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The Eurasian steppe species *Euphorbia caesia* KAR. & KIR. (Euphorbiaceae) – a new member of the flora of Austria

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Abstract

Euphorbia caesia KAR. & KIR. is reported for the first time for Austria and Central Europe. Its taxonomic position as well as phytogeographic relationships to some Western European taxa are discussed. Lectotypes for its taxonomic synonyms *E. cyparissias* var. *pubescens* C.A. MEY. and *E. esula* var. *cyparissioides* BOISS. are proposed.

Key Words: *Euphorbia caesia*; Flora of Austria; Flora of Central Europe; phytogeography.

Zusammenfassung

Euphorbia caesia KAR. & KIR. wird erstmals für Österreich und Mitteleuropa festgestellt. Ihre taxonomische Position sowie die phytogeographischen Beziehungen zu einigen westeuropäischen Taxa werden diskutiert. Lectotypen werden für die taxonomischen Synonyme *E. cyparissias* var. *pubescens* C.A. MEY. und *E. esula* var. *cyparissioides* BOISS. vorgeschlagen

Introduction

The flora of Central Europe is regarded as very well studied. However, even in this region there are possibilities for records of species new for the area. One such example is an exciting discovery of the Eurasian steppe species *Euphorbia caesia* KAR. & KIR. in Niederösterreich.

Euphorbia caesia in Asia and Eastern Europe

E. caesia KAR. & KIR. has been described by the famous Russian botanists G.S. KARELIN and I.P. KIRILOV[1] (1841) on the materials of their expedition in 1840 to South Altai, Dzhungaria and other territories which now belong to Kazakhstan (its eastern part). This species belongs to section *Esula* DUMORT. subsection *Esula* BOISS. and to the recently described series *Caesiae* (GELTMAN 2001). KARELIN & KIRILOV (1841) also described *E. eriophylla* KAR. & KIR., which was later regarded by LEDEBOUR (1850) as a pubescent variety of the former – *E. caesia* var. (β) *pilosa* LEDEB. BOISSIER (1862) placed *E. caesia* into synonymy of his variety *E. esula* var. *cyparissoides* BOISS. which included not only *E. caesia*.

[1] Also known as J. KIRILOW.

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PROKHANOV (1949) treated both *E. caesia* and *E. eriophylla* as synonyms of *E. subcordata* C.A. MEY., also described from East Kazakhstan. He was followed by authors of Euphorbiaceae accounts in some other "Floras" (GAMAYUNOVA 1963, NASIMOVA 1983). However, modern Russian students of the genus (BAIKOV 1994, 1996, 2007, GELTMAN 1996a, b) prefer to treat *E. caesia* and *E. subcordata* as independent species, although these taxa evidently are closely related.

Authors of the Flora Europaea (SMITH & TUTIN 1968) proposed an extremely wide concept of *E. esula* L. and related species and included *E. subcordata* into *E. esula* var. *tommasiniana* (BERTOL.) NYMAN (= *E. virgata* WALDST. & KIT.). *E. caesia* was not mentioned even in the synonymy. This concept with some minor changes was accepted by GOVAERTS & al. (2000) in the world checklist of Euphorbiaceae. However, such concept was never accepted by botanists of the former USSR where subsection *Esula* reaches the maximum diversity. This group evidently needs a new detailed revision but it can be stated that there are no evident reasons to include *E. caesia* into *E. esula* even if the latter would be accepted in its widest reasonable limits.

GOVAERTS & al. (2000) accepted *E. esula* var. *caesia* (KAR. & KIR.) LEDEB., Fl. Alt. 4: 182 (1833). However, such combination was never done and could not be done. LEDEBOUR (1850) accepted both *E. caesia* and *E. esula* var. *caesia* C.A. MEY. in LEDEB., Fl. Altaic. 4: 182 (1833). The latter was based on the different type and described earlier then *E. caesia*. In the recent internet version of the checklist (http://apps.kew.org/wcsp/home.do) this mistake was corrected and *E. caesia* was accepted in the species rank, but as combination *E. caesia* (C.A. MEY.) KAR. & KIR. with the above mentioned variety as the basionym. It looks like that such approach is not correct because KARELIN & KIRILOV (1841) did not cite Meyer's variety and the type of *E. esula* var. *caesia* coincides with the type of *E. tshuuiensis* (PROKH.) SERG. ex KRYLOV – the species related to *E. caesia* but evidently separate.

