

Remarks on the Species *Trifolium patens***Poznámky o *Trifolium patens***

Radovan H e n d r y c h

Department of Botany, Caroline University of Prague, Benátská 2, Praha 2

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A b s t r a c t — *Trifolium patens* has been a species hitherto almost unknown in Czechoslovakia. In reality, however, it has been much more frequent in that country than presumed owing to its being overlooked by samplers; its occurrence is partly native (in Slovakia and, probably also in Moravia), partly it has been introduced (Bohemia). When considering also the distribution of areas from some other countries where *T. patens* has been known as an introduced species it seems that in its total area it tends to migrate to the north. From the Czechoslovak localities it may be presumed that *T. patens* will be ascertained also in the neighbouring Lower Austria, Silesia and Saxony. The material received from ČSSR indicates that we are faced there with the same range of variability as has been known from its whole area. As a means to its safer distinction from similar species for which it could be mistaken the necessary chief distinguishing characters are introduced below.

For the first time *T. patens* was reported from the Czechoslovak territory by GAYER (1917 : 76), namely from south-western Slovakia, from localities between the villages of Zohor and Lozorno, further from Jablonové and Plavecký Štvrtok. Also the data by DEGEN et soc. (1923 : 90), are associated with these localities. All mentioned localities were generalised by JÁVORKA (1925 : 621), when describing *T. patens* of the former district of Bratislava. Through omitting all the above sources *T. patens* was not included in the first flora of Czechoslovakia (POLÍVKA, DOMIN et PODPĚRA 1928). It was Soó (1930 : 250), who first mentioned *T. patens* as a species represented in the Czechoslovak flora, in his detailed review of the above title and reported it also as a general data for Bratislava. For a long time, it represented the last report of this species of the Czechoslovak territory. DOSTÁL (1950 : 78), introduced, besides Bratislava, as further and only places of the occurrence of *T. patens*, also the villages Kamenín and Kamenný Most near Štúrovo, (also in Slovakia).

When checking the Czechoslovak species of the genus *Trifolium* in a preliminary paper (HENDRYCH 1956 : 404—405) I mentioned that besides western Slovakia *T. patens* appeared also in Moravia, and what more, in several localities in Bohemia numbering eleven in those days. Later, I followed the appearance of this species on several occasions and, during last years, I managed to find *T. patens* in a number of further localities which were the very reason for writing this paper.¹⁾

As evident from the map (Fig. 2) *T. patens* is distributed in Czechoslovakia in several mutually separated districts. In Bohemia it is fairly well represented in the Elbe Lowlands where it has been known from the wider neighbourhood of the town Pardubice right to the village of Štětí provided it has not been indicated, up to now, by only two known localities from the foot of the north-

¹⁾The present paper is a part of a prepared series of similar papers dealing with more important Czechoslovak species of the genus *Trifolium* of which I had already published papers on *T. lupinaster* (HENDRYCH 1963) and *T. badium*, (HENDRYCH 1965); other papers are in preparatory stages of various degrees.

east part of the Bohemian Massif, from the town Kravaře whereto *T. patens* might have penetrated in the direction from the Elbe along the river Ploučnice. From the Elbe Lowlands it penetrates distinctly and rather far along the river Jizera, right to the town Mnichovo Hradiště from where I vainly looked for it

farther upstream. Its somewhat isolated appearance is its finding place at Zlíchov (not recently confirmed), in the immediate proximity of Prague. There are three hitherto known localities in south Bohemia which do not fit into the pattern of the distribution of *T. patens* in Bohemia and to a large extent, in the whole of Czechoslovakia: from the town Mezimostí nad Nežárkou and the town Veselí nad Lužnicí, which will probably be the highest situated localities of *T. patens* above the sea level in this country, and finally, the locality in the town Písek.

From Moravia *T. patens* has hitherto been reported only from the proximity of the village Hejčín near the city of Olomouc and from the town Hranice. Both localities give, however an idea that this species might be distributed in Moravia along the river Morava and perhaps also along its lower tributaries right down to its confluence with Danube so that there might be a continuous connection with the

localities in Záhorie-Lowland on the territory of Slovakia.

Similarly, I had no opportunity to ascertain what connection there is and whether such a connection with the localities in Záhorie-Lowland is towards the river Váh or the region of the river Nitra or towards the Slovak part of the Danubian Basin. Nevertheless the existence of reports on *T. patens* from the lowest part of the region of the river Hron in the neighbourhood of Štúrovo may indicate this possibility. The last known sector of the *T. patens* distribution in this country is the appearance of this species in east Slovakia. It appears there in several known localities along the river Bodva where it fluently penetrates from the neighbouring Hungary wherefrom, for several years its locality

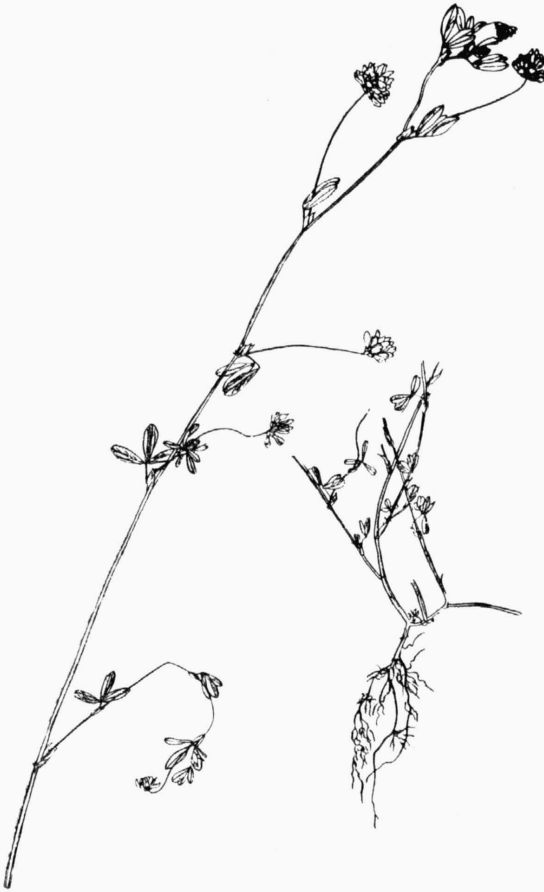


Fig. 1. — Habitus of *Trifolium patens* (Del. K. HÍSEK).

