

The database of the Western Carpathian forest vegetation*

RICHARD HRIVNÁK¹, KAROL UJHÁZY², MILAN CHYTRÝ³ & MILAN VALACHOVIČ¹

¹Institute of Botany, Slovak Academy of Sciences, Sienkiewiczova 1, SK-845 23 Bratislava, Slovakia, e-mail: richard.hrivnak@savba.sk, milan.valachovic@savba.sk

²Department of Phytology, Faculty of Forestry, Technical University of Zvolen, Masarykova 24, SK-960 53 Zvolen, Slovakia, e-mail: ujhazy@vsld.tuzvo.sk

³Department of Botany, Masaryk University, Kottlářská 2, CZ-611 37 Brno, Czech Republic, e-mail: chytry@sci.muni.cz

HRIVNÁK R., UJHÁZY K., CHYTRÝ M. & VALACHOVIČ M. (2003): The database of the Western Carpathian forest vegetation. – *Thaiszia – J. Bot.* 13: 89-95. – ISSN 1210-0420.

ABSTRACT: Phytosociological relevés of the Western Carpathian forest vegetation are being stored in the electronic database program TURBOVEG. At present, this database exists only in the Czech Republic and Slovakia as a part of the National Phytosociological Databases, but not in the other Western Carpathian countries. In January 2002, the database of the Western Carpathian forests contained 4740 relevés – 1673 from the Czech Republic and 3067 from Slovakia. Some basic statistics of the vegetation-plot data are presented.

KEYWORDS: Czech Republic, database, forest communities, Slovakia, TURBOVEG, Western Carpathians.

Introduction

The existence of a great amount of published as well as unpublished phytosociological relevés and the elaboration of vegetation compendia of geographic and administrative units requires establishing of electronic databases. In the Czech Republic and Slovakia, the database system

*Paper was presented as a poster at the conference "Aktuális flóra- és vegetációkutatás a Kárpát-medencében V" in March 2002 in Pécs (Hungary).

TURBOVEG (HENNEKENS & SCHAMINÉE 2001) is used for this purpose. During the third meeting of the European Vegetation Survey in Rome 1994, the Working Group Council proposed to use TURBOVEG as the standard computer package. At present, this program is being employed in most European countries. An active mass utilization of this software in the Czech Republic and Slovakia started in 1996, when also national electronic phytosociological databases were formed (VALACHOVIČ 1996, 1999, CHYTRÝ 1997, CHYTRÝ & RAFAJOVÁ 2003). Until that time, the program FYT (KUČERA 1992) had been used in the Czech Republic, and the program FYTOPACK (JAROLÍMEK & SCHLOSSER 1997) in Slovakia. At present, there exist separate national phytosociological databases in both republics. They are managed by the Department of Botany of the Faculty of Science of the Masaryk University in Brno and the Department of Geobotany of the Botanical Institute of the Slovak Academy of Sciences in Bratislava. In January 1, 2002, the Czech national database contained 48449 phytosociological relevés, whereas the Slovak database contained 15029 relevés. The classification of vegetation is closely associated with the national vegetation survey projects. Information on databases is provided on internet homepages (http://www.sci.muni.cz/botany/dbase_cz.htm and <http://nic.savba.sk/sav/inst/bo tu/cdf/index.html>).

Database of the Western Carpathian forests was established within the framework of national databases. In addition to the mentioned institutions, Department of Phytology of the Faculty of Forestry of the Technical University in Zvolen participated in excerpting the phytosociological data.

Basic statistics of the database

In January 2002, the database contained 4740 phytosociological forest relevés. Almost 65% were recorded from the territory of Slovakia, and more than 35% originated from the Czech Republic. Major part of relevés has been excerpted from published original papers, monographs (2572 relevés) and theses (1632 relevés). The data originate from 187 published papers and unpublished materials (Tab. 1).