E. caesia is a perennial plant with mostly linear leaves and does resemble *E. virgata* in this matter. However, it differs in grayish-green colour of the whole plant and especially in green, grayish or slightly yellow-green raylet-leaves during flowering instead of bright-yellow ones characteristic for *E. virgata*. It also differs by earlier flowering time. In Asia and Eastern Europe as well as in Austria *E. caesia* starts flowering from late April, some fruits appear in the second half of May and in June this plant is mainly in fruits. *E. virgata* starts flowering at least in mid-May and usually later. Detailed morphological description of the species is given at the end of this paper.

The distribution area of *E. caesia* occupies vast territories from the Volga river to Transbaicalia and Mongolia, but its core lies in Northern and Eastern Kazakhstan and in the southern part of Western Siberian regions of Russia (Fig. 1). *E. caesia* is also well represented in the south-eastern part of the European Russia and to the north even to Central Urals. It certainly occur in Mongolia, mostly Western and Northern, although detailed distribution in this country is still unclear. The most eastern locality is likely one in the southern part of the Chita region in Russia. Its distribution area almost falls into the eastern part of the Eurasian steppe zone in the system of LAVRENKO (1950), although some localities in Kazakhstan are in the northern part of the Asian desert zone.

E. caesia is a typical steppe plant and occurs in zonal steppe communities and also in forests (especially pine), bush thickets, dry ("steppefied") meadows, fallow lands, etc.

Sometimes (e.g. in Central Urals and in Yenisey valley near Krasnoyarsk) it is restricted to remnants of steppe communities which are found on rocks along rivers.

Euphorbia caesia in Austria

In Austria *E. caesia* was found in a restricted area in Niederösterreich near Blumau and northwest of Wiener Neustadt, in a former military area and at the western margin of an air field. It occurs in open patches of steppe meadows and along unpaved roads on calcareous gravel. Plants found in Austria definitely fall within limits of variation of *E. caesia*, although have some minor differences from ones of the main part of the distribution area. Austrian specimens are generally lower and have shorter leaves. Raylet-leaves are yellow-greyish, although "most typical" *E. caesia* has purely grey ones. However, similar plants can be found in Russia, Kazakhstan or Mongolia, so it is not reasonable to separate them as subspecies or variety.

Selected specimens: Niederösterreich, südwestliches Steinfeld, Rotäcker E Feuerwerksanstalt (NW Wr Neustadt), 290 m s.m., Trockenrasen, 27.04.1997 W. Till s.n. [WU] (Fig. 2); – Niederösterreich, Wiener Becken, militarisches Übungsgelände südlich von Blumau, 250 m s.m., 01.06.1998 W. Till s.n. [WU]; – Niederösterreich, südlich des Soldatenfriedhofs bei Blumau, am Rand des militarischen Sperrgebiets, 250 m s.m., Kalkschottersteppe, 18.04.1999 W. Till s.n., [WU]; – Niederösterreich, ca. 800–2000 m östlich der Kirche beim Soldatenfriedhof bei Blumau, randlich im militärischen Sperrgebiet, Fahrwege nordwestlich und östlich der Kote 243 entlang der Aluminiumschlackenaufschüttungen, ca. 245 m s.m., Kalkschottersteppe, am und entlang des Fahrwegs, 16.05.1999 W. Till s.n. [WU] (Fig. 3); – Niederösterreich, südlich des Soldatenfriedhofs bei Blumau, randlich im militarischen Sperrgebiet, 250 m s.m., Kalkschottersteppe, 24.05.1999 W. Till s.n. [WU].

