

Galium parisiense – a new alien species for the Czech Republic

Galium parisiense – nový zavlečený druh pro květenu České republiky

Zdeněk Kaplan¹ and Vladimír Řehořek²

¹*Institute of Botany, Academy of Sciences of the Czech Republic, CZ-252 43 Průhonice, Czech Republic, e-mail: kaplan@ibot.cas.cz;* ²*Faculty of Sciences, Masaryk University, Kotlářská 2, CZ-611 37 Brno, Czech Republic; e-mail: rehorek@sci.muni.cz*

Kaplan Z. & Řehořek V. (1998): *Galium parisiense* – a new alien species for the Czech Republic. – Preslia, Praha, 70: 51–56.

Two specimens of *Galium parisiense* L. having their origin in the wild in the Czech Republic have been found during the study of the herbaria of PR and BRNM. The species has never been reported for the country before. The earlier collection is from the present-day area of Prague in central Bohemia, the later one from a field near the village of Nedachlebice in southeastern Moravia. Both localities are situated on the northeastern border of the species distribution. No recent occurrence of the species in the wild in the Czech Republic has been reported, except for the single find in a concrete flower-bowl in Brno, southern Moravia. Intraspecific variation and its taxonomic evaluation is discussed in the present paper.

Key words: *Galium parisiense*, alien species, Czech Republic, herbarium

Four species of *Galium* L. sect. *Kolgyda* Dumort. have been reported from the Czech Republic so far. *Galium aparine* L. is a widespread field weed distributed throughout the country from the lowlands up to the montane belt, growing also in natural vegetation of floodplain forests and on river banks. *Galium spurium* L. is mainly confined to a region of thermophilous Pannonian vegetation in southern and southeastern Moravia and in central Bohemia with several casual localities in slightly colder regions. *Galium tricorutum* Dandy has a similar distribution pattern but it is restricted to areas of calcium-rich rocks. *Galium verrucosum* Huds. was found rarely in central Bohemia in the past as an alien weed.

While studying specimens of *Galium* in Czech herbaria we found two specimens of *G. parisiense* L. from the Czech Republic collected in the wild. The earlier collection came from the present-day area of Prague in central Bohemia (“Sarka, 1835, E. Hofmann”, PR), the later one from a field near the village of Nedachlebice in southeastern Moravia (“Uh. Hrad.: Nedachlebice: v bramborišti u Pašovské, 27. VII. 1924, S. Staněk”, BRNM). The species has not been found in nature in the Czech Republic since that time. The only recent occurrence of the species came from an artificial habitat, as it was found growing as a weed in a concrete flower-bowl in the very centre of Brno City (“Brno: v květinové míse na Nám. Svobody, 27. IX. 1996, M. Smejkal”, BRNU). The nomenclature, description and total range of the species under consideration is as follows.

G. parisiense Linnaeus, Sp. Pl. 108. 1753.

- ≡ *G. anglicum* [var.] β. *parisiense* (L.) Kostel., Ind. Hort. Bot. Prag. 61. 1844, nom. illeg.
- ≡ *G. anglicum* subsp. *parisiense* (L.) Nyman, Consp. Fl. Eur. 2: 330. 1879, nom. illeg.
- ≡ *G. parisiense* [var.] α. *typicum* Beck, Fl. Nied.-Österr. 2/2: 1122. 1893, nom. inval.

- = *G. anglicum* Hudson, Fl. Angl. 69. 1762.
- ≡ *G. parisiense* subsp. *anglicum* (Hudson) Arcang., Comp. Fl. Ital. 315. 1882.
- ≡ *G. parisiense* [var.] β. *anglicum* (Hudson) Beck, Fl. Nied.-Österr. 2/2: 1122. 1893.

- = *G. litigiosum* DC. in Lam. et DC., Fl. Franc. ed. 3. 4: 263. 1805.
- ≡ *G. anglicum* [var.] β. *litigiosum* (DC.) Koch, Syn. Fl. Germ. 331. 1835.
- ≡ *G. divaricatum* Pourret ex Lam. [var.] β. *litigiosum* (DC.) Kostel., Ind. Hort. Bot. Prag. 61. 1844.
- ≡ *G. parisiense* subsp. *litigiosum* (DC.) Arcang., Comp. Fl. Ital. 315. 1882.

