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The *Senecio doria* Group (*Asteraceae-Senecioneae*) in Central and Southeastern Europe

By

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With 8 Figures

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Summary

GRULICH V. & HODÁLOVÁ I. 1994. The *Senecio doria* group (*Asteraceae-Senecioneae*) in Central and Southeastern Europe. – *Phyton* (Horn, Austria) 34(2): 247–265, 8 figures. – English with German summary.

Four species of the *Senecio doria* group occur in the area studied: *Senecio doria* L., *S. umbrosus* W. & K., *S. macrophyllus* M. BIEB. and the new species *S. fontanicola* GRULICH & HODÁLOVÁ. This species is known only from a few localities in southern Carinthia in Austria. The chromosome number of *S. fontanicola* is $2n = 40$. The morphology and distribution of the above taxa are discussed; a key for their identification is also presented.

Zusammenfassung

GRULICH V. & HODÁLOVÁ I. 1994. Die *Senecio doria*-Gruppe (*Asteraceae-Senecioneae*) in Mittel- und Südost-Europa. – *Phyton* (Horn, Austria) 34(2): 247–265, 8 Abbildungen. – Englisch mit deutscher Zusammenfassung.

Im Untersuchungsgebiet kommen vier Arten der *Senecio doria* – Gruppe vor: *S. doria* L., *S. umbrosus* W. & K., *S. macrophyllus* M. BIEB. und die neue Art *S. fontanicola* GRULICH & HODÁLOVÁ. Diese Art ist nur von einigen Standorten im südlichen Kärnten (Österreich) bekannt. Die Chromosomenzahl von *S. fontanicola* beträgt $2n = 40$. Morphologie und Verbreitung dieser Taxa werden diskutiert; ein Bestimmungsschlüssel für die vier Arten ist ebenfalls enthalten.

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1. Introduction

The taxa of the *Senecio doria* group cover a very wide area. They are known from the western Mediterranean (Morocco, Spain, southern France, Sardinia, Sicily), from the southern and south-eastern borders of the Alps, from the Dinarid, Balcans, Pannonian Lowlands, Carpathians, and further to the east from the area around the reaches of the central Dnieper, and the Don and Volga Basins to western Siberia and Central Asia.

From this area several taxa were described as being not sufficiently distinguishable morphologically. In the taxonomic literature these taxa are classified either as subspecies of *S. doria* (CHATER & WALTERS 1976, SOÓ 1970) or, mainly in the Central European literature, as separate species (NYÁRÁDY 1964, DOSTÁL 1950, DOBROČAJEVA & al. 1987, SZAFER & al. 1988, WAGENITZ 1987). The narrow concept of the species presented in the above works is partly a consequence of the Central-European taxonomic school. The concept of microspecies can also be found in the Flora of the USSR (ŠIŠKIN 1961).

There were some problems in the taxonomic evaluation of plants from the Carinthian Alps and South-Eastern part of the Carpathians and their adjacent areas.

The aim of the present study is to analyze the variability of the studied taxa, to characterize their taxonomic position and to describe their distribution.

2. Material and Methods

The specimens from the following herbaria were studied: BP, BRA, BRNM, BRNU, GM, KRAM, LE, LW, MMI, Museum Komárno, PR, PRC, SAV, SIB, SLO, SOM, TRE, W, WNLN (abbreviations from HOLMGREN & al. 1990). The data from the literature are considered only where the identity of taxa is not in dispute. Living material of the taxa was also studied. Literature sources, referred to in the review of localities, are not included in the references where they are mentioned in the bibliography of FUTÁK & DOMIN 1960; the 'ms.' in the list means manuscript.

3. Key to the species of *Senecio doria* group in the Central and South-Eastern Europe

- 1a Plants always glabrous, ligules 5–6(7). Humid places and alluvia of lowland rivers 2
- 1b Plants usually hairy, ligules (5)6–8. Open woodland and scrub 3
- 2a Stems 50–70(–100) cm, basal leaves oblanceolate, 15–30 × 2–6 cm, involucre 6–8 mm. Flowering time VI–VII *S. fontanicola*
- 2b Stems 50–150 cm, basal leaves oblong-ovate, 15–40 × 3–10 cm, involucre 5–6 mm. Flowering time VIII–IX *S. doria*
- 3a Basal leaves oblong-ovate, 20–80 × 5–15 cm, involucre 5–7 mm, ligules 5–7. Flowering time VIII–IX *S. macrophyllus*
- 3b Basal leaves widely ovate, 15–50 × 5–15 cm, involucre 7–8 mm long, ligules 7–8. Flowering time VII–IX *S. umbrosus*

4. *Senecio doria* L.

Syst. Nat. ed. 10, 2: 1215 (1759)

This species (Fig. 1) occurs in planar and colline belts, especially in the alluvia of lowland rivers. It occurs in the Pannonian Lowlands and reaches Transsilvania and the River Dnieper along the river valleys. It grows on



Fig. 1. *Senecio doria*. – Slovakia, Podunajská nížina Lowlands, Kamenín, 11.8.1989, HODÁLOVÁ (SAV).

Fig. 2. *Senecio fontanicola*. – Austria, Carinthia, between Heiligengeist and Pogöriach, 11.7.1907, RONNIGER (W, Holotypus).

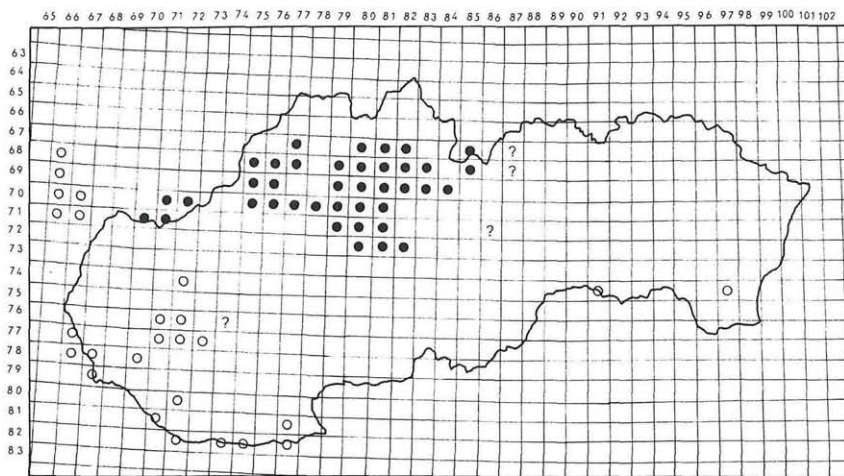


Fig. 3. The distribution of *Senecio doria* and *S. umbrosus* in Slovakia and Moravia. — ○ = *S. doria*, ● = *S. umbrosus*, ? = doubtful records.

heavy clayey soil, which is rich in minerals. *S. doria* most probably originally occurred in shrubby borders or on dry places in the alluvia. At its northernmost limit it reaches southern Moravia. Most of the existing south Moravian and some south Slovakian populations occupy secondary localities (margins of roads, around the margins of former complexes of halophyte vegetation). The Moravian localities (Fig. 3) are situated between the towns of Břeclav and Slavkov u Brna. A further, rather large, set of localities is situated on the alluvium of the River Danube and reaches of the River Morava, between the towns of Vienna and Bratislava. Other isolated localities in Austria are spread throughout the Vienna Basin and in the area of Seewinkel. The occurrence of this species continues sporadically in Slovakia and northern Hungary, namely in the Danube Basin and the adjacent basins of the rivers Váh and Hron. Rather large number of localities occurs as far as the city of Budapest and around the lakes of Balaton and Velencei-tó. Its presence in northeastern Hungary is not documented by the herbarium specimens. However, this species occurs in the adjacent area of eastern Slovakia (around the town of Turňa nad Bodvou) and perhaps it grows in the Východoslovenská nížina Lowlands. We suppose that this species is more widespread in Hungary than is stated above; however, there are no herbarium data documenting this fact. It seems probable that some data published by Soó 1970, namely from southern Hungarian lowlands, really belong to this species. Interpretation of other data of *S. doria* from this publication as well as from other literature is problematic without the possibility to study voucher herbarium