Synonymy and description

Euphorbia caesia KAR. & KIR., Bull. Soc. Imp. Naturalistes Moscou, [14], 4: 743 (1841)

≡ *Tithymalus caesius* (KAR. & KIR.) KLOTZSCH & GARCKE, Abh. Königl. Akad. Wiss. Berlin, 1859: 87 (1860).
Lectotype (GUBANOV & al. 1998): In montosis deserti Soongoro-Kirghisici prope Arkat, 1840 Karelin et Kiriloff 442 [LE].

= *Euphorbia cyparissias* L. var. *pubescens* C.A. MEY. in LEDEB., Fl. Altaic., 4: 180.
Lectotype (selected here): Prope Ustkamenogorsk, [5. 1826,] Ledebour [LE].

= *Euphorbia eriophylla* KAR. & KIR., Bull. Soc. Imp. Naturalistes Moscou, [14,] 4: 744 (1841)
≡ *E. caesia* var. *pilosa* LEDEB., Fl. Ross., 3, 2: 577 (1850)
≡ *E. subcordata* LEDEB. var. *eriophylla* (KAR. & KIR.) BOISS., in DC., Prodr. 15 (2): 161 (1862).
Lectotype (GUBANOV & al. 1998): In montosis deserti Soongoro-Kirghisici ad rivulum Narym, 1840 Karelin et Kiriloff 445 [LE]

= *Euphorbia esula* L. var. *cyparissioides* BOISS., in DC., Prodr. 15 (2): 161 (1862).
Lectotype (selected here): In montosis deserti Soongoro-Kirghisici prope Arkat, 1840 Karelin et Kiriloff 442 [LE].

Dark green or grayish, glabrous or pubescent perennial. Rootstock thin, horizontal or obliquely descent. Stems few or numerous, erect, 10–50 cm, scaly at the base. Leaves linear or oblong, 1-6 cm long and 0.3–0.7 cm wide, rounded or truncate at the base, more or less acute or almost rounded at the apex, sometimes with vegetative branches in the axils, usually with 2–10 axillary rays. Pseudoumbel of 5–10 (15) rays, once or rarely twice dichotomous; raylet-leaves 2, broadly triangular, rhombic-ovoid or reniform, the same colour or slightly yellowish-green when flowering. Cyathium 1–2.5 mm long and 0.7–2.2 mm in diam., with small, obtuse pubescent lobes. Nectaria 4, semilunary, from purple to dark yellow, with short appendices ("horns"). Fruit trilobate, 2.5–3.2 mm long and 3–3.5 mm wide, glabrous or slightly rugose. Seeds ca. 2.2 x 1.5 mm, surface glabrous, with a small caruncula.

BOISSIER (1862) cited with his *E. esula* var. *cyparissioides* several specimens which belong to *E. caesia*, *E. subtilis* PROKH. and probably some other species. By selecting here a lectotype conspecific with *E. caesia* (this specimen is cited by Boissier and its duplicate was seen by him) we regard this variety as a synonym of *E. caesia*.

Discussion

The significant disjunction (between Austria and the Volga river) in the distribution of *E. caesia* is of great interest. This fact confirms the suggestion of more extensive occurrence of the steppe zone in Eurasia in the geological past. According to LAVRENKO (1951) his Eurasian steppe zone is of Miocene age, steppes of the modern type can be traced from Pliocene, but the actual structure and composition of communities of steppe plant cover were formed in Quaternary.

No doubt that the occurrence of *E. caesia* in Austria supports the above mentioned idea. It is quite possible that *E. caesia* could have had a more or less continuous distribution from modern Central Europe to Siberia, probably, just after some Pleistocene glaciations. This time could be characterized by strictly continental climate similar to those of modern South Siberia. Later, because of climate changes, the distribution area of *E. caesia* in Eastern Europe has been reduced.

