Preslia, Praha, 58 : 193—198, 1986

A new species of *Cardamine pratensis* agg. from Eastern Slovakia

Nový druh z okruhu *Cardamine pratensis* z východného Slovenska

Karol Marhold and Ján Záborský

MARHOLD K.[1]) et ZÁBORSKÝ J.[2]) (1986): A new species of *Cardamine pratensis* agg. from Eastern Slovakia. — Preslia, Praha, 58 : 193—198.

A new species, *Cardamine majovskii* MARHOLD et ZÁBORSKÝ, is described from Eastern Slovakia. It is morphologically similar to *Cardamine matthioli* MORETTI in COMOLLI, however these species differ both in size of all flower parts and size of pollen grains.

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Cardamine pratensis agg. represents a varied complex from the point of view of morphology and karyology, which was investigated by many authors in Northern and Western Europe (LÖVKVIST 1956, SOUCHON et TOMASSONE 1971, URBANSKA-WORYTKIEWICZ et LANDOLT 1974 a, b, VYVEY et STIEPEREARE 1984 and others). However, there is no karyotaxonomic paper on this species complex from the Carpathians, except for that of Banach (1950) and several chromosome number reports. Therefore it is probable that from a detailed study on the Carpathian populations a new information will arise.

In the course of our karyotaxonomical and morphological study on *Cardamine pratensis* agg. in Slovakia the following populations were found : the diploid populations (2n = 16) of *C. matthioli* MORETTI in COMOLLI, tetraploid and hexaploid populations (2n = c. 30, 32, c. 44, 48) considered as *C. pratensis* L. at present, octoploid and decaploid populations (2n = 64, c. 80) of *C. dentata* SCHULTES (MARHOLD 1983 Ms., 1984, 1986). Besides, the tetraploid populations (2n = 32) were found in the Východoslovenská Nížina Lowlands, which are morphologically similar to *C. matthioli* more than to *C. pratensis*. However, they are different from *C. matthioli* both by size of all flower parts and size of pollen grains. These populations were misidentified with *C. dentata* because of their large white flowers. The tetraploid populations morphologically identical with or similar to *C. matthioli* have not been confirmed by chromosomal analysis so far in the area of *C. pratensis* agg., but LANDOLT (1984 : 488—489) supposed, according to size of pollen grains, that some herbarium specimens morphologically resembling *C. matthioli* from Eastern Europe, belonged to tetraploids. *C. matthioli* represents a well-established diploid species. The classification of the above-mentioned tetraploid populations within the latter species can be seen as unjustified and, therefore, they are adopted as a separate species, *C. majovskii*.

Cardamine ***majovskii*** MARHOLD et ZÁBORSKÝ, species nova

Species sectionis *Cardamine* ex aggregato *Cardamine pratensis*.

Planta perennis, 15—50 cm. alta, rhizomate brevi, simplici, rarius ramoso et in hoc casu caespites densos formans. Caulis erectus, basi vel in parte media superiore ramosus, raro simplex;