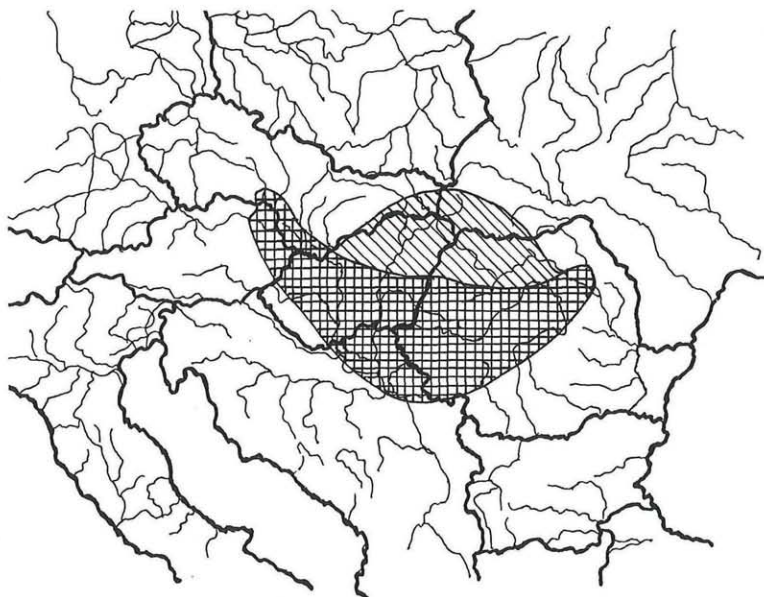


Fig. 4. The distribution of *Senecio doria* in Europe. – Simple hatched area: not verified by herbarium specimens.

specimens. *S. doria* also grows in the northeastern part of Serbia. Further localities are known in Romania, namely from the basin of the River Mureş, where it reaches as far as Transsilvania, and further on from the Cîmpia Romîna Lowland. It reaches the Ukraine in the east, where it also grows in the environs of larger rivers, like the Dniester and its tributaries (Fig. 4).

Specimina visa and other records: Serbia: Beograd (Bornmüller s.d. SIB). – Hungary: Győr (POLGÁR 1918 BP). – Tát (BOROS 1922 BP). – Göd (JÁVORKA & CSAPODY 1958 BP). – Horány (BOROS 1925 BP). – Budapest (KOVÁTS s.d. W; SZÉPLIGETI 1877 SIB). – Budapest, Margit-sziget (KERNER s. d. W). – Budapest, Komaraerdő (DEGEN 1917, 1926 BP; VAJDA 1933 BP; LEHEL 1946 BP; PÉNZES 1948 BP). – Budapest, Erszébetfalva (LENGYEL 1908 BP; KOCSIS 1909 BP). – Felsődabas (BOROS 1932 BP). – Soroksár (LENGYEL 1912 BP). – Isaszeg – Pécel (BOROS 1921 BP). – Szigetújfalu (TAUSCHER 1870 W, 1871 SIB, 1873 LW). – Szigetszentmárton – Szigetcsép (BOROS 1917 BP; DEGEN 1917 BP). – Ráckeve (JÁVORKA & CSAPODY 1952 BP). – Tápiógyörgye (PÉNCES 1947 BP). – Dinnyés – Pákozdi (KÁROLI 1953 BP). – Dinnyés (SCHNEIDER 1906 W; KÁROLI 1953 BP). – Kecskemét (LENGYEL 1926 BP). – Balatonaliga (BOROS 1922 BP). – Austria: Wien (WOLOSZCZAK s. d. SIB). – Wien, Stadlau (KORB 1911 W). – Wien – Aspern

(WOLOSZCZAK s. d. SIB, W; KAHL 1820 W; TSCHERNING 1896 W; SCHNEIDER 1920 W). – Gross-Enzersdorf (HALÁCSY 1871 W). – Gross-Enzersdorf – Lobau (KORB 1921 W). – Lobau (WITTMER 1933 W). – Schlosshof (KORB 1918 W). – Markthof (METLESICS 1956 WNLM). – The right side of the river Danube, against the ruine Devín (ZERNY 1917 W). – Hainburg (MÜRLE 1868 W; MATZ 1856 W; KORB 1907, 1911 W; RECHINGER 1924 W). – Hainburg-Deutsch Altenburg (MÜRLE 1866 W, 1866 LW; MÜLLNER 1879 W; KAHL 1903 W; SCHNEIDER 1903 W). – Deutsch Altenburg (MÜRLE 1866 W; MATZ 1867 W). – Pottendorf (ZERNY 1916 W). – Andau (METLESCIS 1962 WNLM). – Donau (HELM s. d. W), unmapped date. – Moravia: Dyjsko-svratecký úval Lowlands: Jevišovka (WEBER 1923 PR). – Drnholec – Nová Ves (REISEK in OBORNY 1886 :68). – Novosedly (WEBER 1923 PR). – Hustopeče – Starovičky (WEBER 1923 PR). – Nosislav (HEGI 1928 :755). – Zaječí – Šakvice (TEUBER 1899 BRNM; WEBER 1924 PR, 1934 BRNM; GRULICH 1984 MMI). – Zaječí – Rakvice (WEBER 1924 PR). – Rakvice, Trkmanský dvůr (BÍLÝ 1922 BRNM; WEBER 1933, 1935 PR, 1947 BRNM; GRULICH 1984 MMI). – Krumvř – Terezín (ČERNOCH 1959 PR; DVOŘÁK 1950 BRNM; VICHEREK 1960 BRNM). – Brumovice (HEGI 1928: 755). – Kobylí (FORMÁNEK 1883 BRNM). – Brumovice – Kobylí (WEBER 1926 PR). – Kobylí – Vrbice (WEBER 1925 PR). – Podivín (WEBER 1925 PR). – Hustopečská pahorkatina Mts.: Vyškov (DOSTÁL 1950: 1631). – Holubice (WEBER 1933 PR). – Slavkov (DOSTÁL l.c.). – Křenovice (WEBER 1933 PR; ŠOUREK 1942 PR; GRULICH 1986 MMI). – Hustopeče (FORMÁNEK 1883 W; s. coll. 1889 PR; TEUBER 1899 W; BÍLÝ 1919 PR). – Hustopeče N (ROTHER 1894 BRNU; THENIUS 1918 BRNU; BÍLÝ 1921 PR, BRNM; GRULICH 1980 MMI). – Hustopeče SW (SHIRL 1896 BRNM; LAUS 1904 BRNM, 1906 BRNM; VICHEREK 1970 BRNU). – Hustopeče – Popice (WEBER 1923 PR). – Klobouky (SHIRL 1869 BRNU; WEBER 1932 PR). – Kašnice – Krumvř (WEBER 1926 PR). – Krumvř, damp meadow (HRABĚTOVÁ 1954 BRNM; FORMÁNEK s. d. BRNM). – Karlín (WEBER 1933 PR). – Čejč (MAKOWSKY 1857 W; WILDT 1898 BRNM; HRUBY 1923 BRNM). – Mutěnice W (GRULICH 1984 MMI). – Slovakia: Podunajská nížina Lowlands: Bratislava (REUSS 1853: 238; SCHNELLER s. d. PR, 1854, 1856, 1858 BRA; KITAIBEL in KANITZ 1863c: 393; DVOŘÁK 1870 BRNM; HOLUBY 1888b: 59; PANTOCSEK 1907: 238). – Bratislava, Pečenské rameno Arm (LUMNITZER 1791: 375; ENDLICHER 1830: 310; SCHNELLER 1875 W; SABRANSKY 1883 W). – Bratislava, Kapitulské pole (DICHTL in WIESBAUER 1871a: 24). – Bratislava, Petržalka (WIESBAUER 1864 W, 1871a: 24; SCHNELLER s. d. ms.). – Bratislava, Kopčianska cesta (DICHTL in WIESBAUER 1871a: 24). – Bratislava, Petržalka, Hrabiny (ENDLICHER l. c.). – Bratislava, Starý háj (DICHTL in WIESBAUER 1871a: 24). – Bratislava, Ovsíšte (SCHNELLER s. d. PR). – Zlaté Klasy (FEICHTINGER 1864: 274). – Pusté úiany (SCHNELLER s. d. ms; WIESBAUER 1871a: 24). – Topoľovec, levee of the Danube River (DVOŘÁK 1979 BRA). – Topoľníky, levee of the Malý Dunaj River, near the settlement Lapagoš (SVOBODOVÁ 1966: 185). – Trnava (KRZISCH 1856a: 67). – Majcichov. –