Besides *E. caesia*, several other species of *Euphorbia* section *Esula* are found in steppes of Eastern Europe. After detailed analysis it is possible to trace for almost all of them some links with Western European taxa. Examples are:

E. leptocaula BOISS. is characteristic to most dry southern variants of steppes (and sometimes semideserts) of Eastern Europe and occurs from south Ukraine to lower Volga with some penetration to the North Caucasus, but only to pre-mountain and lower mountain areas. The species is characterized by very thin stems and extremely narrow linear leaves. Its closest relative, *E. tenuifolia* LAM. (= *E. graminifolia* VILL., nom. illeg.), occurs in southern France, in one of the areas of concentration of steppe plants in western Mediterranean (GAMARRA GAMARRA & MONTOUTO GONZÁLEZ 1999).

Another species, *E. subtilis* (unfortunately included in Flora Europaea [SMITH & TUTIN 1968] in *E. esula*) occurs in more northern variants of steppes (including forest-steppes) and even penetrates rather far to the north with remnants of steppe communities. It is similar to *E. leptocaula*, but differs mainly in shape and size of the leaves. It also pene-

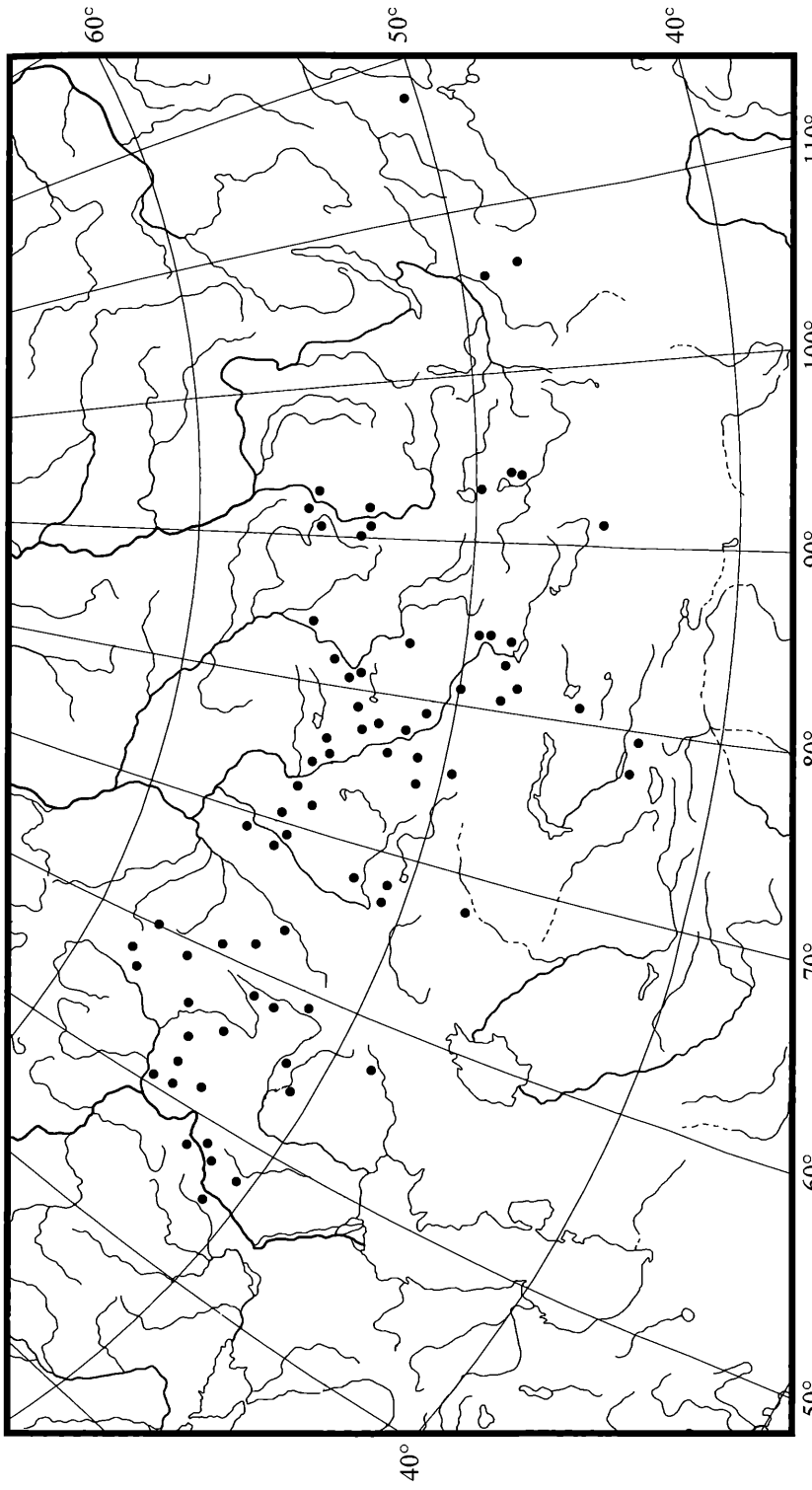

Fig. 1: Distribution area of *Euphorbia caesia* in Asia and Eastern Europe.