The structure of relevé data sets as related to vegetation units depends on the particular research projects in individual countries. Most relevés were recorded in broad-leaved deciduous forests of the class *Quercio-Fagetea* (3577) and more than 93% represent mesophilous or hygrophilous forests of the order *Fagetalia*. The second most represented class are coniferous forests of the class *Vaccinio-Piceetea* (965 relevés). Alder and riparian forests of the order *Alnetalia glutinosae* and alliance *Salicion albae*, and oak forests of the class *Quercetea robri-petraea* and order *Quercetalia pubescenti-petraeae* are insufficiently represented (Tab. 2).

A strong predominance of relevés from mesophilous and hygrophilous broad-leaved forests of the order *Fagetalia* and coniferous forests of the class *Vaccinio-Piceetea* was reflected also in the representation of vascular plants in the herb layer. The twenty most frequently occurring species are

Tab. 1. Number of relevés and bibliographic references included in the databases, according to different sources. Relevés summarised in theses or unpublished reports and published later are included only under publications.

	Czech Republic		Slovakia	
	Number of bibliographic references included in the database	Number of relevés included in the database	Number of bibliographic references included in the database	Number of relevés included in the database
Published papers and monographs	48	715	105	1857
Theses	6	686	18	946
Unpublished relevés	–	157	–	264
Nature reserve survey reports	10	115	–	–
Total	64	1673	123	3067

Tab. 2. Number of relevés included in the databases, according to syntaxonomical units of forest vegetation.

Syntaxonomical units of forest vegetation	Czech Republic		Slovakia		Total in the Western Carpathians
	Czech Republic	Slovakia	Czech Republic	Slovakia	
<i>Alnetalia glutinosae</i>	5	125	–	130	
<i>Erico-Pinetea</i>	–	12	–	12	
<i>Fagetalia</i>	1370	1998	–	3368	
<i>Quercetalia pubescenti-petraeae</i>	147	62	–	209	
<i>Quercetalia robori-petraeae</i>	23	18	–	41	
<i>Robinietea</i>	–	–	–	–	
<i>Salicion albae</i>	15	–	–	15	
<i>Vaccinio-Picetea</i>	113	852	–	965	
Total	1673	3067	–	4740	

given in table 3. There is only one species, *Oxalis acetosella*, which has been recorded in more than a half of all relevés. *Athyrium filix-femina*, *Galium odoratum*, *Senecio ovatus*, *Dryopteris filix-mas*, *Mycelis muralis* a *Viola reichenbachiana* occur in more than one third of relevés (Tab. 3).

Tab. 3. Twenty most frequent species of herb layer in the database of the Western Carpathian forests.

<i>Oxalis acetosella</i>	2665
<i>Athyrium filix-femina</i>	2212
<i>Galium odoratum</i>	2050
<i>Senecio ovatus</i>	1992
<i>Dryopteris filix-mas</i>	1931
<i>Mycelis muralis</i>	1891
<i>Viola reichenbachiana</i>	1630
<i>Dentaria bulbifera</i>	1487
<i>Asarum europaeum</i>	1467
<i>Hieracium murorum</i>	1400
<i>Geranium robertianum</i>	1368
<i>Mercurialis perennis</i>	1354
<i>Ajuga reptans</i>	1268
<i>Prenathes purpurea</i>	1267
<i>Urtica dioica</i>	1266
<i>Maianthemum bifolium</i>	1257
<i>Fragaria vesca</i>	1246
<i>Sorbus aucuparia</i>	1222
<i>Fagus sylvatica</i>	1221
<i>Poa nemoralis</i>	1208

Historically, the last decade appears to be the most fruitful one, concerning the collection of phytosociological data in the Western Carpathian forests. In the database, there are 1549 relevés from this period. The situation in the Czech part of the Carpathians is different from Slovakia: in the Czech Republic, most relevés (936) were recorded in the 1990s, whereas in Slovakia, most data were collected during the 1970s (999 relevés). In any case, almost 92% of the relevés excerpted up to the present were recorded during the last four decades (Fig. 1).