Opoj. – Vlčkovce. – Piešťany. – Drahovce (all KRZSICH 1857: 66). – Jalšové (WEBER 1925 BRA). – Dvorníky, “Rigohegy” (HOLUBY 1859c: 75). – Galanta NE, the Váh River (HRUBY 1942: 108). – Sládečkovce W, the settlement Mešterik (WEBER 1928 PR, 1933, 1935 BRA). – Komárno, the left side of the Malý Dunaj River (FUTÁK 1942 SAV, 1962: 47). – Komárno – Iža (SVOBODOVÁ 1991: 53). – Čenkov (A. KERNER 1871: 202). – Mužla-Čenkov (SVOBODOVÁ 1989: 21) – Mužla – Obid (WEBER 1927 PR). – Obid (BOROS 1918 BP; WEBER 1933 BRA). – Kamenný Most (SVOBODOVÁ 1989 : 21). – Svodín, the settlement Tamás (KLOKNER 1976 Museum Komárno). – Slovenský kras Karst: Zádiel. – Turnianske Podhradie (both LENGYEL 1907a: 172; THAISZ 1909 PR). Drieňovec (DOMIN 1939a: 20; HOLUB 1953: 362). – V'ychodoslovenská nížina Lowlands: Oborín (BOGOLY in litt. 1987). – Ukraine: Ol'gopil' (ROGOVITCH 1853 W). – Balta (ROGOVITCH 1857 W). – Romania: Arad (SIMONKAI 1884 W). – Hunedoara (POP 1951, 1957 SIB). – Blaj (POP 1922 SIB, W). – Luduș (NYÁRÁDY 1906, 1908 SIB) – Bazna (KAYSER 1845 SIB). – Loamneș (HODÁLOVÁ 1992 SAV). – Șura Mare (BARTH 1870 SIB; FUSS 1879 SIB). – Verșești (BARABAS 1973 KRAM). – Gușterița (KAYSER 1845 W, s. d. SIB; SCHUR s. d. W; FUSS 1877 W). – Sibiu, Noul (FUSS s. d. SIB, W). – Orăștie (UNVERRICHT s. d. SIB). – Coșereni (GRINȚESCU 1923 SIB, W).

5. *Senecio umbrosus* W. & K.

Pl. Rar. Hung. 3: 232, t. 210 (1882)

This species (Fig. 5) is described from the surroundings of the town of Lúčky at the foot of the Chočské vrchy Mts., where it still occurs abundantly. It seems that the species represents Illyrian geoelement, it spread from that territory north into Austria, Slovakia and Moravia as well as in an eastward direction to Bulgaria and the South Carpathians. It grows in xerothermic and subxerothermic grass-herb communities on limestones or lime sandstones. In Slovakia (Fig. 3) it is spread insularly in the area stretching from the limestone cliffs of the Váh Basin and the Strážovské vrchy Mts. to the foot of Mt. Sivý vrch and the cliff of the valley of the River Orava. Locally it is rich in its occurrence, e. g. in the western part of the Strážovské vrchy Mts., in the Veľká Fatra Mts. and adjacent parts of the Nízke Tatry Mts., and at the foot of the Chočské vrchy Mts. It is surprisingly rare in other places, e.g. Malá Fatra Mts. It has been secondarily transported to the foot of the Vysoké Tatry Mts. (Podbanské – Štrbské pleso) and probably also to Poland (Dolina Chochołowska Valley). In Moravia it grows in the northwestern part of the Bíle Karpaty Mts. mainly around the towns of Rádějov and Horní Němčí. It has surprising gaps in its occurrence here too, it is missing for instance around the town of Velká nad Veličkou and it clearly does not reach the adjacent Slovak side. In Austria it is bound mainly to the northeastern limestone rim of the Alps (the river

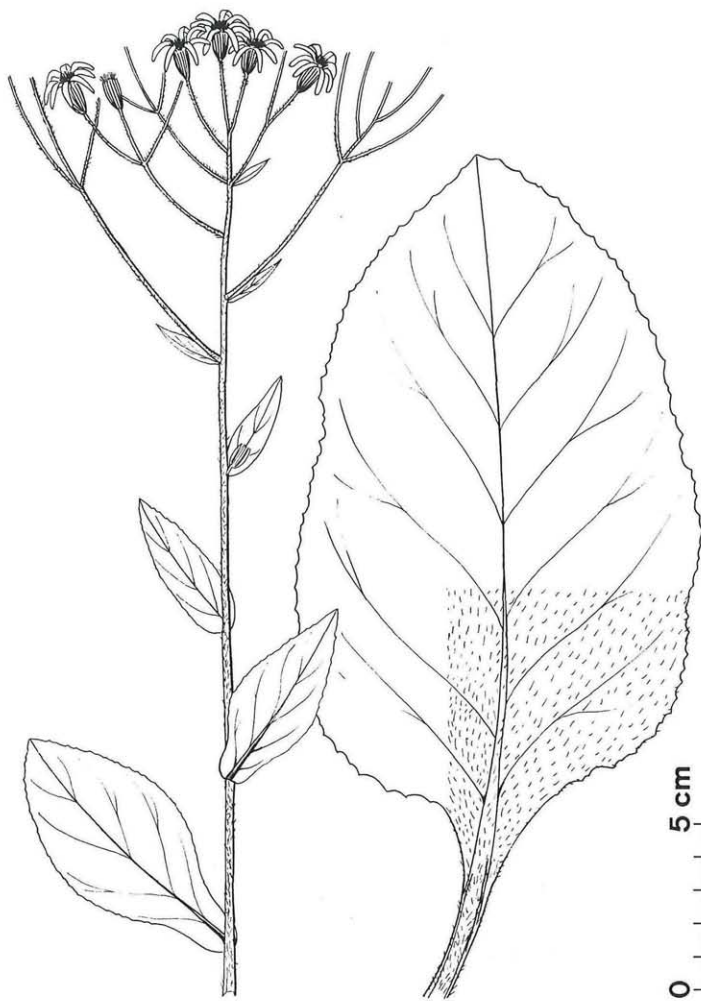


Fig. 5. *Senecio umbrosus*. – Slovakia, Veľká Fatra Mts., Ružomberok, part Hrabovo, 16.8.1992, HODÁLOVÁ & MATISOVÁ (SAV).

basins of Triesting and Piesting; dot map in ZIMMERMANN 1992: 94, 185) from where it has also been secondarily washed away to the moors of the Vienna Basin. Other isolated localities are situated in the central Hungarian mountains (Tata, Tapolca). In the territory of the former Yugoslavia several isolated localities are evidently to be found. We have seen herbarium specimens from mountains to the Northeast of Zagreb (Croatia) and from Bosnia, it probably grows in Serbia, too (DOMAC 1950: 399). Further,

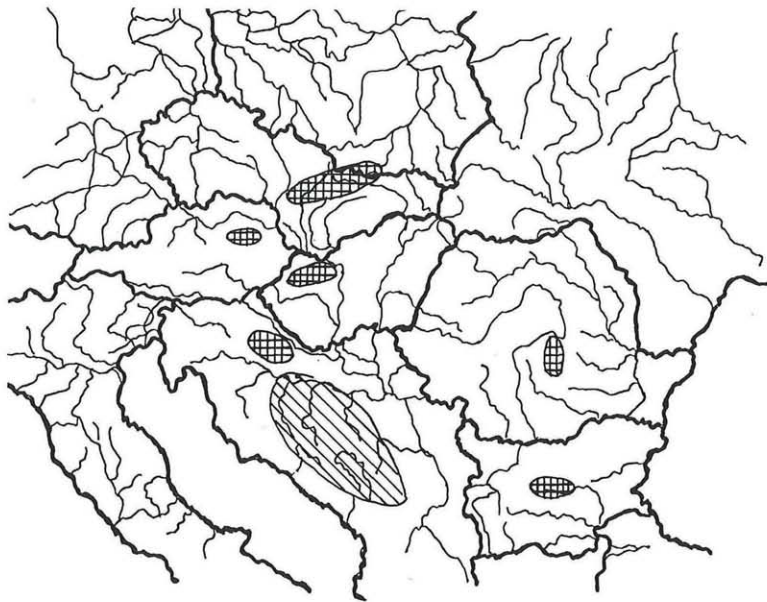


Fig. 6. The distribution of *Senecio umbrosus* in Europe. – Simple hatched area: not verified by herbarium specimens.