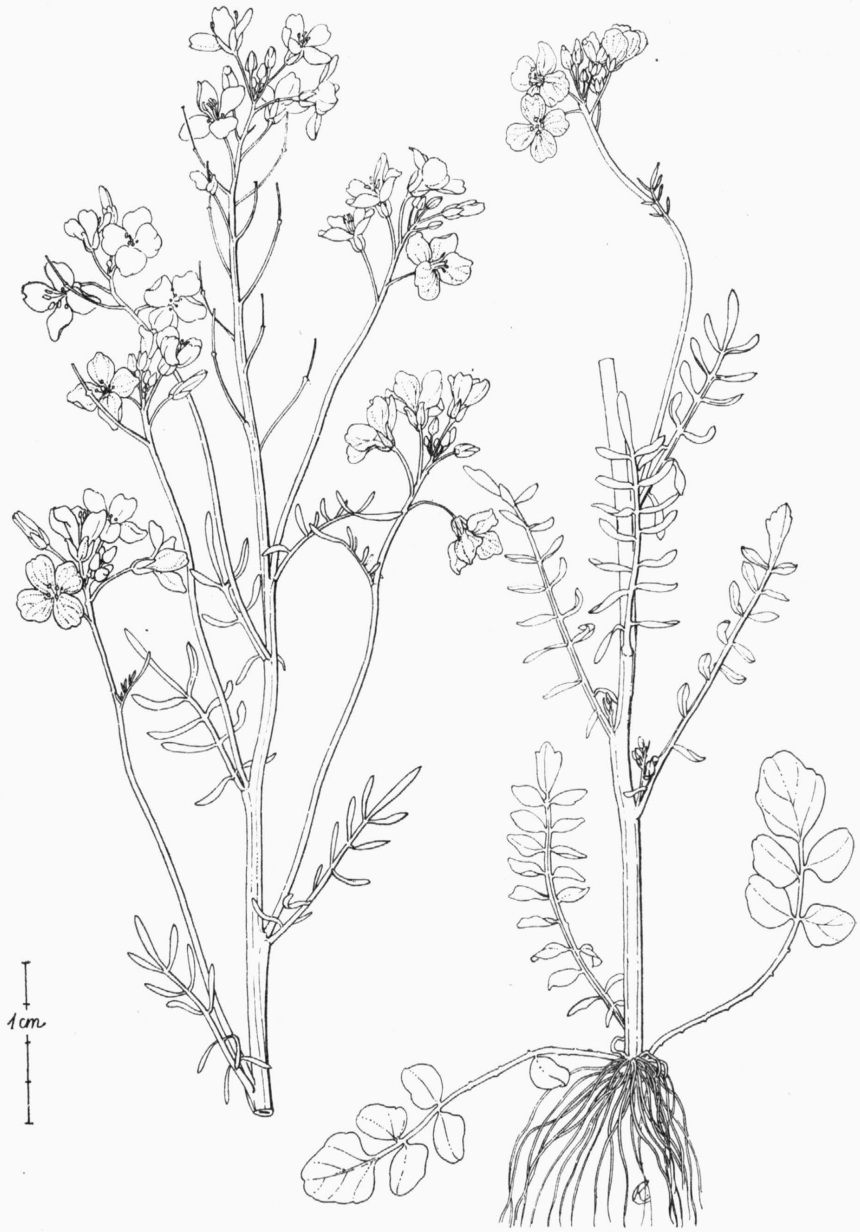

Fig. 1. — *Cardamine majovskii* MARHOLD et ZÁBORSKÝ. Del. K. Cigánová.

glaber. Folia rosularia basalia per anthesin saepe emorientia, glabra, nonnisi ea iuvenissima pro parte majore dense, rarius sparse pilosa, pilis praesertim rhachidis semper apicem versus adpressis. Folia rosularia basalia imparipinnata, foliolis lateralibus 2—14, sessilibus usque inconspicue petiolatis, ovatis, obovatis vel oblanceolatis, foliolo apicali majore, 7—19 mm. lato, reniformi usque cuneata basi, margine integerrimo vel crenato. Folia caulina 3—14, glabra, pinnatisecta (rarius primum et secundum folium infernum compositum); segmenta secundi folii inferni 11—25, tertii 9—23, foliorum sequentium caulis apicem versus numero decrescente, plerumque integerrima, oblanceolata usque linearia (praesertim in caulis parte superiori); segmenta foliorum caulinorum mediorum necnon inferiorum patentissima, ea infima saepe usque divaricata. Inflorescentia racemosa, simplex vel composita, floribus (8—) 10 usque 70(—100). Sepala (3,0—) 3,3—4,9 mm. longa, petala alba, venulis violaceis, rarius pallide violacea, obovata, (8,0—) 8,5—13,0 (—15,5) mm. longa, (5,0—) 5,5—8,5 (—10,0) mm. lata. Filamenta staminum breviorum 2,2—4,7 mm., eorum longiorum 3,9—6,7 mm. longa. Grana pollinis unius individui 31,37—34,40 μm. Siliquae 0,9—1,3 (—1,4) mm. latae, 18—46 mm. longae, pedunculi 9,5—24,5 mm. longi. Chromosomatum numerus 2n = 32. Floret a mensis Aprilis dimidio usque ad Junii initium.