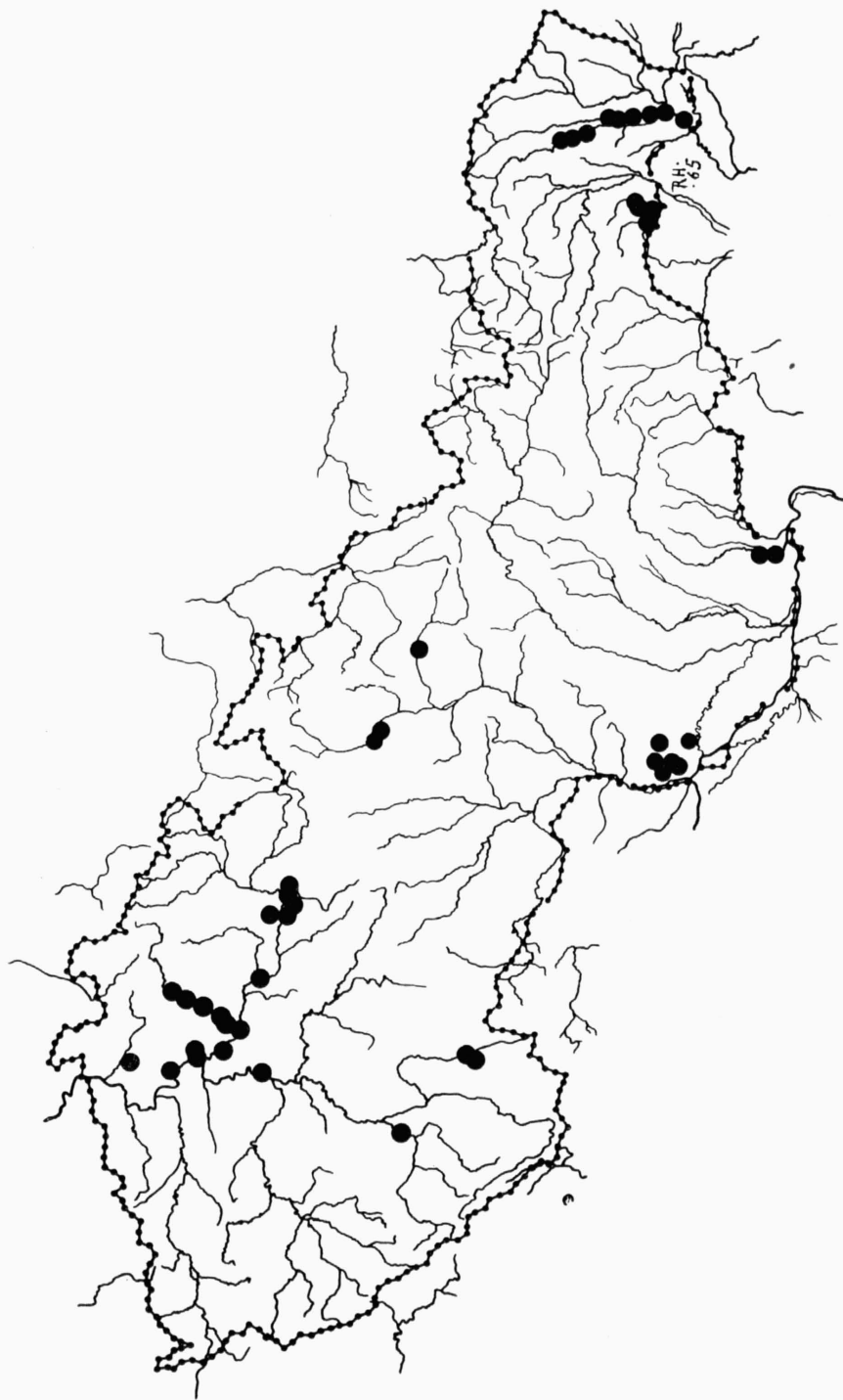


Fig. 2. — The distribution of *Trifolium patens* in Czechoslovakia (Orig.).

has been known from the immediate proximity of the Czechoslovak border (JAKUCS 1952 : 250). This locality also induced me to look for *T. patens* on the Czechoslovak bank of the Bodva. *T. patens* penetrates remarkably far to the north from the Czechoslovak-Hungarian border along the river Ondava and Topla, namely right to the village of Hanušovce; there it probably ends since farther northwards I have never found it anywhere.

From the above it follows that *T. patens* will certainly be ascertained also in other parts of Czechoslovakia. I should certainly expect it in the region of the river Ohře, at least in its lower and central part. In Moravia, beside its already presumed appearance in the southern part of the country *T. patens* may be expected in the area of the river Odra region (in the neighbourhood of the city of Ostrava). In Slovakia it will be necessary to look for *T. patens* in the lower Váh region, lower Nitra region and lower Hron region as well as to expect its occurrence along the lower courses of the rivers Latorica and Laborec and in the neighbouring parts of East-Slovakia Lowlands.

