Polyplody and Variation in the *Campanula rotundifolia* Complex.
Part II. (Taxonomic)
2. Revision of the Groups *Vulgares* and *Scheuchzerianae*
in Czechoslovakia and Adjacent Regions

Abstract

Cytological and morphological studies have been carried out on populations of *Campanula rotundifolia* L., *C. Tatrae* Borbás (group *Vulgares*) and *C. bohemica* Hruby (group *Scheuchzerianae*) from a wide range of habitats in Czechoslovakia. Chromosome counts have been made on material from 185 populations, revealing the presence of two ploidy levels within the limits of the species *C. rotundifolia* L.: diploid (2n = 34) and tetraploid (2n = 68). The other two species are tetraploid, with 2n = 68. *C. Tatrae* Borbás, comprising monticolous derivatives of *C. rotundifolia* L., is subdivided into three subspecies [subsp. *Tatrae*, subsp. *mentiens* (Witas.) Kovanda and subsp. *sudetica* (Hruby) Kovanda], each representing a major regional facies of the species. Within *C. bohemica* Hruby, two vicarious subspecies are recognized which can be equated with subsp. *bohemica* and subsp. *gelida* Kovanda. Ecology, geographical distribution, variation and relationships of all these taxa have been reconsidered. Descriptions and distribution maps are provided.

INTRODUCTION

Members of the *Campanula rotundifolia* complex are variable and phenotypically plastic plants whose identification and classification have caused considerable confusion. An indication of the wide disagreement over the delimitation and rank of the Czechoslovak taxa is provided by treatments in different Floras (see Domíč et Podpěra 1928, Domín 1935, Hnedrych 1950, Dostál 1954, 1958) and monographic studies (see Witasek 1902, 1906, Hruby 1930, Podlecký 1965). The taxonomic difficulty can be attributed to the scarcity of "good" morphological characters which could be used to define the specific and subspecific limits, and the exceptional range of variation of many of those which are available. Together with a few floral characters, such as the position of flower buds, form and length of calyx-teeth and shape of corolla, the most important taxonomic characters concern the shape of rhizome, hairiness of stem, shape of leaves and morphology of capsule. Another source of problems is the presence in the Czechoslovak
material of different cytotypes which are not always recognizable on morphological grounds. A detailed investigation has therefore been carried out with the hope of resolving these problems, and a study of the relationships between cytology and morphological variation has already been published (see Kovanda 1970a). Taxonomic conclusions concerning the groups Saxicolae, Lanceolatae and Alpicolae were considered in a subsequent paper (Kovanda 1970b). The purpose of the present paper is to discuss the Czechoslovak representatives of the Vulgares and Scheuchzerianae groups in more detail.

This study is based chiefly on material collected in the field in 1962—1968 and 1972—1975. The population samples were from localities throughout Czechoslovakia. Samples from a number of populations were cultivated in experimental plots. Herbarium material has also been used, the main collections consulted being those of Department of Botany, National Museum, Průhonice (PR), Department of Botany, Charles University, Prague (PRC), Department of Botany, Moravian Museum, Brno (BRNM), Department of Plant Biology, Purkyně University, Brno (BRNU), Botanical Institute of the Slovak Academy of Sciences, Bratislava (BAV), Slovak National Museum, Bratislava (BRA), Department of Botany, Comenius University, Bratislava (SLO) and Department of Botany, Natural History Museum, Vienna (W).

**Group Vulgares**

*Campanula rotundifolia* L. Sp. Pl. 163, 1753


**Cytology**

Over the past 15 years, *Campanula rotundifolia* and related taxa have been the subject of many comprehensive cytological studies (see Böcher 1960, 1966, Hubac 1961, Gaddella 1962, 1963, 1964, Podleck 1962, Podleck et Damboldt 1964, Bielawska 1964, 1968, Løyve et Løyve 1965, Laine 1968, Kovanda 1970a, Geslot 1973, Kovanda et Shetler 1971, Laine et al. 1974). Attention was mainly focused on chromosome numbers, and less on observations of chromosome morphology and of meiotic division. The majority of the counts were made on European material; only a few chromosome numbers have been reported from North America, and none from Asia. Alas, the species concepts adopted by the various authors differ widely and some counts have to be critically scrutinized and the names used have to be evaluated as to the exactness of definition of category and nomenclature before they are taken into account. Nonetheless, the results of these studies, combined with previous evidence (see e.g. Marchal 1920, Böcher 1936, Guinocchet 1942, Sugihara 1942, Böcher et Larsen 1950) revealed the presence within the species limits of three ploidy levels (diploid, tetraploid and hexaploid) posing, at the same time, some new problems. Perhaps the most serious one is that of the geographical distribution of cytotypes. This has so far defied all