Diagnosis:

A *Cardamine matthioli* Moretti in Comolli petalis plerumque latioribus et longioribus, pollinis granulis majoribus necnon chromosomatum numero tetraploideo differt.

A *Cardamine pratensis* L. pilis rhachidis foliorum rosularium iuvenissimorum apicem versus adpressis, segmentis foliorum caulinorum mediorum necnon inferiorum patentissimis, eis infimis saepe usque divaricatis distincta.

A *Cardamine dentata* Schultes folio caulino supremo semper pinnatisecto (nunquam composito), chromosomatum numero tetraploideo diagnoscitur.

Typus: Slovakia orientalis, distr. Východoslovenská nížina: situ occid. a pago Leles, prope bracchium mortuum „Tica"dictum, 24. 4. 1985, leg. K. Marhold.

Holotypus in herbario SAV, isotypus in herbario SLO asservatur.

Cardaminis haec species ad honorem cl. Doc. Dr. Jozef Májovský denominata.

Specimina examinata: omnes localitates in distr. phytogeographico Východoslovenská nížina (sensu Futák 1980) regionis Pannonicum sitae. (Schedarum textus latinisatus).

1. Ad pagum Veľký Horeš, situ occid. a stationis viae ferreae, 2. 5. 1981, Marhold, SLO, 25. 4. 1985, Marhold, SAV. — 2. Situ orient. a pago Borša, ad viam ferream, 2. 5. 1981, Marhold, SLO, 24. 4. 1985, Marhold, SAV (+). — 3. Situ merid.-orient. a pago Bodrog, 4. 5. 1981, Marhold, SLO. — 4. Prope vicum Hrušov, ad viam publicam non procul trivio ad praedium Kerestúr versus, 26. 4. 1985, Marhold, SAV. — 5. Prope bracchium mortuum „Tica" haud procul a vico Hrušov, 26. 4. 1985, Marhold, SAV. — 6. Situ orient. a pago Plešany, 4. 5. 1981, Marhold, SLO, 26. 4. 1985, Marhold, SAV (+). — 7. Situ bor.-occid. non procul ab oppido Kráľovský Chlmec, 3. 5. 1981, Marhold, SLO (+). — 8. In pratis uliginosis ripariis juxta alveum vetustum fluvii Latorica, ca. 1,5 km situ merid.-orient. a praedio Guttmanov dvorec dicto ad bor.-occid. ab oppido Kráľovský Chlmec versus, alt. ca. 100 m, 18. 5. 1981, Hadinec et Křísa, PRC. — 9. Prope bracchium mortuum „Tica", situ merid. a pago Zatín, 4. 5. 1981, Marhold, SLO, 25. 4. 1985, Marhold, SAV (+). — 10. Prope bracchium mortuum „Tica", prope pagum Rad, 26. 4. 1985, Marhold, SAV. — 11. Prope bracchium mortuum „Tica" inter pagos Leles et Veľký Bôľ, 18. 8. 1960, Šomšák et Zajacová, SLO. — 12. Situ occid. a pago Leles prope bracchium mortuum „Tica", 3. 5. 1981, Marhold, SLO, 24. 4. 1985, Marhold, SAV (+). — 13. Cumulus arenae mobilis (in cota 105 m), prope pagum Kapoňa, 11. 4. 1961, Májovský, SLO. — 14. In querceto ad flumen Latorica, ad cotam 105 prope pagum Báčka, 26. 4. 1964, Májovský, SLO. — 15. In silva inter flumen Latorica et pagum Poľany, 21. 5. 1959, Berta, SAV. — 16. Ca. 1 km situ bor.-occid. a ponte viae publicae trans flumen Latorica, ad bor.-bor.-orient. a pago Leles versus, 26. 4. 1985, Marhold, SAV. — 17. In pratis tempore vernali inundatis (ubi aestate pascitur) iuxta bracchium mortuum ad ripam sinistram fluvii Latorica ca. 0,5 km situ bor.-occid. a ponte viae publicae ad bor.-bor.-orient. a pago Leles versus, 21.5.1981, Hadinec et Křísa, PRC. — 18. Zemplínske Jastrabie, in alnetis, 14. 8. 1961, Berta, SAV. — 19. Prope oppidum Veľké Kapušany, ad viam publicam vergentem ad pagum Leles, 20. 5. 1982, Májovský et Murín, SLO (+). — 20. In pratis prope pagum Kapušianske Kľačany, 21. 5. 1963. Májovský, SLO. — 21. Inter pagos Stanča et Úpor, haud procul a via ferrea, 4. 5. 1985, Marhold, SAV. — 22. Inter pagos Drahňov et Budkovce, haud procul a via ferrea, 5. 5. 1985, Marhold, vide. — 23. In silva „Dolný háj" prope pagum Pavlovce nad Uhom, 7. 4. 1960, Májovský, SLO. — Situ bor.-orient. non procul a pago Pavlovce nad Uhom, 29. 4. 1981, Marhold, SLO (+). — 25. Integ pagos Jenkovce et Tašoľa, 6. 5. 1956, Májovský et Michalko, SLO. — 26. Ca. 0,25 km situ orient. a pago Svätuš, 30. 4. 1981, Marhold, SLO (+). — 27. Situ bor. non procul a pago Sejkovce, 28. 4. 1981, Marhold, SLO (+). — 28. In pratis udis inter pagos Porostov et Ostrov, 23. 4. 1964, Májovský, SLO. — 29. Prope pagum Porostov, in pratis „Veliki Blata" sub monte Vihorlat, 26. 4. 1954, Michalko, SAV. — 30. In pratis „Veliki Blata" inter oppidum Sobrance et pagum