In the absolute majority of localities where I found *T. patens* it appeared in the meadows of inundation area of rivers, namely in meadows which were rather moist, high in humus, unmanured but cut regularly twice a year. *T. patens* flowers there often on fairly large areas, sometimes only nestwise and in groups after the autumn hay-making. Until then it is quite inconspicuous, usually not yet in bloom, and even though we had known of its presence on the given spot it is difficult to find it in the high grass stand.

These meadows have usually developed through long years of regular hay-making a fairly uniform and also common composition where quite regularly there are represented species such as *Agrostis vulgaris*, *Alchemilla vulgaris* ssp. div., *Alopecurus pratensis*, *Anthoxanthum odoratum*, *Bellis perennis*, *Briza media*, *Campanula patula*, *Carex distans*, *C. flava* ssp. *flava*, *C. hirta*, *C. leucanthemum*, *Cirsium canum*, *C. oleraceum*, *Dactylis glomerata*, *Euphrasia rostkoviana*, *Festuca pratensis*, *Galium mollugo*, *G. verum*, *Geranium pratense*, *Holcus lanatus*, *Knautia pratensis*, *Lathyrus pratensis*, *Linum catharticum*, *Lotus corniculatus*, *Lychnis flos-cuculi*, *Lysimachia nummularia*, *Phleum pratense*, *Pimpinella saxifraga*, *Poa pratensis*, *P. trivialis*, *Polygonum bistorta*, *Potentilla erecta*, *Prunella vulgaris*, *Ranunculus acer*, *Rhinanthus major*, *R. minor*, *Rumex acetosa*, *Sanguisorba officinalis*, *Silene inflata*, *Stellaria graminea*, *Succisa pratensis*, *Tragopogon orientalis*, *Trifolium campestre*, *T. dubium*, *T. hybridum*, *T. pratense*, *T. repens*, *Trisetum flavescens* and other plants. In some cases, in addition to the above species, nearly always present, some other plants may be added such as *Carex davalliana*, *Colchicum autumnale*, *Galium boreale*, *Molinia coerulea*, *Parnassia palustris*, etc.

Besides the above meadows which certainly represent the most frequent type of stands, I found *T. patens* on field boundaries, trenches, lawns, navigation embankments and dikes, but also it was found in gardens and even on rubbish heaps. Several times I found it even in swampish parts of meadows.

Summing up its stand conditions we see that in our country *T. patens* appears mostly in communities so to say traditional though not in their present shape and special composition quite native. Certainly, in such communities the competition for it as for a newcomer is (at least in Bohemia) very difficult (see THELLUNG 1915 : 52). Therefore, it is striking that in all such stands it appears as a species quite adapted to such communities not seeming there at all odd.

Difficult is the question whether *T. patens* is indigenous or introduced in our country. Especially problematic is its distribution in Bohemia and Moravia. For Slovakia where the known localities are fairly closely connected with the distribution of *T. patens* from the south this question does not seem controversial and the local distribution evidently appears as native. The extent of floristic investigations carried out both in the past and at present exclude any objection that might be stated to the explanation of its nativity, in particular, concerning Bohemia.

The character, and especially, the distribution of localities in Bohemia, probably only with the exception of the localities in southern Bohemia, would, on the whole indicate that *T. patens* is its native species. The only objection I should state is that the plants of *T. patens* as collected by various samplers (believing them to be *T. campestre* or *T. dubium*), originate all from recent times; only from the years 1929, 1932 and later when their numbers rapidly increase. I counted the materials from Bohemia of the species *T. campestre* and *T. dubium* collected since the oldest herbarium items preserved from the beginning of the 19th century up to now; it appeared that in the main herbaria, up to 1929 fall 3/4 of the total number of items whereas from 1929 (the year of the origin of the oldest sampled plant of *T. patens* in Bohemia, collected near Zličov in the neighbourhood of Prague) to 1947 originated only approximately 1/4 of all items of both given species. Therefore, there is a question why right up to 1929 there was not a single item of *T. patens* among the plants of *T. campestre* and *T. dubium* the species for which *T. patens* used to be mistaken in this country. At the same time, on the territory from where it has been known at present, the most intensive sampling floristic activity was going on, Bohemia had ever known, already in the second half of the 19th century (the so-called Čelakovský era). Such a consideration might be superfluous if *T. patens* were present on one to three localities so that it might easily be assumed it had been overlooked by samplers. It is not so, therefore, it is necessary to accept as fairly significant the explanation that *T. patens* was somehow introduced to Bohemia, probably not very long before 1929, and later, it became there distributed.

Against the view of *T. patens* being native for Bohemia there is a persistent doubt which has indirect roots also in the fact that the first locality known from Bohemia, near Zličov, is situated in an area from which several cases of introduction of foreign plants to Bohemia had been reported in the past (perhaps only temporary ones); only of clovers it was the following species: *Trifolium pallidum* W. & K., *T. lappaceum* L., and *T. maritimum* HUDS.

Under similar considerations I had, already in the past (HENDRYCH 1956 : 405), come to a conclusion that *T. patens* is evidently a secondary species in Bohemia.