Slender annual herb. Stem branching from the very base, 5–40 cm long, prostrate to ascending, sharply quadrangular, retrorsely scabrid on angles, internodes 2–5 times longer than the leaves. Leaves and leaf-like stipules in whorls of 5–7, 4–12 mm long, (0.8–)1.0–2.5(–3.0) mm wide, linear to oblanceolate, cuspidate, antrorsely scabrid along the ± revolute margins and midrib, glabrous. Inflorescences arising from the base of the stem, 7–11(–16) flowered, 2–5(–7) times longer than the leaves. Peduncules 2–12 mm long at anthesis, 7–19 mm long in fruit, ± straight, pedicels 0.5–2.5 mm long at anthesis, 1–6 mm long in fruit, divaricate. Corolla greenish-white, tinged with red outside, 0.5–1.0 mm in diameter. Mericarps reniform, 0.8–1.3 mm long, finely hispid with hooked setae or glabrous.

The species occurs in southern, western and central Europe; from SE England (Clapham et al. 1987), France (De Langhe et al. 1973, Guinochet & Vilmorin 1975), Portugal (Pereira Coutinho 1939, Kliphuis 1984) and Spain (Valdés et al. 1987), through Switzerland (Aeschimann et al. 1994, Hess et al. 1972), central Germany (Rothmaler 1996), Austria (Janchen 1959) and Italy (Ehrendorfer 1982), eastwards to Slovakia (Řehořek 1977, Zahradníková 1985), Hungary (Soó 1966), Rumania (Paucă 1961) and Bulgaria (Stojanov & Stefanov 1933); outside Europe it is found on the Canary Islands (Lid 1967), in northern Africa (e. g. Jafri 1979, Täckholm 1974) and southwestern Asia (Ehrendorfer & Schönbeck-Temesy 1982, Heller & Heyn 1986); it has been introduced also in the North America (e. g. Hitchcock & Cronquist 1976, Shetler & Skog 1978).

The species exhibits a high degree of variation. This is manifested in its morphology mainly by its general appearance, branching, leaf size, shape of inflorescence and fruit indumentum. However, only the character of the fruit remains constant, the other characters are liable to changes induced by environmental conditions. Two elementary morphotypes can be distinguished on the basis of the presence or absence of hooked setae on the fruit surface: plants with fruits finely hispid or that with fruits glabrous.

The variation of *G. parisiense* has been studied both in wild populations in neighbouring Slovakia and in herbarium material originating mostly from the Mediterranean area and south-western Asia. The observed morphological variation pattern has been subsequently revealed to be analogous to European plants of *G. spurium*. Moreover, both species also share some characters in their behavior. As several features are common to both species, the taxonomic position of their fruit types is evaluated simultaneously here. The following observations were fundamental:

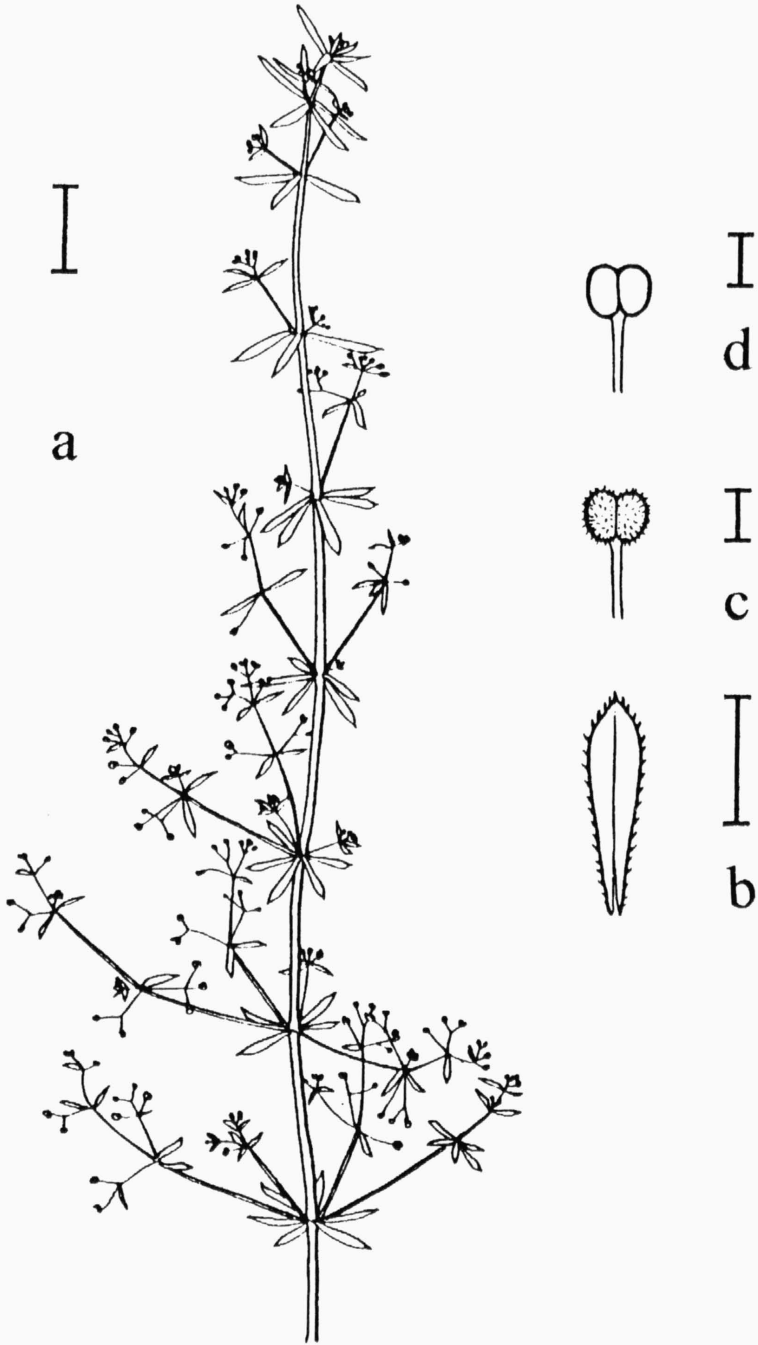


Fig. 1. – *Galium parisiense*; a – general appearance, scale bar = 10 mm; b – leaf, scale bar = 5 mm; c – fruit of *G. parisiense* var. *parisiense*, scale bar = 1 mm; d – fruit of *G. parisiense* var. *leiocarpum*, scale bar = 1 mm (drawn by A. Skoumalová-Hadačová).

1. While a great majority of individuals keep the fruit characteristics during the whole ontogenetic development, some exceptions can be occasionally found. These plants have sparsely hispid young fruits which, however, become glabrous during maturation.
2. The character of the fruits is mostly common to all members of a population.
3. Transition forms, distinguished by ripe fruits with a sporadic occurrence of short setae, also exist but the extreme forms prevail.
4. Distinct ecological requirements and a linkage of both types of *G. spurium* to different agricultural systems are sometimes claimed in the literature (e. g. by Soó 1966, Soó 1980, Dostál 1989). While plants with hispid fruits have been ascribed to communities of the *Secalietalia* Br.-Bl. 1936 em. J. Tüxen et R. Tüxen in Malato-Beliz et al. 1960 and *Aperetalia* J. Tüxen et R. Tüxen in Malato-Beliz, J. Tüxen et R. Tüxen 1960, glabrous-fruited populations have been assigned to the *Lolio remoti-Linetalia* J. Tüxen et R. Tüxen in Lohmeyer et al. 1962. However, no true dependence in fact exists and, especially in fields in warmer regions, plants of both forms are sometimes found growing together in the same place.
5. No other character, either morphological or karyological, correlated with the fruit characteristics has been found.
6. Native distribution ranges of each species, *G. parisiense* and *G. spurium*, are occupied by both plants with glabrous as well as setose fruits, sometimes even occurring together at the same site. The presence of a single type in a large area is only found on the border of its introduced range, e. g. glabrous-fruited *G. parisiense* in England [described as *G. anglicum* Hudson there] (Clapham et al. 1987) and in North America, *G. spurium* with hook-hispid fruits in Eastern Asia, Central Africa and North America (Correll & Johnston 1970, Cronquist et al. 1984, Hitchcock & Cronquist 1976, Ohwi 1984, Shetler & Skog 1978, Yamazaki 1993).

Even though the characteristics of the fruit are usually common to all members of a population, they are not associated with any other character. Therefore, the taxonomic level of variety is considered the most adequate for the evaluation of the variation. The nomenclature of the two varieties of *G. parisiense* is presented here:

- var. *parisiense* [syn.: var. *trichocarpum* Tausch, Flora 18/23: 354. 1835; f. *trichocarpum* (Tausch) Borza, Consp. 2: 259. 1949]: fruits finely hispid with hooked setae;
var. *leiocarpum* Tausch, Flora 18/23: 354. 1835 [syn.: f. *leiocarpum* (Tausch) Borza, Consp. 2: 259. 1949]: fruits glabrous.