Tibava, 26. 4. 1954, MICHALKO, SAV. — 31. Situ bor.-orient. non procul a pago Iňačovce, 29. 4. 1981, MARHOLD, SLO (+). — 32. Prope pagum Laškovce, haud procul a via ferrea, 5. 5. 1985, MARHOLD, SAV. — 33. In pratis inter pagos Porostov et Tibava, 20. 4. 1949 MICHALKO, SLO. — 34. Prope pagum Vinné, in pratis udis, 23. 4. 1954, MICHALKO, SAV. — 35. Haud procul a statione viae ferreae Nacina Ves, 5. 5. 1985, MARHOLD, SAV.

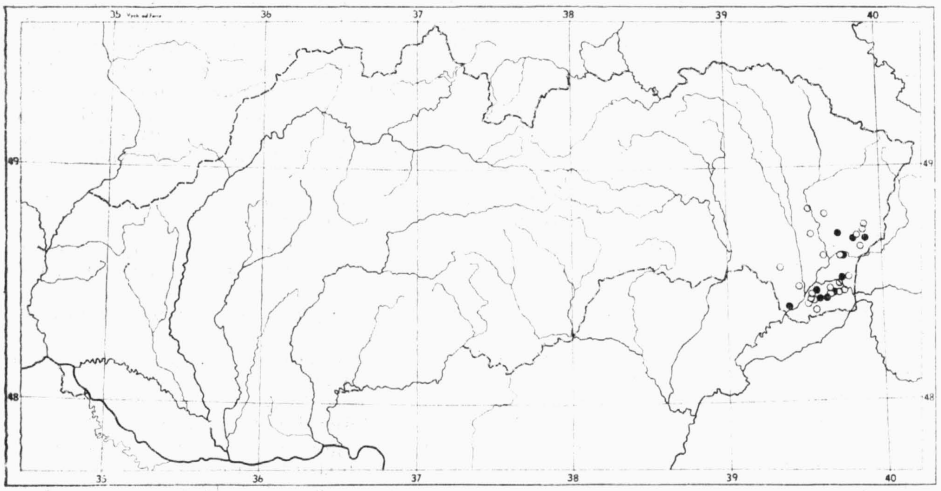

Fig. 2. — Distribution of Cardamine majovskii MARHOLD et ZÁBORSKÝ in Slovakia. ● — Populations investigated karyologically.

