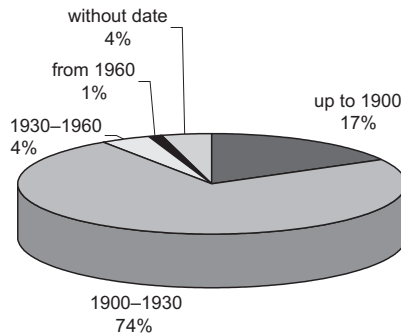
**Fig. 3.** Distribution of the *Polypodium x mantoniae* Rothm. et U. Schneid. on the basis of the herbarium specimens.



**Fig. 4.** Distribution of the *Polypodium cambricum* L. on the basis of the herbarium specimens.

Figure 5 shows dynamics of specimen entry into the collections. It can be seen that most specimens (74 %) were collected in the period 1900–1930. After 1960 only 1 % of the specimens of the *Polypodium vulgare* complex were collected. In 3.6 % of specimens the date of collection was not cited.

The revision of the entire material deposited in the two herbaria shows the distribution of the *Polypodium vulgare* complex in Croatia. Considering the collected material, the taxon is distributed in the greater part of Croatia.



**Fig. 5.** Temporal structure of specimens of *Polypodium vulgare* L. complex in both herbarium collections.

The herbarium collections do not contain specimens collected during planned floristic research of approximately similar intensity in all parts of Croatia. These maps thus illustrate a partial distribution only, on the basis of individual collections, over a longer period, during which some parts of Croatia were not included in the research and so are not represented among the specimens collected. The time dynamics of herbarium specimen collections shows a drastic fall in the recent period. Since the 1950s botanical research in Croatia has been focused on phytosociological research, together with a sharp fall in the intensity of floristic and taxonomic research.

Literature data for taxa from the *P. vulgare* complex have not been mentioned since it is impossible for them to be revised taxonomically in line with the most recent taxonomic approaches.

More complete data on the distribution of the *P. vulgare* complex than these shown here can be obtained only by planned, organised floristic mapping of the entire area of Croatia.

### References

- AKERROYD, J. R., JERMY, A. C., 1993: *Polypodium* L. In: TUTIN, T. G., BURGESS, N. A., CHATER, A. O., EDMONDSON, J. R., HEYWOOD, V. H., MOORE, D. M., VALENTINE, D. H., WALTERS, S. M., WEBB, D. A. (eds.), *Flora Europaea* 1., 15–16. Cambridge University Press, Cambridge.
- DOSTÁL, J., REICHSTEIN, T., 1984: *Polypodium* L. In: KRAMER, K. U., (Hrsg.), HEGI, G., *Illustrierte Flora von Mitteleuropa*. 1 (1), 279–285. Verlag Paul Parey, Berlin.
- HRŠAK, V., 2000: Two fern taxa from the *Polypodium vulgare* L. complex – new for Croatia. *Acta Bot. Croat.* 59, 375–381.
- JERMY, A. C., CAMUS, J. M., 1998: *Illustrierter Leitfaden zum Bestimmen der Farne und farnverwandten Pflanzen der Schweiz und angrenzender Gebiete*. SVF, Zürich.
- JÄGER, W., LEONHARDS, W., LESCHUS, H., 1994: Die Gattung *Polypodium* im Bergischen Land und in dem angrenzenden Gebieten. 2. Teil: Dokumentation der mikro- und makro-morphologischen Befunde. *Jahresber. Naturwiss. Vereins Wuppertal* 47, 73–80.
- MAYER, E., HORVATIĆ, S., 1967: *Polypodium* L. *Analitika Fl. Jugoslav.* 1, 150–152.
- MLAKAR, J., 1987: Rod *Polypodium* v Sloveniji. *Biol. Vestn.* 35(1), 45–58.
- NEUROTH, R., 1996: *Biosystematik und Evolution des Polypodium vulgare – Komplexes* (Polypodiaceae, Pteridophyta). *Diss. Bot.* 256.
- NIKOLIĆ, T., BUKOVEC, D., ŠOPE, J., JELASKA, S. D., 1998: Kartiranje flore Hrvatske – mogućnosti i standardi. *Nat. Croat.* 7, Suppl. 1, 62.
- PHILIPPI, G., 1993: *Polypodium* L. In: SEBALD, O., SEYBOLD, S., PHILIPPI, G. (Hrsg.), *Die Farn- und Blütenpflanzen Baden-Württembergs*, 184–187. Verlag Eugen Ulmer, Stuttgart (Hohenheim).