A similar consideration for Moravia is prevented by the fact that only three localities are known to me from there the oldest of which dates from 1911. Regarding the geographical position of all these localities I presume, and that with a considerable conviction, from the analogy from Slovakia, that *T. patens* will evidently be found in the lowlands of southern and central Moravia in a continuous series the same as in eastern Slovakia or, in the end, even in Bohemia in the Elbe-Lowland. If this presumption proves to be true, its distribution in Moravia would have a fairly continuous connection with its distribution in Pannonia where there is no doubt about the autochthonous appearance of *T. patens*.

In Slovakia, I believe *T. patens* to be definitely native, perhaps only the higher frequency might be secondary.

I dare say this question cannot be finally solved since it involves a problem expressed once by THELLUNG (1915 : 57) by the following words: „Wenn, wie wir angenommen haben, die eingebürgerten Pflanzen sich in jeder Hinsicht verhalten sollen wie die einheimischen, wie ist es dann möglich, sie von den letzteren zu unterscheiden?“

The newly ascertained astonishing range of appearance of *T. patens* in our flora which is in such a great controversy with its former ideas on its Czechoslovak distribution (cf. DOSTÁL 1950 :

478) may be compared with the actual representation of the species *Poa supina* in our flora (at least in Bohemia and Moravia) which had been carried out in a quite unusual way by JIRÁSEK and CHRTEK (1962a, 1962b, 1964), or even with the discovery of the occurrence of *Glyceria declinata* disclosed by applying literature through the paper by WALTERS (1948, 1959), by HOLUB (1959a, 1959b, 1960), in this country. There is, however, a difference in that both the species, especially *Poa supina*, belong to indigenous species, probably in all their distribution in Bohemia right from the start, according to the existence of even old herbarium items.

Following are localities I ascertained in herbaria¹⁾ and terrain on the Czechoslovak territory:

České středohoří: Ad viam publ. pr. opp. Kravaře (Preiss 1936); in monte Dubí hora pr. opp. Kravaře (Preiss 1936).

Dolní Povltaví: Pr. pag. Zlíchov ad urb. Praha (Rohlena 1929).

Polabí: Ad pag. Štětí, 150 m (Hendrych 1964); ad portum in opp. Mělník, 155 m (Mikuláš 1943); ad stat. ferroviae Mělnická Vrutice, 185 m (Protiva 1943); ad pag. Jiříce, 170 m (Hendrych 1964); ad pag. Nový Vestec, 170 m (Hendrych 1963); non proc. a pag. Oseček, 190 m (Hendrych 1963); ad pag. Žižín, situ pag. Černá za Bory verg. (J. Hadač 1932); ad pag. Černá za Bory (O. Horák 1932); in opp. Pardubice, inter loc. Karanténa et loc. curs. equor. (J. Hadač 1936); pr. pag. Mnětice, 220 m (Hendrych 1958); ad pag. Nové Jesenčany, 200 m (Hendrych 1960); inter vic. Famílie et vic. Studánka in opp. Pardubice, 220 m (Hendrych 1957); pr. pag. Trnová, 210 m (Hendrych 1957); non proc. a pag. Srnojedy, 200 m (Hendrych 1957); ad pag. Neratov (V. Horák 1945).

Pojizeří: Pr. opp. Bakov n. Jiz., 220 m (Hendrych 1959); inter pag. Chrást et Vinec, 210 m (Hendrych 1963); sub pag. Písková Lhota, 210 m (Hendrych 1963); ad fl. Jizera pr. opp. Mladá Boleslav (Holub 1950); ad pag. Brodce, 210 m (Hendrych 1964); sub opp. Benátky n. Jiz., 200 m (Hendrych 1959); inter pag. Škorkov et Sojovice, 175 m (Hendrych 1963).

Jihočeská pánev: Ad coll. Šibeniční vršek pr. opp. Mezimostí n. Než. (Kurka 1941); ad stat. ferroviae Veselí n. Luž. (Kurka 1949).

Pootaví: Ap. sepuler. nov. ad opp. Písek, 340 m (Ambrož 1942).

Hornomoravský úval: Pr. pag. Hejčín (Laus 1911, 1913, 1920, 1929, 1930, 1932, 1937; Otruba 1941); pr. opp. Olomouc (Leneček 1926); ad loc. Hrabůvka pr. opp. Hranice na Mor. (Petrak s. a.).

Záhorie: Ad pag. Plavecký Štvrtok (Degen 1916; Scheffer 1921, 1928); ad pag. Stupava pr. urb. Bratislava (Krist 1938); ad pag. Zohor pr. urb. Bratislava (Picbauer s. a.; Ptačovský s. a.); inter pag. Zohor et Lozorno (Gayer s. a.).

Košická nížina: Ad fl. Bodva pr. pag. Chorváty, 170 m (Hendrych 1960); ad pag. Peder, 185 m (Hendrych 1964); situ austr. a pag. Čečejevce et Mokrance, 190 m (Hendrych 1964); ad septentr. a pag. Perín verg., 200 m (Hendrych 1964).

Východoslovenská nížina: Sub pag. Hanušovce, 150 m; ad pag. Bystré 155 m; ad pag. Vyš. Žipov, 146 m; inter pag. Hlinné et Čierne n. T., 165 m; sub pag. Sol', 145 m; non proc. ab opp., Vranov, 130 m; pr. pag. Horovce, 115 m; ad septentr. et orient. a pag. Hraň verg., 100 m; ad austr. a pag. Brehov vers., 100 m; ad pag. Nová Vieska n. B., 100 m; ad austr.-or. a pag. Borša, 90 m (omnes Hendrych 1964).