Perennial plant. Rhizome short, simple, rarely branched (when branched plants are densely caespitous). Stem 15 to 50 cm tall, glabrous, erect, at the base and at the upper part branched, rarely simple. Rosette leaves glabrous, during flowering time often extinct, only the majority of the youngest leaves dense, unfrequently sparsely hairy, hairs especially on rhachis invariably adpressed towards the top of the leaves. Rosette leaves pinnate, 2-14-foliolate, leaflets sessile or indistinctly petiolate, ovate, obovate or oblanceolate, terminal leaflet large, 7—19 mm broad, reniform or cuneate at the base, entire or crenate. Cauline leaves 3—14 glabrous, pinnatisect (seldom the 1-st and the 2-nd basal leaves pinnate), second lowermost leaf with 11—25 leaflets or sections, third lowermost leaf with 9—23 ones. The number of leaflets or sections diminishes gradually upwards, they are mostly entire, oblanceolate to narrowly lineate (especially at the upper part of stem). Leaflets or sections of middle and lower cauline leaves horizontally spreading, lower leaflets or sections of those leaves often slightly deflexed. Inflorescence racemose, simple or compound, (8—) 10—70 (—100) flowered. Sepals (3,0—) 3,3—4,9 mm long, petals white or with lilac veins, rarely pale lilac, obovate (8,0—) 8,5—13,0 (—15,5) mm long, (5,0—) 5,5—8,5 (—10,0) mm broad. Filaments of shorter anthers 2,2—4,7 mm long, longer ones 3,9—6,7 mm long. Average size of pollen grains from one plant ranges 31,37—34,40 μm. Siliques 0,9—1,3 (—1,4) mm broad, 18—46 mm long, peduncules 9,5—24,5 mm long. Flowering time IV.—VI.

Chromosome numbers were analysed in populations marked (+) in the list of the localities. The chromosome number is identical for all populations studied, 2n = 32.

The chromosome numbers were examined in root-tips of cultivated plants by the squash method. The root-tips were pretreated with 0,002 M aqueous solution of hydroxyquinoline for 3 hours, then fixed for 10 min to 24 hours in a freshly prepared mixture of ethanol and acetic acid (3 : 1), macerated for 5 min in mixture of hydrochloric acid and ethanol (1 : 1), washed in water, and stained with propionic orcein.

C. majovskii was found only in the Východoslovenská Nížina Lowlands, where it represents the most abundant species of the *C. pratensis* agg. The floristic composition of the plant communities with *C. majovskii* is illustrated by phytosociological relevés from the classical locality (1) and from a locality near to Zatín (2).

Relevé 1: Plot area 20 m^2, cover: E_1 = 90 %, E_0 = 0 %, pH(H_2O) = 5, 16, pH(KCl) = 4,09, $CaCO_3$ content 0,25 %, 24. 4. 1985. E_1: *Oenanthe aquatica* (L.) Poir. 3, *Typha latifolia* L. 2, *Agrostis stolonifera* L. 2, *Rorippa amphibia* (L.) Bess. 1, *Alisma plantago-aquatica* **L.** 1, *Mentha pulegium* L. +, *Cirsium arvense* (L.) Scop. +, *Ranunculus sceleratus* L. +, *Carex riparia* Curt. +, *Lycopus europaeus* L. +, *Cardamine majovskii* Marhold et Záborský +.

Relevé 2: Plot area 20 m^2, cover: E_1 = 98 %, E_0 = 0 %, pH (H_2O) = 6,60, (ph (KCl) = 5,51, $CaCO_3$ content 0,36 %, 25. 4. 1985. E_1: *Carex gracilis* Curt. 4, *Galium palustre* L. 2, *Juncus inflexus* L. 1, *Carex vulpina* L. 1, *Cardamine majovskii* Marhold et Záborský 1, *Lychnis flos-cuculi L.* +, *Trifolium hybridum* L. +, *Ranunculus repens* L. +, *Rorippa amphibia* (L.) Bess. +, *Iris pseudacorus* L. +, *Stellaria palustris* Retz. +, *Glyceria maxima* (Hartman) Holmberg +, *Mentha pulegium* L. +, *Salix* sp. +, *Myosotis laxiflora* Rchb. *r*, *Taraxacum officinale* L. r.