S. umbrosus is documented from Bulgaria, from the central parts of the Stara Planina Mts. In the Romanian Carpathians it probably occurs solely in the Bucegi Mts. Thus the area of *S. umbrosus* is insular and in the main it skirts the Panonská nížina Lowlands from the North, West and South (Fig. 6).

There exists some more data from Slovakia the authenticity of which is not altogether apparent. This includes data in the literature from around the towns of Kremnica, Spišská Nová Ves and the Belianské Tatry Mts., undocumented by herbarium specimens. There also exists a specimen labeled as collected at Mt. Lomnický Štít (DOMIN 1919 PRC), though it is suspected that a mistake was made in the arrangement of the herbarium material. Similar cases of mistakes in DOMIN's data relating to other species were also registered (KIRSCHNEROVÁ 1986). Findings from all the localities mentioned have not been repeated by anybody else; moreover, in most cases, the ecological conditions at these localities are not suitable.

Specimina visa and other records: Croatia: Varaždinske Toplice (VUKOTINVIČ 1853 W, s. d. LW). – Sused (VUKOTINVIČ s. d. W). – Podsused (VUKOTINVIČ 1833 W; SCHLOSSER s. d. W). – Croatia, central part (VUKOTINVIČ 1889 W, unmapped date. – Bosnia and Herzegovina: Sarajevo (SCHLOSSER s. d. W). – Hungary: Tata (BOROS 1925 BP; CSAPODY & JÁVORKA 1932 BP). – Tapolca (JÁVORKA 1949 BP). – Hun-

gary (LANG s. d. LW), unmapped date. – Austria: Moosbrunn (WITTING 1848 WNLN; REUSS 1864 W; s. coll. 1877 W, LW, BRAUN 1878, 1880 W; MÜLLNER 1878, 1885 W; OSTERMEYER 1880 WNLN; s. coll. 1880 WNLN; WOLOSZCZAK 1883 W; EICHENFELD 1889 W; s. coll. 1880 W; SCHNEIDER 1903 W; ROTHE 1925 BRNU; THENIUS 1926 BRNU). – Weissenbach (JURATSKA 1859 W; KHEK 1892 W; THEIL 1909 W). – Pottenstein (KHEK 1892 W; TSCHERNING 1896 W; KORB 1907 W; RONNIGER 1907 W; NEUMANN 1960 W). – Pottenstein – Berndorf (NEUMANN 1960 W). – Pernitz (NIESSL s. d. BRNU; MÜLLNER 1897 W; RONNIGER 1921 W). – Pernitz, Hohe Mandling (RONNIGER 1921 W; POLATSCHKE 1971 W). – Gutenstein (TKANY 1842 BRNU). – Moravia: Bílé Karpaty stepní Mts.: Radějov (NEVOLE 1948 BRNM; KUBÁT 1949 PR). – Radějov, Radějovské údolí Valley (SILLINGER 1927 PRC; DEYL 1958 PR). – Radějov, Dolný Mlýn (PODPĚRA 1929 BRNU). – Tvarožná Lhota, foresters house Jiříkovec, the stream Járkovec (WEBER 1934 W; ČOUKA 1906 BRNU; STANĚK 1924 BRNU; PODPĚRA 1929 BRNU; PODPĚRA & LAUS 1929 PR, BRNM, LW; DOSTÁL 1942 PRC). – Šumárník (ŠOUREK 1943 PR). – Kněždub (s. coll. s. d. PR). Tvarožná Lhota, Nature reserve Čertoryje E (WEBER 1927 PR; GRULICH 1982 MMI). – Blatnice-Hluk (STANĚK 1922 BRNU). – Blatnička, Jasenová (SILLINGER 1929a: 9). – Boršice (WEBER 1934 PRC). – Horní Němčí, Nature reserve Drahy (ELSNEROVÁ 1942 GM; GRULICH 1985 MMI). – Korytná, Prašnice (STANĚK 1923 BRNU). – Nivnice, in the valley Čupák (PODPĚRA 1933 BRNU). – Suchá Loz, the stream Hradecká (STANĚK 1924 BRNU). Bílé Karpaty lesní Mts.: Radějov, Mandátske údolí Valley (STANĚK 1924 BRNU; WEBER 1926 PR; SILLINGER 1927 PRC; PODPĚRA 1929 BRNU; SOJÁK 1955 PR). – Tvarožná Lhota, Vojšické Louky (STANĚK 1924 BRNU). – Malá Vrbka, Mt. Výzkum (STANĚK 1924 BRNU). – Javorník, the foot of Mt. Machovych (STANĚK 1924 BRNU). – Korytná, Kadlečková (STANĚK 1923, 1924 BRNU). – Suchá Loz, Mt. Studený vrch N (STANĚK 1924 BRNU). – Březová, Mt. Doubrava (STANĚK 1924 BRNU). – Suchov (WEBER 1935 PR). – Nivnice (WEBER 1927 PR). – Slovakia: Strážovské a Súľovské vrchy Mts.: often. – Poľana Mts.: Zvolen (KITAIBEL in KANTZ 1863c: 393: 393; JÁVORKA 1924-25: 1143). – Zvolen, Zvolenská dolina Valley (JÁVORKA 1910a: 163). Banská Bystrica, Mt. Urpín (V. NÁBĚLEK s. d. SAV). – Banská Bystrica, foot of Mt. Vartovka (KMONÍČEK in FUTÁK 1943: 98). Lučanská Malá Fatra Mts.: Vrčisko, Mt. Studenec (WAGNER 1901a: 35; MARGITAI 1908 PR). – Kláštor pod Znievom (FUTÁK 1964 ms.). – Strečno (KRZSICH 1861a: 116; NEILREICH 1866: 119; MÁJOVSKÝ & MICHALCO 1950 SLO; DOSTÁL 1954 PR). – Vrútky (PTAČOVSKÝ s. d. ms.). – Krivánska Malá Fatra Mts.: Mt. Malý Kriváň (WAHLENBERG 1814: 267; REUSS 1853: 239; NEILREICH 1866: 119; ROCHEL sec. SAGORSKI & SCHNEIDER 1891: 240). – Mt. Chleb (ZÁBORSKÝ 1958 SLO). – Mt. Poludňový grúň (KUBÁT 1981: 357). – Štefanová, Mt. Podžiar (ŠACHL 1972: 808). – Stoh, on the bangs of the Stohový potok Stream (DVOŘÁK 1964 BRNU). – Mt. Veľký Rozsutec, Kreminná dolina Valley (ŠACHL l. c.; KUBÁT l. c.). – Mt. Malý Rozsutec (KUBÁT l. c.). – Zázrivá, the settlement Biela (KLÁŠTERSKÝ & MĚSÍČEK 1959 PR; ŠACHL l. c.). – Zázrivá, Mt. Čapica E (SOJÁK 1950 PR). – Sučany, Sučianská dolina Valley, the settlement Jarolín (ŠACHL 1970: 495). – Párnica (NEILREICH 1866: 119). – Párnica, the stream Zázrivka (VITTKAY in SZONTAGH 1863: 1066). – Veľká Fatra Mts.: often. – Chočské vrchy Mts.: often. – Nízke Tatry Mts.: Liptovský Mikuláš – Kráľova Lehota (FUTÁK 1957 SAV). – Liptovský Hrádok (FUTÁK 1957 ms.). – Ludrová, Mt. Salatín (TRAPL 1930: 119). – Liptovská Lužná, Červená Magura (SILLINGER s. d. ms.). – Liptovská Osada, Mt. Ždiar (SILLINGER s. d. ms., LENGVEL 1913 BP; ŠMARD 1934 BRNU). – Liptovská Osada – Liptovská Lužná (ŠMARD 1934 BRNU). – Liptovská Osada – Korytnica (PODHAJSKÝ 1924 BRNU; LENGVEL 1930 BP). – Korytnica (REHMAN s. d. LW);