The area of *T. patens* (see Fig. 3) is spreading only in Europe, namely in its southern half only. The western margin of the area stretches as a stripe over the extreme north of Spain, round Cantabrian Mountains through the Vascongadas province and farther along the southern foot of the Pyrenees and their foot-hills right to the eastern coast of the peninsula. Similarly it stretches along the Pyrenees on their northern side. In France, however, *T. patens* is more widely distributed and it takes there more or less the whole southern, western and northwestern part of France and also, a considerable portion of the central France. In the south-east it penetrates right to the foot-hills of Alpes-Maritimes

¹⁾ The following herbarium collections are involved: The Botanical Institute of the Charles University in Prague, The Department of Botany of the National Museum, Prague-Průhonice, Botanical Institute of the J. E. Purkyně University, Brno; Department of Botany of the Moravian Museum, Brno; Botanical Institute of the Komenský University, Bratislava; Department of Botany of the National Museum in Budapest, and private herbaria of the samplers V. Horák (Pardubice) and J. Holub (Prague), and R. Kurka (Veselí nad Lužnicí).

where it mounts up approximately 500—570 m above sea level, similarly as in the mountain range of Auvergne (CHASSAGNE, 1957 : 118). In the north it penetrates to the neighbourhood of Paris and in general to the south of the river Seine. In Switzerland it has been reported as an indigenous species only in the southern part of the country where in Tessin and Bergel it mounts, according to some reports, as high as to 1000—1200 m. above sea level. In



Fig. 3. — The area of *Trifolium patens*; dotted are the territories of introduced appearance (Orig.).

Italy it is in situations up to 900—1000 m. above sea level distributed in all continental territory. Apart from the continental Europe *T. patens* has been known from some mediterranean islands, namely from Crete, from the island of Thasos and Corsica. From Italy *T. patens* spreads to Austria, here perhaps only to Middle and Lower Styria, and particularly distinctly to the Balkan peninsula where it is present in nearly all Yugoslavia and Albania, southwards right to Greece; it mounts, however, to situations of 700 to 1200 m. above sea level as indicated in the summary records from Velebit (DEGEN 1937 : 326), of from Bosnia (BECK 1927 : 232). From Greece it reaches the European part of Turkey where, in the neighbourhood of Istanbul is probably the location of the extremely eastern point of its total distribution. In Bulgaria *T. patens* appears in the western, south-western and central part reaching situations as high as 1000 to 1200 m. above sea level (STOJANOV 1930 : 40). In Rumania it is distributed in lowlands and in a hilly country zone (from Brasov to 900 m.

above sea level), in Transylvania and Banat in the regions of Craiova and Pitesti where the eastern line of its area is situated. In Hungary its appearance is limited to lowlands, especially in Alfeld Lowland but also in Transdanubian Region right to Kis-Alfeld Lowland. From Hungary it reaches to the north, to Czechoslovakia (see above).

Except the area which I have described here and which may approximately be considered as indigenous, *T. patens* has been reported from some countries as an introduced species. Thus it is the northern half of Switzerland, further Alsatia and Upper Rhineland, the neighbourhood of Manheim, and in Austria, Salzburg and Corinthia. Apart from the problems of its occurrence in Bohemia which has been mentioned on previous pages of this paper, it remains to be concluded that the most distant from its indigenous area is its introduced finding place in Poland. From there *T. patens* has been known coming from the foot-hills of Beskid Niski where it had been found in 1933 on meadows near the village Wróbliek Szlachecki near the road to Rymanow, by PIECH (1939 : 69). Later it was reported from the basin of the river Nidzica in Malopolska Lowland (KOSTRAKIEWICZ, 1959 : 56).

According to its distribution in Bohemia it may be assumed that *T. patens* might be found along the Elbe in Germany. In the same way I should expect, with a great degree of certainty, its appearance in Lower Austria as follows from its distribution in Slovakia and indirectly, in Moravia and finally, in the north-east of Hungary.

Likewise the eventual penetration of *T. patens* cannot be excluded through the North-Moravian Odra-Lowland to Poland, especially if we consider the specimens found on the northern foot-hills of Polish Carpathians which may not be so isolated from one another as may appear when considering its present distribution.

Finally, the autochthonous origin of the total area of *T. patens* is even so very doubtful. Even though I cannot go more into detail for want of wider and deeper records I wish to point out that it cannot be excluded that the whole area is on its northern border probably in a certain progressive movement. That is indicated by the distribution of those regions where the appearance of *T. patens* has been introduced or where it has been indicated as such. Whatever are the causes and ways of this movement and propagation, it cannot be considered as impossible that they all by themselves represent, today, a certain phase of the total shift of the area of *T. patens* northward.

I believe interesting results may be received by investigating *T. patens*, especially in western Europe where it may be expected farther north than it has hitherto been known. Nor should be impossible its introduction to south-east of England, or elsewhere.

I should, namely, not exclude, and it seems to me quite probable, that for the related species such as *T. campestre*, *T. aureum* and *T. dubium*, a great part of their present areas, that is to say, their extramediterranean to extrasubmediterranean parts, appeared gradually, perhaps already in the early historical era, through an indirect influence by man. He, by extending the area transformed by ecumene created gradually locally advantageous conditions as well as contributed to their gradual introduction. I should judge so partly from the configuration of the areas of the above-mentioned species but also from the local conditions under which these species appear outside the mediterranean or from where they are reported.