Individuals from both the above named spontaneous occurrences in the Czech Republic, as well as those from the artificial site, belong to var. *parisiense*. Plants representing var. *leiocarpum* have never been found in the field so far. They were only cultivated in Prague botanical gardens around 1860 and in Červený Hrádek in the middle of the 19th century.

Acknowledgments

We are obliged to Dr. J. Štěpánková and Dr. J. Holub (both Průhonice) for useful comments on the manuscript. We are also grateful to Dr. J. R. Cross (Průhonice) and David Chiller (Prague) for language revision of the manuscript. Our thanks are due to the members of the above mentioned herbaria who enabled us to study their herbarium material. This work was financially supported partly by grant no. 206/95/0680 of the Grant Agency of the Czech Republic.

Souhrn

Při revizi starších herbářových položek byly autory tohoto příspěvku nalezeny doklady dvou sběrů druhu *Galium parisiense* L. z České republiky, který z našeho území dosud nikdy nebyl uváděn. První nález pochází z údolí Šárka u Prahy („Sarka, 1835, E. Hofmann“, PR), druhý z jihovýchodní Moravy od Nedachlebice („Uh.[erské] Hrad.[iště]: Nedachlebice: v brambořišti u Pašovské, 27. VII. 1924, S. Staněk“, BRNM, ut *G. aparine* L. var. *tenerum* (Schleicher) Koch f. *microspermum* Staněk; geografické označení „Pašovské“ asi odpovídá místnímu názvu lesa „Pašovické“ JV od obce). Žádný recentní přirozený výskyt tohoto druhu u nás není znám. Nedávno však byl nalezen jako plevel na druhotném stanovišti v samotném středu Brna (“Brno: v květinové míse na Nám. Svobody, 27. IX. 1996, M. Smejkal”, BRNU).

Jedná se o jednoletý druh, který se od všech ostatních jednoletých druhů známých z našeho území liší následující kombinací znaků: Lodyhy tenké, 5–40 cm dl., internodia 2–5x delší než listy. Listy v přeslenech po 5–7, čárkovité až obkopinaté, na ± podvıtných okrajích a na rubu na střední žilce s dopředu směřujícími osténky, 4–12 mm dl., (0,8–)1,0–2,5(–3,0) mm šir. Květenství 7–11(–15)květů, 2–5(–7)x delší než příslušné listy. Stopky květenství 2–12 mm dl., za plodu 7–19 mm dl., ± přímé, stopky květů 0,5–2,5 mm dl., rozkladité, plodní stopky 1–6 mm dl. Korunní listky na vniřní straně zelenavě bílé, na vnější s červenavým nádechem, koruna 0,5–1,0 mm v průměru. Plůdky ledvinovité, 0,8–1,3 mm dl., jemně háčkovitě chlupaté nebo až lysé.

G. parisiense je morfologicky velmi variabilní druh. Kromě taxonomicky nevýznamných odchylek v celkovém habitu rostlin, tvaru květenství a velikosti listů, které jsou vysoce modifikovány prostředím, lze rozlišit na základě odění plodů dva výraznější typy. Na základě terénních pozorování na Slovensku a studia herbářových sběrů z různých částí areálu se zdá být nejvhodnější taxonomickou kategorií pro hodnocení této variability úroveň variety. Rostliny nalezené na území České republiky se vyznačují plody háčkovitě chlupatými, které patří k nominální var. *parisiense*. Typ s lysými plody, jehož správné jméno je var. *leiocarpum* Tausch, byl u nás pouze pěstován.