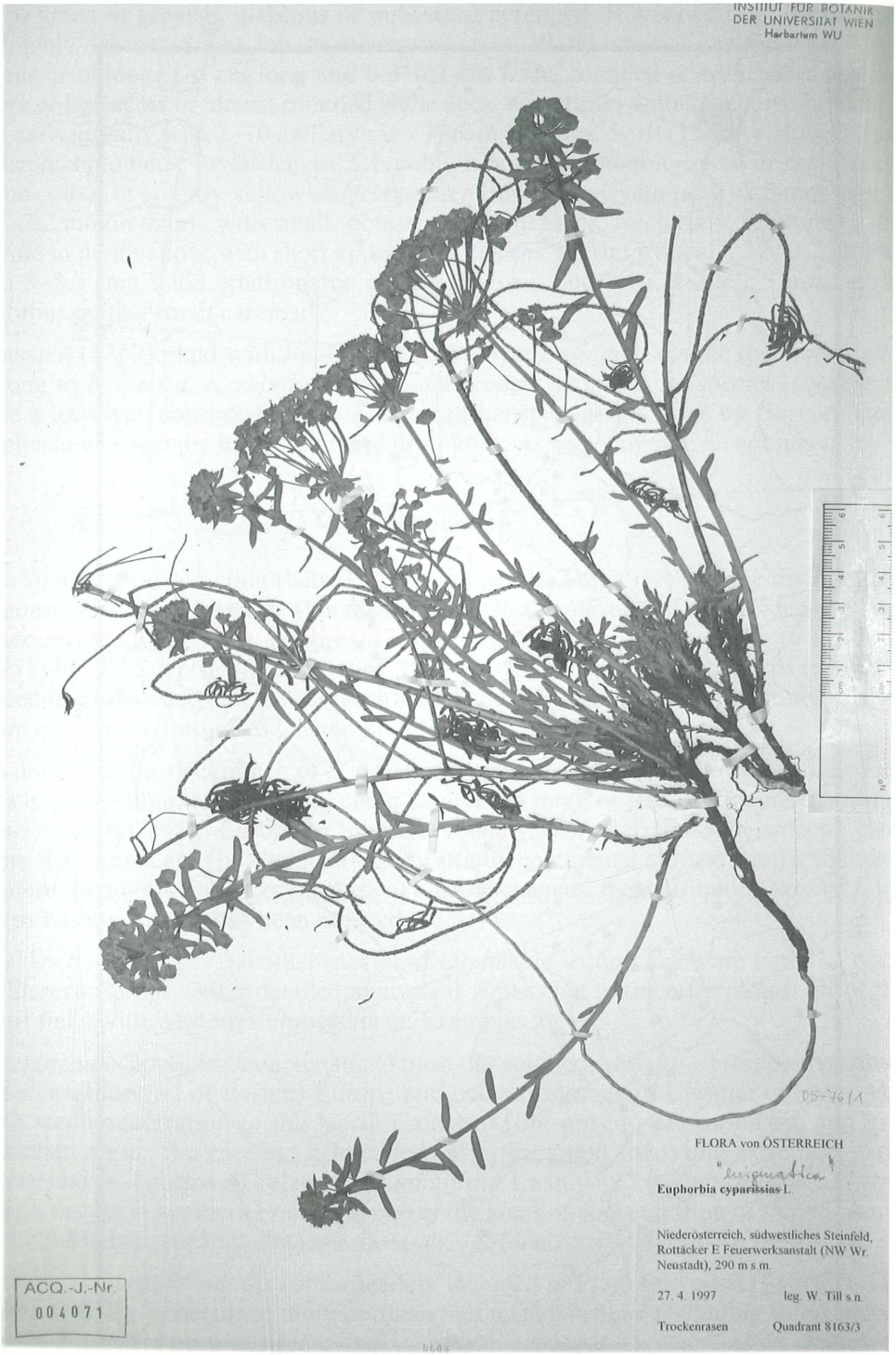

Fig. 2: Herbarium specimen of *E. caesia* found in Austria, 27. 4. 1997 W. Till.