The variability¹⁾ of *T. patens* is relatively not extensive. It appears in some characters, the habitus being of foremost importance. Typical, and also most frequent are plants ranging from decumbent to rather weakly ascending outgrowth. More rarely, however, upright to straight plants appear. Even greater is the variability of leaves. Most of them are on the lower part of the stem composed of cuneate elliptical leaflets, in the middle and upper part of the stem being cuneate, narrowly elliptical, in front weakly almost truncate and serrate dentate either from their half, or at least in front. Sometimes also, the leaves from the central part of the stem possess wider leaflets so that they are only cuneate elliptical and only upper or the uppermost leaves have their leaflets narrowly cuneate elliptical. The middle leaflet possesses, as a rule a short small petiole but distinctly, although only slightly longer than the lateral leaflets; sometimes this small petiole is absolutely of almost equal length as the lateral leaflets, very rarely, it is on the contrary, much longer. The last case concerns plants which were described as *T. parisiense* DeCANDOLLE & LAMARCK (1815 : 562). Evidently, however, only a small deviation is here involved which is connected with normal transitional forms between individual plants, or on one plant itself. In the determination practice I succeeded when starting from ratios of leaves in the approximate centre of the stem length or in its upper part.

When comparing with the outgrowth and leaves, the variability in flowers is almost negligible since, in the shape of flower and its parts as well as in the colouring (distinctly golden yellow), in the size and shape of inflorescence this species is practically invariable.

Of the interspecific taxons, perhaps only three had been described: *T. patens* (var.) *β pygmaeum* SERINGE in DeCANDOLLE (1825 : 206) differing from typical plants as the name itself says only by the proportionality of the outgrowth. This type I myself have never observed in Czechoslovakia nor among herbarium specimen from other countries have I had it at my disposal. More frequent seems to be *T. patens* f. *petiolulatum* BEYER (1891 : 28) differing only by longer small petioles of the central leaves; this form, which is probably identical with the above-mentioned *T. parisiense* I found fairly frequently among plants sampled on the Czechoslovak territory besides typical plants. When determining these plants there is a danger of mistaking them for *T. campestre*, however, by correct determination of other features this can be avoided. As it seems, the last described form up to now has been *T. patens* f. *gracile* CHENEVARD (1910 : 320) differing only by its habitus; these plants are of a straight outgrowth, with loosely spread branching so that they remind those not well informed of lower

¹⁾ Nomen : *T. patens* SCHREB. in STURM (1804) Deutschl. Fl. 1/16 (sine pag.). — Synonyma : *T. aureum* THUILL. (1799) Fl. Paris., ed. 2, 385, non POLLICH. — *T. spadicum* DUBOIS (1803) Fl. Orleans no 1683, non L. — *T. parisiense* DC. et LAM. (1815) Fl. Fr. 5 : 562, incl. — *T. procumbens* LOISEL. (1828) Fl. Gall., ed. 2, 2 : 127, non L. — *T. chrysanthum* GAUDIN (1829) Fl. Helv. 4 : 603. — *T. speciosum* MARG. et RENT. (1838) Ess. Fl. Zante 41, non WILLD. — *Amarenus patens* C. PRESL (1832) Symb. Bot. 1 : 46. — Spec. authen. mihi ign., species e vicin. opp. Tergeste et Gorica descr.

Icona : STURM l. c. tab. 256; REICH. f. et BECK, Ic. Fl. Germ. Helv. 22, tab. 120, fig. II. — 14—23; HEGI Fl. Mitt.-Eur. 4/3: 1292. — JÁV. et CSAF. Ic. Fl. Hung. tab. 276 fig. 2001. — VICIOSO, Tréb. Esp. Tab. 4. — mea tab. I. — Exsicc.: Baenitz Herb. Eur. no 2280 et 5951. — Fl. exs. Austr.-Hung. no 2818 — Herb. Graec. norm. no 1418. — Pl. Gal. Belg. no 464. — Fl. Romen. exs. no 554 (cum *T. campestre* mixt.). — Fl. Boh.-Mor. exs. no 1483. — E. REVERCHON, Pl. Crète no 238. — Reliq. Maillean. no 173, 173a. — Sintenis, It. Thess. 1896 no 380. — Sintenis Bornmüller, It. Turc. 1891 no 442. — Reichenb. Fl. Exs. Germ. no 2218.

plants of *T. aureum* or also of *T. campestre*. I never saw very typical forms of this plant form from the Czechoslovak territory.

In the present fairly wide conception of the genus *Trifolium*, *T. patens* belongs to the section *Chronosemium* SERINGE in DeCANDOLLE (1825 : 204) which itself, however, possesses a higher taxonomic value than has been assigned to it hitherto. According to PRESL (1830 : 47), whose view as to the division of the genus *Trifolium* s. l. is not probably far from the truth, it is a separate genus *Amarenus*. According to the division of the section *Chronosemium* as suggested by GIBELLI et BELLI (1889 : 11) *T. patens* belongs to a group designed as *Cochleariformia*, together with the species *T. aureum*, *T. campestre* and others. According to the division of this group as suggested by BOBROV (1947 : 244) *T. patens* belongs to a series *Agraria*, characterised by "Vexillo cochleariformiter dilatato ungue evidentiter post anthesin rhytideo" (orig. diagn. ross.). Besides *T. patens* includes BOBROV into this series also the species *T. aureum*, *T. campestre* and *T. lagrangei*. At the same time it seems that inside of the series thus delimited, *T. patens* has a position, so to say, marginal. It seems to me that it suggests a transitional form from the series *Agraria* to the series *Sebastiania* BOBROV (1947 : 247), characterised by "Vexillo late obovato usque suborbiculato post anthesin rubiginoso" (orig. ross.), with species *T. sebastiani* and *T. erubescens*. I believe it to be so on the basis of the flower shape and also, of vegetative parts even though the difference is not more profusely marked. The series *Filiiformia* specified by „Vexillo cymbiformi, floribus lucide flavescentibus 2—4 mm. longer, capitulo 3—15 floro." (orig. ross.), with the species *T. dubium* and *T. micranthum* BOBROV (1947 : 246), is taxonomically more distant to this series.