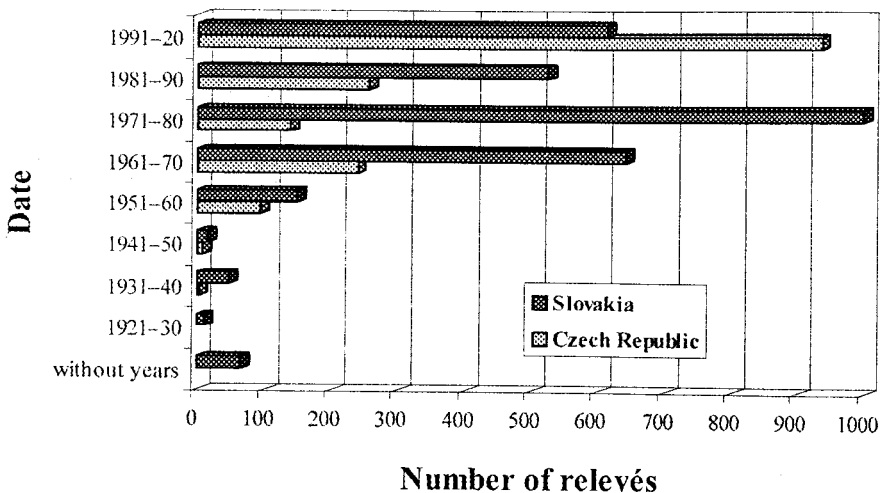


Fig. 1. Proportion of relevés per decades. Missing dates of relevés recording were substituted by publication dates.

Most phytosociological relevés were recorded in the mountain ranges of the Biele Karpaty Mts., Javorníky Mts., Moravskoslezské Beskydy Mts., Slovenský raj and Volovské vrchy Mts. (Fig. 2, 3). The numbers of relevés can be displayed either in grid system of the Central European mapping (Fig. 2), or within

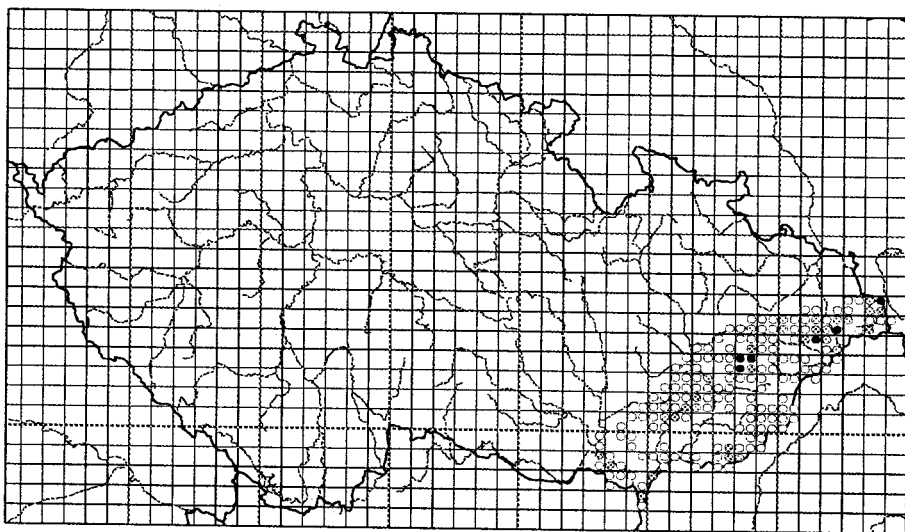


Fig. 2. Distribution map of forest relevés in the Czech part of the Western Carpathians. Darker colours indicate mapping fields with more relevés.

orographical units (Fig. 3). Square network is preferred in the Czech Republic (e.g. CHYTRÝ et al. 2001), whereas the overview of syntaxa according to orographic units is presently used in national vegetation compendia in Slovakia (VALACHOVIČ et al. 1995, JAROLÍMEK et al. 1997, VALACHOVIČ 2001).