WEBER 1934 PRC). – Podkonice, Mt. Vysoká NE. – Moštenica. – Moštenica, Mt. Vlačuhovo SW, NW. – Moštenica, the stream Uhliarsky potok N. – Moštenica, valley Šponga. – Kyslá. – Kyslá, Kozí Chrbát SW (all PROCHÁZKA & KRAHULEC 1982: 182). – Medzibrod. – Dolina do Tajchu (probably Sopotnická dolina Valley) (FUTÁK 1943: 98). – Dúbrava, Krížska dolina Valley (MARHOLD & ZAHRADNÍKOVÁ 1985 SAV). – Demänová (WAGNER 1826 BP). – Ľanovo, Mt. Poludnica (FUTÁK 1942 SLO). Vysoké Tatry Mts.: Podbanské – Štrbské pleso (secondary occurrence, along the roads) (PASTYRIK & MAJOVSKÝ 1941 SLO). – Mt. Lomnický štít, at the foot (DOMIN 1919 PR), doubtful record. – Belianske Tatry Mts.: Javorina, valley Zadné Meďodoly (GREGORZEK & BERDAU sec. SAGORSKI & SCHNEIDER 1891: 240). – Javorina (JÁVORKA 1924–1925a: 1143), no voucher specimen, doubtful record. – Liptovská kotlina Basin: Ružomberok, Mt. Mních (FUTÁK 1958 SAV, 1971 ms.; Vraný 1899 PRC). – Likavka (LENGYEL 1913 BP, 1915a: 23). – Spišské kotliny Basins: stream Brusník. – stream Levočský potok (both GRESCHIK 1929: 313), no voucher specimens, doubtful records. – Biele Karpaty Mts.: Lednické Rovné (cult. HOLUBY 1888b: 59; BRANCSIK 1901b: 123). – Straženic, the settlement Keblie (FAJMONOVÁ 1972 ms.). – Straženie (HAJNÁ 1932 PRC). – Javorníky Mts.: Púchov, Mt. Ostre nec. – Nimnica, Mt. Stohovec. – Ihršte, Mt. Trstená (all FAJMONOVÁ l. c.). – Udiča, Mt. Klapy (FUTÁK 1962 ms.). – Západné Beskydy Mts.: Dolný Kubín, Mt. Kuzminovo (CHRTEK & KRÍSA 1971: 416). – Dolný Kubín (FRITZE & ILSE 1870: 525). – Dolný Kubín, Mt. Predný Krnáč (CHRTEK & KRÍSA l. c.). – Dolný Kubín – Kňažia (FUTÁK 1964 ms.). – Mokrač, stream Jelšava (SAGORSKI & SCHNEIDER 1891: 240; HLAVAČEK 1954 SAV; GREBENŠČIKOV & al. 1956: 73). – Kňažia (FUTÁK 1959 ms.). – Kňažia – Široká (FUTÁK 1957 SAV, 1963 ms.). – Oravský Podzámok (REUSS 1853: 239; KRZISCH 1861a: 116; SZONTAGH 1862b: 288; NEILREICH 1866: 119; KOTULA 1882 W; JÁVORKA 1911 BP, BRNU; HRABĚTOVÁ 1950 BRNU; VITTKAY sec. GREBENŠČIKOV & al. l. c.). – Pucov, valley of the stream Pucov – Pribiš, the valley of the stream Pribiš (both CHRTEK & KRÍSA l. c.). – Horná Lehota – Sedliacka Dubová (FUTÁK 1957 ms.). – Sedliacka Dubová (both FUTÁK 1964 ms.). – Podbiel, Mt. Biela skala (KRZISCH 1860: 160; NEILREICH 1866: 119; FUTÁK 1957 SAV). – Orava (WIERBITZKY 1840 W; ROCHEL s. d. W), unmapped date. – Poland: Dolina Chochołowska Valley, Głebowiec Valley (MIREK & MÍRKOVÁ 1989, photo seen). – Romania: Braşov (SIMONKAI 1884 BP). – Predeal (SCHUR s. d.). – Sinaia (LOITLESBERGER 1897 W; WOŁOSZCZAK 1908 W). – Bulgaria: Loveč (s. coll. s. d. SOM). – Trojan (s. coll. s. d. SOM). – Trojanska Planina (URUMOV 1939 SOM). – Kazanlák (NEJČEV 1900 SOM; JURKOVSKI 1933 SOM).

6. *Senecio macrophyllus* M. BIEB.

Fl. Taur. Cauc. 2: 308 (1808)

The nomenclature of this taxon is very complicated and it is mainly a consequence of the atomizing concept adopted in the Floras of the former Soviet Union (ŠÍŠKIN 1961). It follows from the study of the photograph of the BIEBERSTEIN's type material, deposited in the herbarium of the St. Petersburg Institute of Botany of the Russian Academy of Sciences (LE), that the name *S. macrophyllus* can be applied to the studied populations in the western Ukraine (Fig. 7) as well as to the plants documented by herbarium

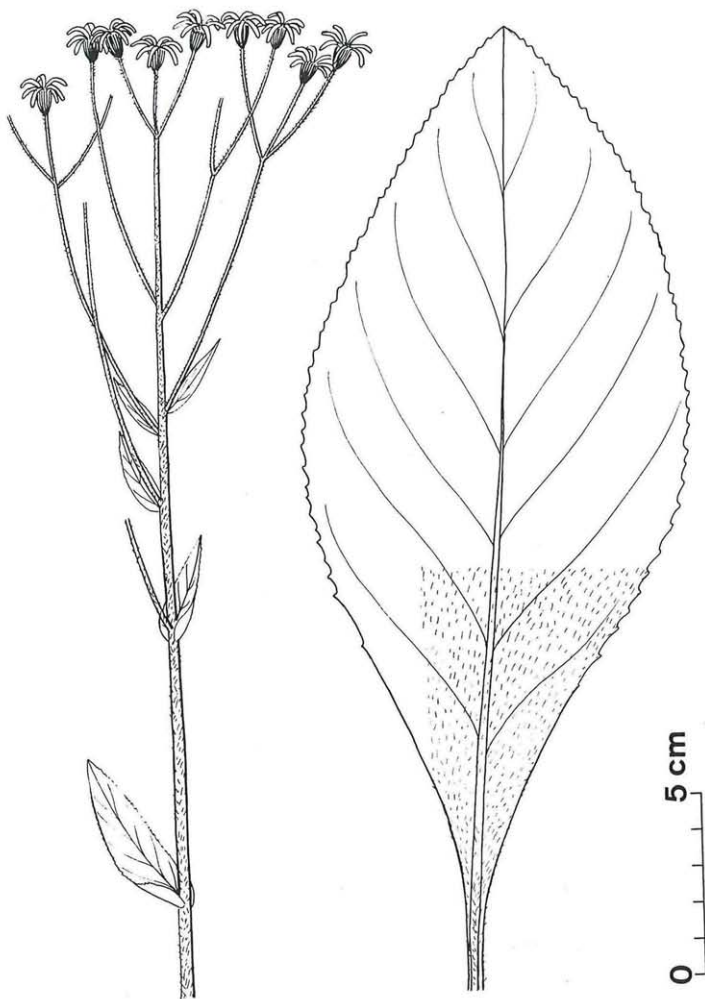


Fig. 7. *Senecio macrophyllus*. – Ukraine, Podolje, Mt. Lysa gora, 5.8.1990, HODÁLOVÁ & KAGALO (SAV).