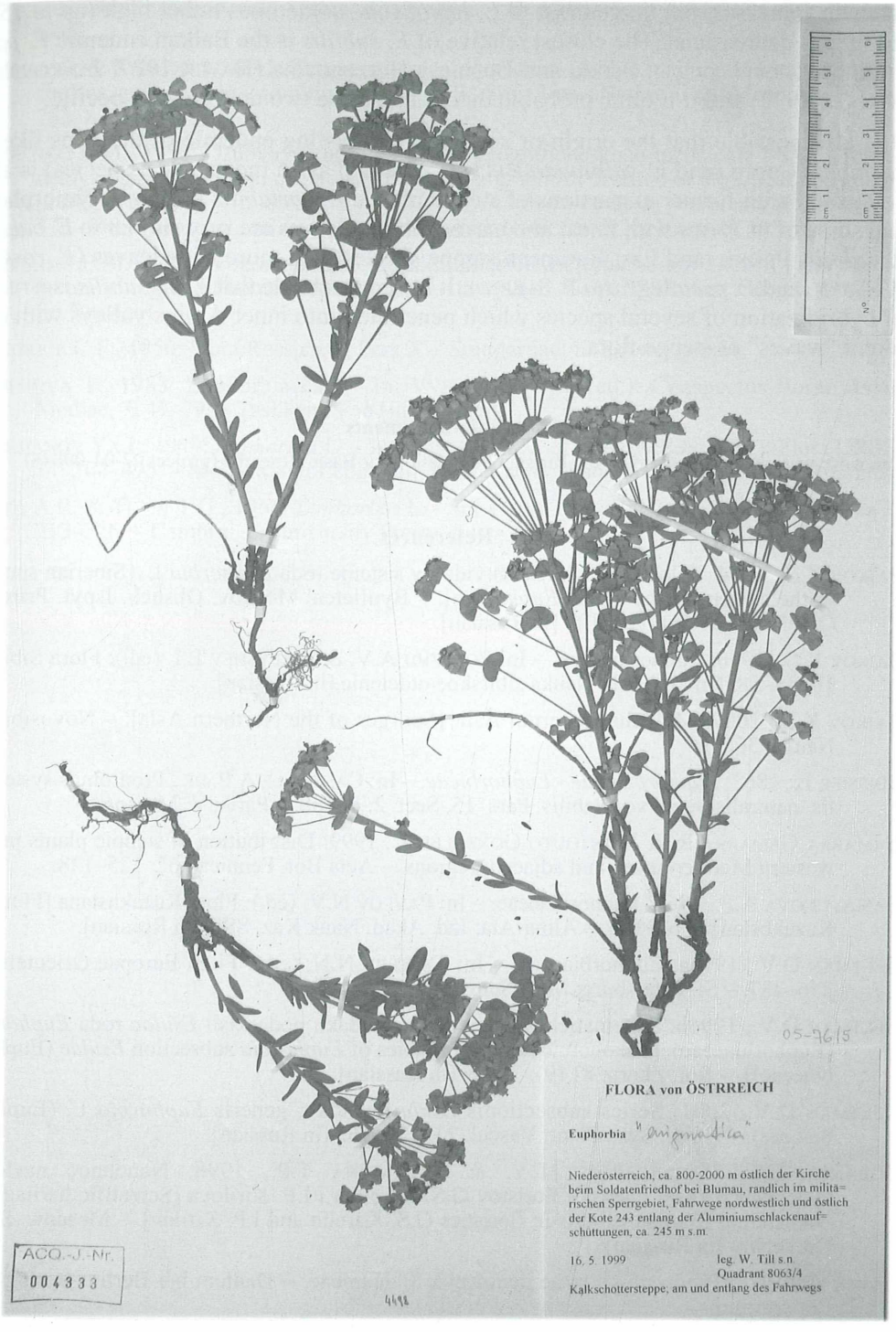

Fig. 3: Herbarium specimen of *E. caesia* found in Austria, 16. 5. 1999 W. Till.

trates to Caucasus, but, in contrast to *E. leptocaula*, sometimes rather high (up to 1500 m) in arid depressions. The closest relative of *E. subtilis* is the Balkan endemic *E. pancicii* BECK, occurring in Serbia and Bosnia – Herzegovina (HAYEK 1927, JANKOVIČ & NIKOLIČ 1972) and it is quite probable that in fact these two taxa are conspecific.

It is also possible that the origin of such very interesting endemic of the Alps like *E. variabilis* Cesati (and *E. valliniana* BELLI if regarded as an independent species) is also