To the series *Agraria* belongs, besides the previously stated species, also *T. dolopicum* published as exsiccative „C. Haussknecht, Iter Graecum 1885" (sine numero) as *T. patens*. It was designated as *T. dolopicum* by HELDREICH and HOCHSTETER and published as such for the first time by GIBELLI et BELLI (1889 : 3). These authors, however, expressed a view it might involve hybrid plants between *T. patens* and *T. brutium* (cf. HALACSY 1901 : 405). The sampler himself, however, designated and named these plants as *T. patens* β *koronense* (HAUSSKNECHT 1893 : 78). Even though these types are doubtlessly very closely related to *T. patens*, I believe them to belong to an utterly separate species as I can judge from the seen cotype specimens. This *T. dolopicum* is, however, also the most closely related species to *T. patens* of all other species. Hitherto it has been known only from Thracia and Thessaly (HAYEK 1927 : 849), more recently, according to RECHINGER (1943 : 359) reported by TURRIL from the Athos peninsula, above Chilandari, which means that it is quite sympatric with *T. patens*.

As I have already stated when investigating the Czechoslovak material it was disclosed that *T. patens* was being mistaken by samplers partly for *T. campestre* and also, for *T. dubium*; at least, those items of *T. patens* were thus determined

which had been sampled previously not only in Czechoslovakia but also abroad. On the whole, it is to be said that the species of the series *Agraria* and the series *Filiformia* are altogether most often mutually mistaken species of the whole genus *Trifolium*. This also resulted in a considerable doubtfulness of some designations in the past. Therefore, I included into my tables of chief distinguish-



Fig. 4. — Comparative flower diagrams of similar and related species: a — *T. campestre*, b — *T. patens*, c — *T. dubium*, d — *T. aureum*, e — *T. micranthum* (Orig.).

ing characters (Fig. 4—6) of central European representatives besides *T. patens*, *T. campestre*, *T. dubium* also *T. aureum* and, in the end also *T. micranthum* which species I expect to be disclosed on the Czechoslovak territory as introduced, perhaps even as transient introduced.

T. patens can be easily distinguished from *T. campestre* by the shape of flowers, colour and shape of inflorescence, shape of leaflets, length of small petiole of the middle leaflet. In *T. patens* the standard is narrowly cochleariform, wings possessing a long, more or less pointed lobe, the heel has a distinct notch in front, the colour of the flowers is golden yellow, the inflorescence is freely crowded, hemispherical in shape, the leaflets are usually cuneate narrowly elliptical in the centre of the stem, the central leaflet with a distinct small petiole but comparatively only slightly longer than the lateral leaflets which are usually about 1.5 to 2.2 mms. long.

In *T. campestre* the standard is widely cochleariform, in its widest part somewhat broken in the crosswise direction, the wings possessing an obtuse lobe and the heel has an indistinct notch in front, the colour of the flowers being

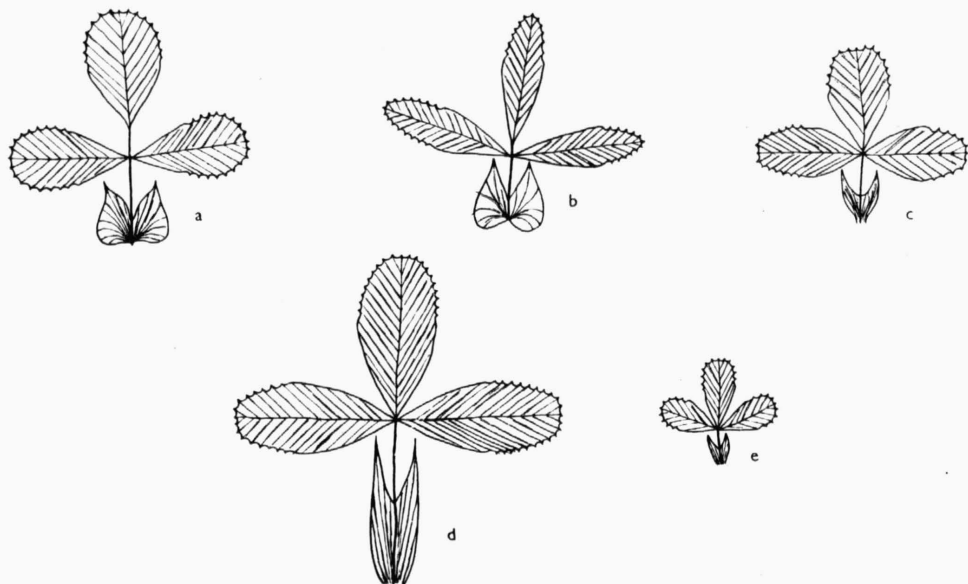


Fig. 5. — Distinguishing characters in leaves of *T. patens* and related or similar species: a — *T. campestre*, b — *T. patens*, c — *T. dubium*, d — *T. aureum*, e — *T. micranthum* (Orig.).