References

- Aeschimann D., Burdet H. M. et al. (1994): Flore de la Suisse et des territoires limitrophes. Ed. 2. – Griffon, Neuchâtel.
- Clapham A. R., Tutin T. G. & Moore D. M. (1987): Flora of the British Isles. Ed. 3. – Cambridge University Press, Cambridge.
- Correll D. S. & Johnston M. C. (eds.) (1970): Manual of the vascular plants of Texas. – Texas Research Foundation, Renner.
- Cronquist A., Holmgren A. H., Holmgren N. H., Reveal J. L. & Holmgren P. K. (1984): Intermountain Flora; vascular plants of the Intermountain West, U.S.A. Vol. 4. – The New York Botanical Garden, Bronx.
- De Langhe J.-E., Delvosalle L., Duvigneaud J., Lambinon J. & Vanden Berghen C. (1973): Nouvelle Flore de la Belgique, du Grand-Duché de Luxembourg, du Nord de la France et des Régions voisines. (Ptéridophytes et Spermatophytes) – Jardin botanique national de Belgique, Bruxelles.
- Dostál J. (1989): Nová květena ČSSR. Vol. 2. – Academia, Praha.
- Ehrendorfer F. (1982): Fam. 122. *Rubiaceae*. – In: Pignatti S. (ed.), Flora d'Italia 2: 353–379, Edagricole, Bologna.
- Ehrendorfer F. & Schönbeck-Temesy E. (1982): 6. *Galium* L. – In: Davis P. H. (ed.): Flora of Turkey and the East Aegean Islands 7: 767–849, Edinburgh University, Edinburgh.
- Guinochet M. & Vilmorin R. de (1975): Flore de France. Vol. 2. – Centre National de la Recherche Scientifique, Paris.
- Heller D. & Heyn C. C. (1986): Conspectus Florae Orientalis. Fasc. 3. – Israel Acad. Sci. Human., Jerusalem.
- Hess H. E., Landolt E. & Hirzel R. (1972): Flora der Schweiz und angrenzender Gebiete. Vol. 3. – Birkhäuser, Basel & Stuttgart.

- Hitchcock C. L. & Cronquist A. (1976): Flora of the Pacific Northwest. Ed. 3. – University of Washington Press, Seattle & London.
- Jafri S. M. H. (1979): *Rubiaceae*. – In: Jafri S. M. H. & El-Gadi A. (eds.), Flora of Libya 65: 1–41, Department of Botany, Al-Faateh University, Tripoli.
- Janchen E. (1959): Catalogus florae Austriae. Vol. 1. Pteridophyten und Anthophyten. 3. Heft. – Springer, Wien.
- Kliphuis E. (1984): Cytotaxonomic studies on the genus *Galium* L. Notes on some species occurring in Portugal. – Mem. Soc. Brot., Coimbra, 27: 77–87.
- Lid J. (1967): Contributions to the Flora of the Canary Islands. – Universitetsforlaget, Oslo.
- Ohwi J. [eds.: Meyer F. G. & Walker E. H.] (1984): Flora of Japan. – Smithsonian Institution, Washington.
- Paucă A. (1961): Fam. 100. *Rubiaceae* B. Juss. – In: Săvulescu T. (ed.), Flora Republicii Populare Romine 8: 524–589, Academia Republicii Populare Romine, Bucuresti.
- Pereira Coutinho A. X. [ed.: Palhinha R. T.] (1939): Flora de Portugal. Ed. 2. – Lisboa.
- Rothmaler W. [eds.: Bäßler M., Jäger J & Werner K.] (1996): Exkursionsflora von Deutschland. Vol. 2. Gefäßpflanzen: Grundband. Ed. 16. – Gustav Fischer, Stuttgart.
- Řehořek V. (1977): *Galium tenuissimum* a *G. parisiense* subsp. *anglicum* – nové taxony československé květeny. [*Galium tenuissimum* and *G. parisiense* subsp. *anglicum* – new taxa of Czechoslovak flora.] – Zprávy Čs. Bot. Společ., Praha, 12: 79–81.
- Shetler S. G. & Skog L. E. (eds.) (1978): A provisional checklist of species for Flora North America (Revised). – Missouri Botanical Garden, St. Louis.
- Soó R. (1966): A magyar flóra és vegetáció rendszertani-növényföldrajzi kézikönyve. Vol. 2. – Akadémiai Kiadó, Budapest.
- Soó R. (1980): A magyar flóra és vegetáció rendszertani-növényföldrajzi kézikönyve. Vol. 6. – Akadémiai Kiadó, Budapest.
- Stojanov N. & Stefanov B. (1933): Flora na Blgarija. – Sofia.
- Täckholm V. (1974): Student's Flora of Egypt. Ed. 2. – Caire University, Beirut.
- Valdés B., Talavera S. & Fernández-Galiano E. (eds.) (1987): Flora Vasculare de Andalucía Occidental. Vol. 2. – Ketres Editora, Barcelona.
- Yamazaki T. (1993): *Rubiaceae*. – In: Iwatsuki K., Yamazaki T., Boufford D. E. & Ohba H. (eds.), Flora of Japan 3a: 206–240, Kodansha, Tokyo.
- Zahradníková K. (1985): *Rubiaceae* Juss. Marenovité. – In: Bertová L. (ed.), Flóra Slovenska [= Flora of Slovakia] 4/2: 7–69, Veda, Bratislava.

Received 23 September 1997

Accepted 29 January 1998