connected with former expansions of steppe plants. *E. variabilis* is very polymorphous and some of its forms with linear and narrow oblong leaves are very similar to *E. caesia*, *E. subtilis* PROKH. and East European steppe species with more wide leaves (*E. rossica* P. SMIRN. and *E. pseudagraria* P. SMIRN.). It is very probable that *E. variabilis* is a result of hybridization of several species which penetrated into inner Alpine valleys with different "waves" of steppe flora.

Acknowledgements

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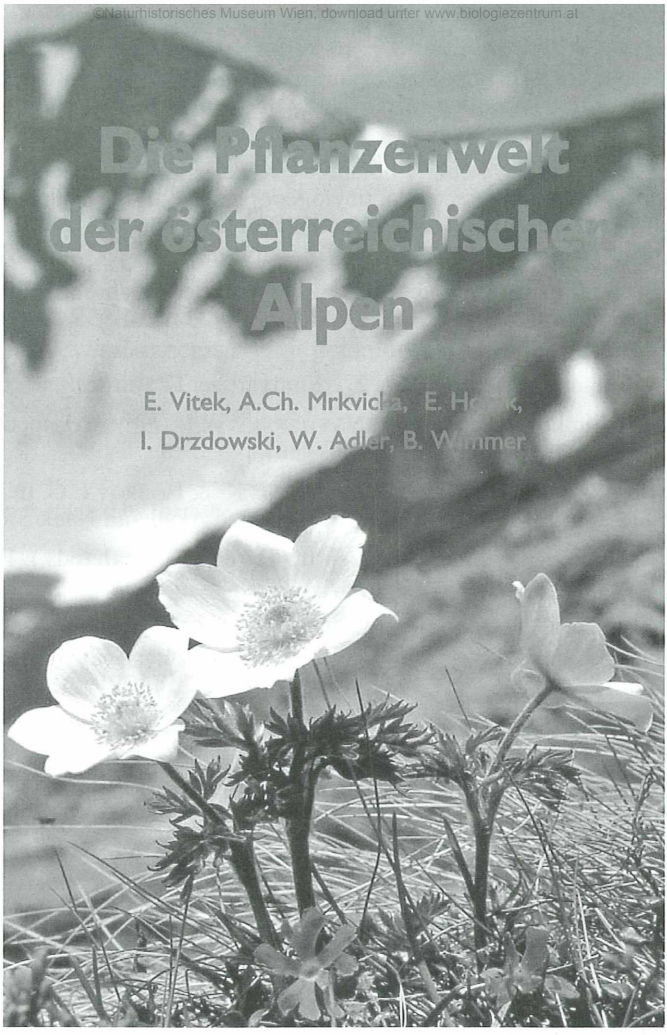

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