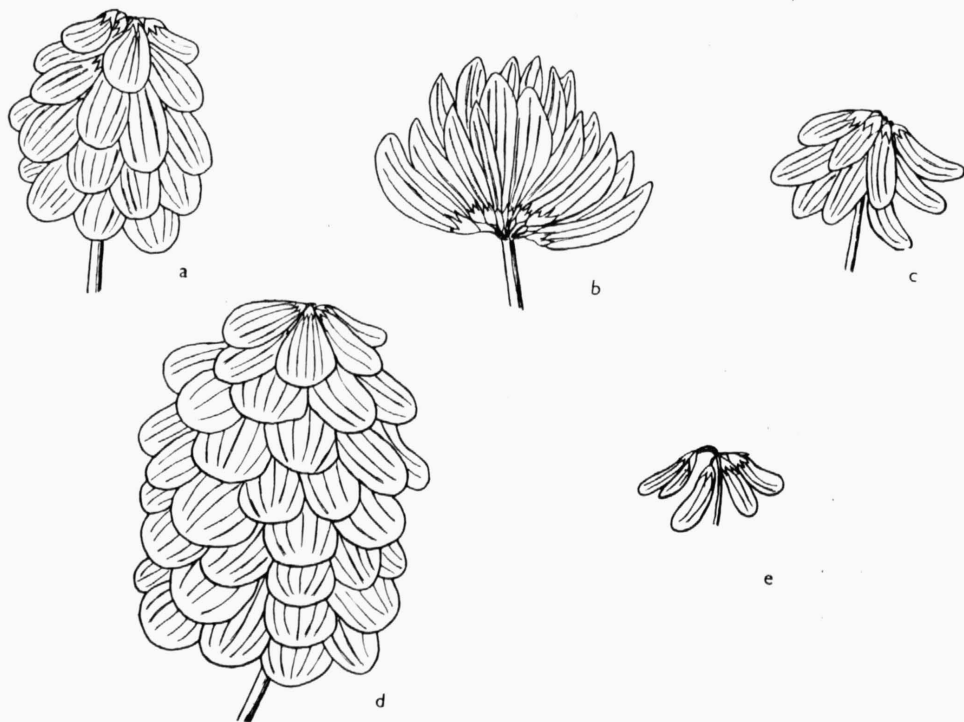


Fig. 6. — Schematic comparison of inflorescence in individual similar and related species: a — *T. campestre*, b — *T. patens*, c — *T. dubium*, d — *T. aureum*, e — *T. micranthum* (Orig.).

lemon yellow, while the inflorescence is more crowded, globose to oval, later shortly oval to almost cylindrical, the leaflets in the centre of the stem being always cuneate obovate with the central leaflet always placed on a longer, 4–5 mms. long little petiole, usually with some lateral deviation.

The differences between *T. patens* and *T. dubium* are somewhat analogical. In *T. dubium* the standard is heelform, wings have a medium long rounded lobe and a heel rather more pointed in front, without a notch; the colour of flowers is light to whitish yellow, the inflorescence thin, poor in flowers, the leaflets being cuneate, obovate, all the three of them to the same degree shortly petioled.

To mistake it for *T. aureum* is fairly improbable though this species itself is frequently being taken for *T. campestre*. Similarly unlikely is its being mistaken for *T. micranthum* which, however, could easily be taken for *T. dubium* what happens frequently in territories of their common appearance.

Souhrn

Jetel otevřený lze stále považovat za poměrně málo známého zástupce naší květeny. Výsledky studia v terénu ukazují, že je druhem podstatně častějším, než jak by se zdálo z počtu lokalit dopedávna známých z území Československa. Zvláště nápadné je množství lokalit objevených v Čechách, kde jej autor považuje za druh poměrně nedávno zavlečený, ale pozoruhodně zdolmáčený v dosti širokém rozsahu výskytu a nadto na stanovištích, která se svým charakterem kryjí s charakterem jeho stanoviště z území indigenního výskytu (hlavně louky v inundačním pásmu toků, ale i, ač méně, na mezích, v příkopech, na hrázích a v trávnicích). Pokud se týče výskytu na Moravě, zdá se, že by mohl být původní; jinak jej tam autor sám nesledoval. Skutečné rozšíření bude na Moravě rozhodně větší než jak by se zdálo z těch několika lokalit, objevených na mylně determinovaném materiálu v herbářích.

Na Slovensku se zdá být *T. patens* druhem původním, jen asi frekvence jeho tamního výskytu bude zřejmě druhotná. Rozšíření na Slovensku je plynulým pokračováním jeho rozšíření v Maďarsku.

Na základě druhotného výskytu v některých zemích, autor dochází k závěru, že v současné době je *T. patens* vlivem nepřímých zásahů v druhotné migraci na sever od severní hranice jeho přirozeného areálu. Domnívá se, že lze očekávat jeho nálezy snad i ve větším počtu z Německa (jmenovitě Polabí), další nálezy z Polska, ale jmenovitě ze zemí západní Evropy, včetně Británie.

Většinou je zaměňovaný tento druh za *T. campestre*, což se týkalo téměř všech lokalit nalezených v herbářovém materiálu z Čech, Moravy a Slovenska. Od *T. campestre* lze *T. patens* při větší pozornosti snadno rozlišit podle tvaru květů, barvy a tvaru květenství, tvaru lístků a délky řapíčku prostředního lístku. U *T. patens* je pavéza úzce lžičkovitá, křídla s dlouhým a více méně zašpičatělým lalokem, člunek vpředu se zřetelným zářezem, barva květů zlatožlutá, květenství je volně nahloučené, v obrysu polokulovité, lístky jsou uprostřed lodyhy většinou klínovitě úzce eliptické, prostřední lístek s řapíčkem zřetelným, ale jen poměrně málo delším než řapíčky u lístků postranních (obvykle bývá asi 1,5–2,2 mm dlouhý).

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