items from Romania and Poland. From the Ukraine the name *S. schvetzovii* is introduced by some authors (DOBROČAJEVA & al. 1987). This taxon was described from Baškir (Davlekanovo) by KORŠINSKI (KORŠ. in Fl. Yugo-Vost. Evr. Čast. SSSR, 6: 370, 1936). As we had no opportunity to see the type specimen of *S. schvetzovii* the question as to whether it really is a synonym of *S. macrophyllus* remains unresolved. In the area studied *S. macrophyllus* occurs in Poland and the Ukraine (Fig. 8), growing on dry

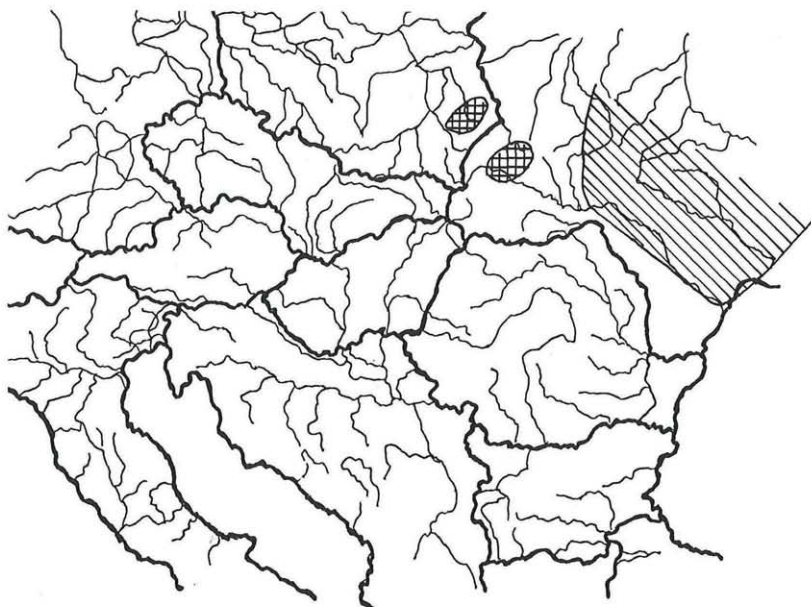


Fig. 8. The distribution of *Senecio macrophyllus* in Southeastern Europe. – Simple hatched area: not verified by herbarium specimens.

places. To date, we have seen a specimen from only one locality in Poland, near Chełma. However, in the literature there are also data which come from around the town of Tomaszów Lubelski. This species certainly grows in the western Ukraine around L'viv and in the basin of the River Dniester.

It grows in localities around L'viv together with species that are documented by the two following relevés:

Oblast' L'vivs'ka, Rajon Zoločivs'ky, Podolje, Mt. Lysa gora, exp. NE, elevation 15°, relevé area 40 m², coverage E₁: 100% (HODÁLOVÁ & KAGALO 1989).

<i>Carex montana</i> L.	3	<i>Acinos arvensis</i> (LAM.) DANDY	+
<i>Carex flacca</i> SCHREB.	2a	<i>Agrimonia eupatoria</i> L.	+
<i>Carex humilis</i> LEYS.	2a	<i>Allium montanum</i> F. W. SCHMIDT	+
<i>Gymnadenia conopsea</i> (L.) R. BR.	2a	<i>Anemone sylvestris</i> L.	+
<i>Inula ensifolia</i> L.	2a	<i>Anthemis tinctoria</i> L.	+
<i>Melampyrum arvense</i> L.	2a	<i>Asperula cynanchica</i> L.	+
<i>Brachypodium pinnatum</i> (L.) PB.	2b	<i>Aster amellus</i> L.	+
<i>Briza media</i> L.	1	<i>Bupleurum falcatum</i> L.	+
<i>Carex michelii</i> HOST	1	<i>Campanula glomerata</i> L. s. l.	+
<i>Inula hirta</i> L.	1	<i>Campanula sibirica</i> L.	+
<i>Lembotropis nigricans</i> (L.) GRISEB.	1	<i>Carlina biebersteinii</i> BERNH.	
<i>Linum catharticum</i> L.	1	ex HORNEM.	+

<i>Carlina onopordifolia</i> BESS.		<i>Pimpinella saxifraga</i> L.	+
ex SZAF, KULCZ. & PAWE.	+	<i>Plantago lanceolata</i> L.	+
<i>Coronilla coronata</i> L.	+	<i>Plantago stepposa</i> KUPRIAN.	+
<i>Euphorbia angulata</i> JACQ.	+	<i>Prunella grandiflora</i> (L.) SCHOLLER	+
<i>Euphorbia cyparissias</i> L.	+	<i>Ranunculus polyanthemus</i> L.	+
<i>Galium verum</i> L.	+	<i>Ranunculus repens</i> L.	+
<i>Gentiana cruciata</i> L.	+	<i>Salvia dumetorum</i> ANDRZ.	+
<i>Geranium sanguineum</i> L.	+	<i>Sanguisorba officinalis</i> L.	+
<i>Knautia arvensis</i> (L.) COULT.	+	<i>Scabiosa ochroleuca</i> L.	+
<i>Linum flavum</i> L.	+	<i>Solidago virgaurea</i> L.	+
<i>Lotus corniculatus</i> L.	+	<i>Stachys recta</i> L.	+
<i>Onobrychis arenaria</i> DC.	+	<i>Succisa pratensis</i> L.	+
<i>Orchis militaris</i> L.	+	<i>Teucrium chamaedrys</i> L.	+
<i>Origanum vulgare</i> L.	+	<i>Thesium linophyllum</i> L.	+
<i>Peucedanum alsaticum</i> L.	+		

Oblast' L'viv'ka, Rajon Zoločiv's'ky, Podlesje, Mt. Biela gora, exp. NE, elevation 5°, relevé area 20 m², coverage E₂: 30%, E₁: 100% (HODALOVÁ & KAGALO 1989)

E ₂ : <i>Fraginus excelsior</i> L.	2	<i>Eryngium planum</i> L.	+
<i>Prunus spinosa</i> L.	1	<i>Epipactis helleborine</i> (L.) CR.	+
<i>Acer pseudoplatanus</i> L.	+	<i>Euphorbia cyparissias</i> L.	+
<i>Cornus sanguinea</i> L.	+	<i>Galium aparine</i> L.	+
<i>Frangula alnus</i> MILL.	+	<i>Hypericum perforatum</i> L.	+
<i>Sambucus nigra</i> L.	+	<i>Knautia arvensis</i> (L.) COULT.	+
E ₁ : <i>Arrhenatherum elatius</i> (L.) J. & K. PRESL.		<i>Lembotropis nigricans</i> (L.) GRISEB.	+
<i>Briza media</i> L.	2a	<i>Leontodon hispidus</i> L.	+
<i>Festuca pratensis</i> HUDS.	3	<i>Lotus corniculatus</i> L.	+
<i>Dactylis glomerata</i> L.	2a	<i>Lysimachia nummularia</i> L.	+
<i>Astragalus glycyphyllos</i> L.	1	<i>Medicago falcata</i> L.	+
<i>Glechoma hederacea</i> L.	1	<i>Pimpinella major</i> (L.) HUDS.	+
<i>Origanum vulgare</i> L.	1	<i>Plantago lanceolata</i> L.	+
<i>Agrimonia eupatoria</i> L.	+	<i>Primula veris</i> L.	+
<i>Anthemis tinctoria</i> L.	+	<i>Ranunculus polyanthemus</i> L.	+
<i>Asarum europaeum</i> L.	+	<i>Ranunculus repens</i> L.	+
<i>Bupleurum falcatum</i> L.	+	<i>Salvia dumetorum</i> ANDRZ.	+
<i>Campanula trachelium</i> L.	+	<i>Salvia verticillata</i> L.	+
<i>Carlina biebersteinii</i> BERNH.		<i>Solidago virgaurea</i> L.	+
ex HORNEM.	+	<i>Teucrium chamaedrys</i> L.	+
<i>Centaurea scabiosa</i> L.	+	<i>Trifolium repens</i> L.	+
<i>Cichorium intybus</i> L.	+	<i>Veronica chamaedrys</i> L.	+
<i>Convolvulus arvensis</i> L.	+	<i>Vicia cracca</i> L.	+