In some localities in the Východoslovenská Nížina Lowlands, *C. matthioli* occurs together with *C. majovskii*, but it is less abundant here. *C. pratensis* and *C. dentata* were not found in the Východoslovenská Nížina Lowlands.

Only *C. matthioli* was found in the localities inspected in 1985 near to the Bodrog River in Hungary (Olaszliszka, Erdőbényei, and Sárospatak). *C. majovskii*, however, was not present in these localities.

During press, in 1986, C. majovskii was found near Strážske (distr. Východoslovenská nížina), Modra nad Cirochou, Kamenica nad Cirochou (both distr. Vihorlatské vrchy) and near Ľubiša end Krásny Brod (both distr. Nízke Beskydy).

Acknowledgments

We are deeply indebted to Doc. Dr. J. Májovský, Bratislava, for his critical comments during our work, to Mr. A. Roubal, Kladno, for correcting the translation of the Latin description, and finally to Mrs. K. Cigánová, Bratislava, for the illustration.

SÚHRN

Z Východoslovenskej nížiny je opísaný nový druh, *Cardamine majovskii* Marhold et Záborský. Patrí do sekcie *Cardamine* a do agregátneho druhu *Cardamine pratensis*. Od druhu *Cardamine matthioli* Moretti in Comolli sa líši veľkosťou korunných lupienkov, veľkosťou peľových zŕniek a počtom chromozómov, od druhu *Cardamine pratensis* L. tvarom stonkových listov a postavením chĺpkov na najmladších listoch prízemnej ružice a od druhu *Cardamine dentata* Schultes tvarom najvyššieho stonkového listu ako aj počtom chromozómov.

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Received 15 December, 1985

S. A. Reznikova:

Citologija i fiziologija razvivajuščegosja pylnika

Izd. „Nauka", Moskva 1984, 272 str., 11 tab., 80 obr., cena 3 r 30 k.

Kniha prináša zaujímavé poznatky o procese mikrosporogenézy a gametogenézy, získané na základe komplexného štúdia všetkých etáp vývinu samčieho gemetofytu modelového objektu — peľnice ľalie — od diferenciácie mikrosporangie po vznik zrelých peľových zŕn, klíčenie peľu a rast peľových vrecúšok, a to využitím najmodernejších metód výskumu — histochemických, cytobiochemických a elektrónno-mikroskopických. Tento experimentálny prístup umožnil prehĺbiť poznanie fyziologicko-biochemických zákonitostí a zvláštností metabolických dejov uvedených procesov. Štúdiá biosyntetických procesov a ultraštruktúrne pozorovania rozširujú schému doterajších predstáv o fyziologicko-biochemickom a štrukturálnom mechanizme formovania samčieho gametofytu.

Osobitná pozornosť je venovaná formovaniu steny peľnice, vzájomnému vzťahu a špecializácii jej somatických pletív, ako i ich úlohe pri vývine samčieho gametofytu. Cenným prínosom je súhrn poznatkov o mikrosporo- a gametogenéze in vitro, ktoré sústreďujú otázky súvisiace s transplantáciou a kultiváciou izolovaných mikrosporocytov, mikrospór a zrelých peľových zrn až po indukciu androgénnych haploidov. Záverom práca analyzuje príčiny vzniku rôznych typov samčej sterility.

Publikácia je ilustrovaná tabuľkami, grafmi, prehľadnými schémami a kvalitnými mikrofotografiami (TEM). Sumarizuje svetovú odbornú literatúru z uvedenej problematiky. Poskytuje cenné informácie, ktoré významne môžu prispieť pracovníkom v oblasti rastlinnej biochémie, fyziológie a genetiky, cytológie a embryológie. Môžu byť aplikované i v genetickošľachtiteľskej praxi.

M. G. Ostrolucká