The database is not completed yet. Its building will continue in the next years with the main aim of compiling a representative phytosociological data set for the synthesis and survey of forest communities of the Western Carpathians. In particular, it will be necessary to add relevés from Hungarian and Polish mountain regions.

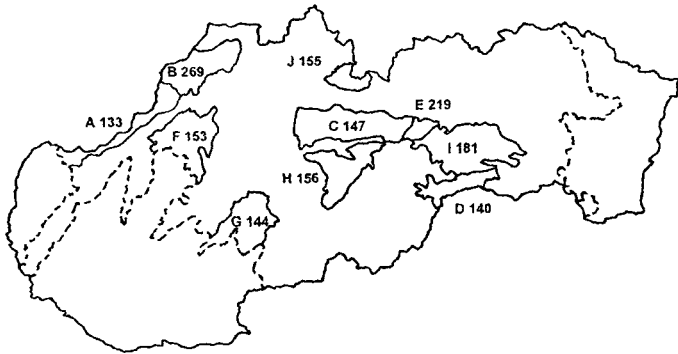


Fig. 3. Distribution map of forest relevés in the Slovak part of the Western Carpathians. Only orographical units with more than 100 relevés are shown (A – Biele Karpaty, B – Javorníky, C – Nízke Tatry, D – Slovenský kras, E – Slovenský raj, F – Strážovské vrchy, G – Krupinská planina, H – Veporské vrchy, I – Volovské vrchy, J – Západné Tatry). The dashed line is the border of the Western Carpathians within Slovakia.

Acknowledgements

The paper was supported by the Slovak Grant Agency for Science (Grant No. 1/7057/20) and by Masaryk University in Brno (project No. MSM 143100010). We are grateful to Dušan Gömöry for translating the text into English.

References

- CHYTRÝ M. (1997): Česká národní fytoecenologická databáze: počáteční stav a perspektivy. – *Zprávy Čes. Bot. Společn., Mater.* 15: 27-40.
- CHYTRÝ M., KUČERA T. & KOČÍ M. (eds.) (2001): *Katalog biotopů České republiky*. – Agentura ochrany přírody a krajiny ČR, Praha.
- CHYTRÝ M. & RAFAJOVÁ M. (2003): Czech National Phytosociological Database: basic statistics of the available vegetation-plot data. – *Preslia* 74: 1-15.
- HENNEKENS S.M. & SCHAMINÉE J.H.J. (2001): TURBOVEG, a comprehensive data base management system for vegetation data. – *J. Veg. Sci.* 12: 589-591.
- JAROLÍMEK I. & SCHLOSSER G. (1997): FYTOPACK - A system of programs to process phytosociological tables. – *Biologia (Bratislava)* 52: 53-59.

- JAROLÍMEK I., ZALIBEROVÁ M., MUCINA L. & MOCHNACKÝ S. (1997): Rastlinné spoločenstvá Slovenska 2. Synantropná vegetácia. – Veda, Bratislava.
- KUČERA T. (1992): [review] FYT. Editor fytoecenologických tabulek. – Preslia 64: 78.
- VALACHOVIČ M. (1996): TURBOVEG - celoeurópsky databázový program pre fytoecenologické dáta. – Bull. Slov. Bot. Spoločn. 18: 189.
- VALACHOVIČ M. (1999): Centrálna databáza fytoecenologických zápisov (CDF) na Slovensku. – In: LESKOVJANSKÁ A. (ed.), Zborník referátov zo 7. zjazdu Slovenskej botanickej spoločnosti pri SAV, p. 87-89, SZOPK, Spišská Nová Ves.
- VALACHOVIČ M. (ed.) (2001): Rastlinné spoločenstvá Slovenska 3. Vegetácia mokradí. – Veda, Bratislava.
- VALACHOVIČ M., OŤAHELOVÁ H., STANOVÁ V. & MAGLOCKÝ Š. (1995): Rastlinné spoločenstvá Slovenska 1. Pionierska vegetácia. – Veda, Bratislava.

Received: 27 March 2003
Revised: 23 September 2003
Accepted: 24 September 2003