Specimina visa and other records: Poland: Chełm, Nature reserve Brzeźno (FJAŁKOWSKI ex KARCZMARZ & SAŁATA 1984: 40; FJAŁKOWSKI 1989: 2; SZELAG 1989 SAV). – Tomaszów Lubelski, Mt. Biała Góra (KARCZMARZ & SAŁATA 1984: 39). – Ukraine: L'viv, Mt. Chomiets (s. coll 1896 LW; WOŁOSZCZAK 1891 W; BLOCKI 1906 LW). – Bil'če (s. coll s. d. LW; s. coll 1877 W; TURCZYŃSKI 1877 KRAM; WOŁOSZCZAK

1891 KRAM; BLOCKI s.d. KRAM, LW, W, 1897 LW). – Mt. Lysá gora (BUHALO 1956 LW; ZELENCHUK 1980 LW; KAGALO 1983 LW; VOLGIN & KARDASH 1984 LW; HODÁLOVÁ & KAGALO LW, SAV). – Mt. Biela gora (ZAGUL'SKIJ 1985 LW; HODÁLOVÁ & KAGALO 1989 LW, SAV). – Brody (KLOEBER 1855 KRAM). – Mylivci (SLENDZIŃSKI 1877 KRAM). – Mel'nica Podil's'ka (SLENDZIŃSKI 1876 KRAM). – Lankivci (SLENDZIŃSKI 1879 KRAM).

7. *Senecio fontanicola* GRULICH & HODÁLOVÁ, spec. nova

Plantae perennes, glaberrimae. Rhizoma brevis, crassa, verticalis. Caules floriferi erecti, crassi, 50–70 (–100) cm alti, regulariter foliiferi. Folia caulina firma, caesia, supremi diminuta, inferiora oblanceolata, in petiolum brevem angustata, 15–30 cm longa, 2–6 cm lata, ad apicem obtusa vel acuta, integerrima vel distantissime dentata. Folia superiora anguste lanceolata, 0.5–1.0 cm lata, basin breve cuneata. Inflorescentia corymbothyrsoidea, multicephala. Capitula in extremitatibus ramulorum solitaria. Involucrum campanulatum, ca. 10 mm in diametro. Squamae in numero 10–13, virides, lanceolatae, 6–8 mm longae. Flores lutei, marginales in numero (5–) 6–7, ligulati, ligulae 5–7 mm longae. Flores centrales tubulosi, 6–9 mm longi. Achenia glabra, ca. 4 mm longa. Floret VI/VII (Fig. 2).

Habitat in Carinthia australis in paludibus circum fontes pratenses.

Holotypus: [Austria], Kärnten, Dobratsch-Abstieg, Heil.Geist-Pogöriach; 11.7.1907; leg. K. RONNIGER (W, Acqu. 1962 No. 23368).

Perennial, glabrous plants. Stock short, thick, vertical. Stems erect, thick, 50–70 (100) cm, regularly foliate. Cauline leaves firm, light grey, the upper ones diminished; basal leaves oblanceolate, narrowed at the base, 15–30 × 2–6 cm, obtuse or acute, completely entire or distantly dentate, upper cauline leaves narrow-lanceolate, 0.5–1.0 cm wide, cuneate at the base. Compound corymbs with many capitula. Involucre campanulate, 10 mm in diameter. Involucre bracts 10–13, 6–8 mm long, greenish, lanceolate. Florets yellow, ray-florets (5–) 6–7, rays 5.0–7.0 mm; inner, tubular florets 6–8 mm. Achenes 4 mm, glabrous. Flowering time VI–VII (Fig. 2).

Chromosome number: $2n = 40$; material from Heiligengeist, NE, leg. GRULICHOVÁ 1991; counted by HODÁLOVÁ.

Plants from Carinthia have been identified until now as *S. doria* L. s. str., however, they differ morphologically, ecologically, and phenologically from the other Central European taxa of the *S. doria* group. The most important characters distinguishing this taxon from the others are: the absence of hairs; the stem length, which is much shorter than that of the other taxa; the shape and size of the leaves, being reversely spear-type, significantly narrower than in allied species; and the length of the involucre bracts, which are 6–8 mm long (in *S. doria* only 5–6 mm). *S. fontanicola* grows in swampy spring areas in the communities of Caricion davallianae KLIKA 1934, in the most humid places with standing water. At localities between the villages of Heiligengeist and Pogöriach it grows to-

gether with the following species: *Carex davalliana* SM., *C. flacca* SCHREB., *C. hostiana* DC., *Carex lepidocarpa* TAUSCH, *Carex x leutzii* KNEUCKER (*C. hostiana x lepidocarpa*), *C. panicea* L., *Cirsium palustre* (L.) SCOP., *Equisetum telmateia* EHRH., *Eriophorum latifolium* HOPPE, *Juncus compressus* JACQ., *Juncus inflexus* L., *Mentha aquatica* L., *Molinia coerulea* (L.) MOENCH, *Parnassia palustris* L., *Pinguicula vulgaris* L., *Potentilla erecta* (L.) RÄUSCHEL, *Primula farinosa* L., *Schoenus ferrugineus* L., *Triglochin palustre* L., *Valeriana dioica* L., *Cratoneuron commutatum* (HEDW.) G. ROTH.

S. fontanicola also differs significantly from the other species of the *S. doria* group phenologically. The majority of plants observed and collected at localities around Heiligengeist on the 20th July 1991 had faded flowers, and the data from the studied herbarium specimens also indicate that this species flowers from the end of June to the middle of July.

To date, this species has been found only at several localities in Carinthia, where it grows in 450–850 m a. s. l. Localities are listed in PACHER 1884: 113, 1894: 58, LEUTE 1973: 396 and MELZER 1975: 262–263. A grid map is included in HARTL & al. 1992: 325.

Specimina visa: Austria: Heiligengeist (AICHINGER 1935 W). – Heiligengeist, NE (GRULICHOVÁ 1991 BRNU). – Heiligengeist-Pogöriach (RONNIGER 1907 W). – Pogöriach, W (GRULICHOVÁ 1991 BRNU). – Klagenfurt (s. coll. s. d. W, s. coll. 1880 W, MILLER s. d. LW).

8. Discussion

The problem of the morphological study of the *S. doria* group lies in the considerable individual variability of the plants, in their relative scarcity and in the fact that there are few specimens in the herbaria studied. The variability of some characters can be observed in living material only.

Stem length: *S. doria*, *S. umbrosus*, *S. macrophyllus* have robust stems, up to 150 cm high, *S. fontanicola* is shorter, 50–70 (100) cm high. The length of the stem, which is very variable, is influenced by ecological factors. While considering this character we must take into account only plants of average size.

Indument: One of the most frequent characters used to distinguish the taxa within the *S. doria* group is the presence or absence of hairs. Plants of *S. doria* and *S. fontanicola* are glabrous, while specimens of *S. umbrosus* usually have hairs on the stems and leaves. In the populations of *S. umbrosus* it is possible to find individuals with dense hairs as well as almost glabrous ones (for example on the Moravian side of the Bílé Karpaty Mts.). A similar situation is found with *S. macrophyllus* in populations occurring in the vicinity of Lviv, where we have observed hairy and almost glabrous types in close proximity. The low taxonomic value of this

character is also confirmed by the observation of KAGALO (in litt.), who studied the changes of the density of indument of *S. macrophyllus* after transferring the plants from nature to the biological station near L'viv. While the absence of indument in *S. doria* and *S. fontanicola* has its taxonomical value, we must take into account the enormous fluctuation of this character, in the other species.

Leaves: There is a great variability in the size and shape of leaves of all observed taxa. The size of the lower stem leaves is as follows: *S. doria* 15–40 × 3–10 cm, *S. umbrosus* 15–50 × 5–15 cm and *S. macrophyllus* 20–80 × 5–15 cm, *S. fontanicola* 15–30 × 2–6 cm. While *S. macrophyllus* has the lower stem leaves widely to oblong-ovate, the lower stem leaves of *S. fontanicola* are oblanceolate. Differences in consistence and shape of the upper stems leaves also have a certain taxonomic significance. In *S. doria* they are broadly ovate, glabrous, stiff, and cartilaginous (this character is especially clear on the dry herbarium material). The upper leaves in *S. umbrosus* and *S. macrophyllus* are ovately lanceolate, while in *S. fontanicola* they are narrowly lanceolate. In all three cases they are more herbaceous.

Inflorescence: There are certain differences among the studied taxa in the shape of their inflorescence. In *S. doria* inflorescence at the time of full flowering is free and diffuse, while in the same phenologic phase in *S. umbrosus*, *S. macrophyllus* and *S. fontanicola* it is usually more compact. However, differences in this character are relative and they are distinct only in the same stage of development of the plants.

Involucrum and flowers: One of the most stable characters is the size of involucre. While in *S. doria* and *S. macrophyllus* the bracts of involucre are 5–6 (7) mm long, in *S. fontanicola* they are 6–8 mm long. To study this character the plants must be in full flowering or in faded stage. In the keys one can often find the differences in number of ligules among given taxa. However, the variability in this character overlaps among species (*S. doria* 5 (6), *S. macrophyllus* and *S. fontanicola* (5)–6–7, *S. umbrosus* 7–8).

Pollen grains: Pollen taken from the herbarium specimens, collected in 1989–1992, was prepared without acetolysis and studied by means of a SEM microscope. No variability in the shape and size of pollen grains was found in the four observed species. Pollen grains were of elliptical or globular shape. In populations there were predominantly plants with exclusively globular grains and only occasionally plants with grains of both shapes. Also no differences in sculpture of exine were observed.

Achenes: We did not manage to find any differences in the achenes among the observed species. The achenes were in all cases glabrous. This character distinguishes all Central and South-East European taxa from the West Mediterranean ones. We have found hairy achenes in plants from

Spain which were identified as *S. legionensis* LANGE, and in probably other plants of the *S. doria* group from southern France and Sicily.

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10. References

- CHATER O. A. & WALTERS M. S. 1976. *Senecio* L.- In: TUTIN T. G. & al. (eds.), *Flora europaea* 4: 191–205. – Cambridge.
- CHRTEK J. & KRÍSA B. 1971. Beitrag zur Flora des Orava Höhenzuges. – *Acta Univ. Carol., Biol.* 6: 385–423.
- DOBROČAJEVA D. N. & al. 1987. *Opredelitel' vyssich rastenij Ukrajiny*. – Kiev.
- DOMAC R. 1950. *Flora za odredivanje i upoznavanje bilja*. – Zagreb.
- DOSTÁL J. 1950. *Květena ČSR*, 2. – Praha.
- FJAŁKOWSKI D. 1989. Nature Reserve Brzezno by Chełm. – In: *The Lubelska Upland et the Leczyńsko*, p.2–6.- Włodawskie Lake District. *Materials of 19th International Phytogeographic Excursion July 7–26*.
- FUTÁK J. 1962. *Floristické poznámky k juhovýchodnej časti západoslovenského kraja*. Sbor. – *Prác Ochr. Prír. Západoslov. Kraja*, p.35–50.
- & DOMIN K. 1960. *Bibliografia k flóre ČSR do r. 1952*.- Bratislava.
- GREBEŠČIKOV O., MICHALKO J., HLAVAČEK A., ZAHRADNÍKOVÁ K. & BRILLOVÁ D. 1956. *Geobotanický a floristický náčrt Kubínskej Hole*. – *Biol. Práce Slov. Akad. Vied* 2 (5): 5–9.
- HARTL H., KNIELY G., LEUTE G.H., NIKLFELD H. & PERKO M. 1992. *Verbreitungsatlas der Farn- und Blütenpflanzen Kärntens*. – Klagenfurt.
- HOLMGREN P.K., HOLMGREN N.H. & BARNETT L.C. 1990. *Index Herbariorum*. Part 1: *The herbaria of the world*, 8th ed. – Bronx, New York.
- HOLUB J. 1953. *Príspevek ke květeně Slovenského krasu*. – *Preslia* 25: 351–364.
- KARCMARZ K. & SAŁATA B. 1984. *Nowy dla flory gatunek starca – Senecio umbrosus* W. et K. – *Ann. Univ. Mariae Curie-Skłodowska, Sect. 3, Biol.* 39 (5): 37–43.
- KIRSCHNEROVÁ L. 1986. *Dva sporné sběry plešky stopkaté (Calycocorsus stipitatus)*.- *Zprávy Českoslov. Bot. Společ. Českoslov. Akad. Věd* 21(1): 56–58.
- KUBÁT K. 1981. *Floristicko-fytogeografická charakteristika a prehľad chránených druhov rastlín štátnej prírodnej rezervácie Rozsutec*, p. 349–363. – In: JANÍK M. & STOLLMANN A., *Rozsutec*. – Martin.
- LEUTE G.-H. 1973. *Nachträge zur Flora von Kärnten III*. – *Carinthia* II 163 (= 83): 389–424.

- MELZER H. 1975. Neues zur Flora von Kärnten und der Nachbarländer Salzburg, Friaul und Slowenien. – *Carinthia* II 165 (= 85): 255–266
- NYÁRÁDY E. I. 1964. *Senecio* L. – In: SAVULESCU T. & al. (eds.), *Flora republicii populare Romîne* 9: 520–587. – Bucureşti.
- PACHER D. 1884. Systematische Aufzählung der in Kärnten wildwachsenden Gefäßpflanzen, 2. – Klagenfurt.
— 1894. Nachträge zur Flora von Kärnten. – Klagenfurt.
- PROCHÁZKA F. & KRAHULEC F. 1982. Květena okolí Moštenice v NT.- *Preslia* 54(2): 167–184.
- Soó R. 1970. *Senecio* L. – In: A magyar flóra és vegetáció rendszertani növény földrajzi kézikönyve. 4: 113. – Budapest.
- SVOBODOVÁ Z. 1966. Nové lokality a rozšírenie niektorých lúčnych a močaristých druhov rastlín. – *Acta fytotechn. (Nitra)* 14: 179–186.
— 1989. Nové nálezy cievnatých rastlín na Slovensku II. – *Bull. Slov. Bot. Spoloč.* 11 (1): 16–24.
— 1991. Floristický príspevok z južného Slovenska. – *Bull. Slov. Bot. Spoloč.* 13: 51–54.
- SZAFER W., KULCZYŃSKI S. & PAWŁOWSKI B. 1988. *Rosliny Polskie*, 2. – Warszawa.
- ŠACHL J. 1970. Nové a vzácné druhy flóry Kriváňské Malé Fatry. – *Biológia (Bratislava)* 25 (7): 489–496.
— 1972. Nové a vzácné druhy flóry Kriváňské Malé Fatry. – *Biológia (Bratislava)* 27 (10): 805–810.
- ŠIŠKIN B. K. 1961. *Senecio* L. – In: ŠIŠKIN B. K. & BOBROV E. G. (eds.), *Flora SSSR* 26: 699–788. – Moskva-Leningrad.
- WAGENITZ G. 1987. Nachträge, Berichtigungen und Ergänzungen zum Nachdruck der 1. Auflage von Band VI/2 (1928/9). – In: CONERT J. A. & al. (eds.), *HEGI, Illustrierte Flora von Mitteleuropa*, 2. Aufl., 6(4): 1353–1452. – Berlin, Hamburg.
- ZIMMERMANN A. 1972. Pflanzenareale am niederösterreichischen Alpenostrand und ihre florensgeschichtliche Deutung. – *Diss. bot.* 18. – Lehre.

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