

A revision of the species of *Trifolium* sect. *Trifolium* (Leguminosae) : II. Taxonomic treatment

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**A revision of the species of *Trifolium* sect. *Trifolium* (Leguminosae).
II. Taxonomic treatment**

M. ZOHARY

RÉSUMÉ

Dans la deuxième partie de sa révision du genre *Trifolium* sect. *Trifolium*, l'auteur étudie la systématique de ce groupe. Il expose une importante clé de détermination pour les 72 espèces de la section. Dans le présent fascicule, il décrit 12 sous-sections comprenant 52 espèces et de nombreuses variétés, dont 4 sont nouvelles: *T. gemellum* var. *leucocephalum* et var. *phyllocephalum*, *T. dichroanthum* var. *ascalonicum* et var. *cyprium*.

SUMMARY

In the second part of his revision of the genus *Trifolium* sect. *Trifolium*, the author studies the systematics of this group. He exposes a comprehensive key for the determination of the 72 species of the section. In the current paper, he describes 12 subsections including 52 species and many varieties, 4 of them are new: *T. gemellum* var. *leucocephalum* and var. *phyllocephalum*, *T. dichroanthum* var. *ascalonicum* and var. *cyprium*.

ZUSAMMENFASSUNG

In zweitem Teil seiner Revision der Gattung *Trifolium* sect. *Trifolium*, untersucht der Verfasser die Systematik dieser Gruppe. Er trägt einen umfassenden Bestimmungsschlüssel für die 72 Arten der Sektion vor. In dieser Lieferung beschreibt er 12 Untersektionen, enthaltend 52 Arten und viele Varietäten, in welchen 4 neue sind: *T. gemellum* var. *leucocephalum* und var. *phyllocephalum*, *T. dichroanthum* var. *ascalonicum* und var. *cyprium*.

Sect. *Trifolium*

Lagopoda L., Sp. Pl.: 767. 1753, p.p.

Lagopus Ser. in DC., Prodr. 2: 189. 1825, p.p.; Bernh., Syst. Verz. Pfl. Erfurt: 220. 1890, pro gen.; Lojac., Nuov. Giorn. Bot. Ital. 15: 228. 1883b; Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 1. 1889; Aschers. & Graebn., Syn. Mitteleur. Fl. 6/2: 526. 1908; Herm., Feddes Repert. 43: 318. 1938; Bobrov, Act. Inst. Bot. Acad. Sci. URSS 1, 6: 265. 1947, pro subgen. p.p.; Koch, Syn. 1: 184. 1837, pro sect. p.p.; Boiss., Fl. Or. 2: 110. 1872, pro sect.

Eulagopus Lojac., l.c.: 232, pro sect.

Trifolium C. Presl, Symb. Bot. 1: 48. 1832, pro gen.; Hossain, Not. Roy. Bot. Gard. Edinb. 23: 397. 1961, pro subgen.

Annuals or perennials. Heads falsely terminal or axillary, sessile or pedunculate. Flowers bractless, very rarely with few bracts at base of head. Calyx 10-20-nerved, hairy or rarely glabrous, with unequal or equal teeth; throat open but then provided with a hairy ring or narrowed by a protruding ring; usually throat closed by a 2-lipped callosity. Corolla mostly partly united. Pod included in calyx tube, 1-, very rarely 2-seeded. Dispersal abolic, calycobolic or synaptospermic.

Typus: *T. pratense* (Hitchcock & Green in Proposals by British Botanists: 177. 1929).

Key to the species of Sect. *Trifolium*

- | | | |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 1a. | Calyx tube 15-20-nerved | 2 |
| 1b. | Calyx tube 10-nerved | 9 |
| 2a. | Fruiting heads depressed, disk-like, not disarticulating into fruiting calyces, but separating as a whole, together with its stipular involucre. Flowers white or cream-coloured; stipules not cuspidate at apex
35. <i>T. cherleri</i> L. | |
| 2b. | Fruiting heads and other characters not as above | 3 |
| 3a. | Heads few, 3-7-flowered, all axillary, surrounded by the broadened leaf stipules and overtopped by the relatively long-petioled leaves
38. <i>T. congestum</i> Guss. | |
| 3b. | Heads terminal, not as above | 4 |

4a.	Leaflets obovate to obcordate, scarcely twice as long as broad. Annuals	5
4b.	Leaflets oblong-lanceolate to elliptical, 3-6 (or more) times as long as broad. Perennials.	7
5a.	Teeth of calyx shorter than tube. Corolla pink, twice as long as calyx. Dwarf caespitose plants 37. <i>T. barbeyi</i> Gib. & Belli	
5b.	Teeth of calyx much longer than tube	6
6a.	Calyx tube long-hairy. Heads sessile, involucrate, disarticulating at maturity into fruiting calyces. 34. <i>T. hirtum</i> All.	
6b.	Calyx tube glabrous or glabrescent. Heads pedunculate, not disarticulating at maturity. 36. <i>T. lappaceum</i> L.	
7a.	Calyx teeth sharp-pointed. Leaflets entire, rounded-obtuse. Stems usually glabrous 6c. <i>T. medium</i> L. var. <i>sarosiense</i> (Hazsl.) Savul. & Rayss	
7b.	Calyx teeth blunt. Leaflets denticulate, acute, or mucronate	8
8a.	Calyx tube mostly glabrous. Stems and stipules glabrous or almost so. Free portion of stipules triangular-lanceolate 20. <i>T. rubens</i> L.	
8b.	Calyx tube, stems and stipules hairy. Free portion of stipules subulate-cuspidate 21. <i>T. alpestre</i> L.	
9a.	Flowers small, 0.3-1.3(-1.4) cm	10
9b.	Flowers large, 1.5-3 cm	56
10a.	Leaflets obovate or ovate, rarely broadly elliptical, 1-1.5(-2) times as long as broad	11
10b.	Leaflets all, or most of them, especially of the middle and upper leaves, elliptical, lanceolate or linear, usually (2.5)3-7 times as long as broad	25
11a.	Free part of stipules ovate to ovate-lanceolate, obtuse or acute, not provided with a subulate cusp or awn or a long mucro	12
11b.	Free part of stipules with a long-aristate or subulate or mucronate tip	13
12a.	Teeth of calyx sharp-pointed, equal 23. <i>T. incarnatum</i> L.	
12b.	Teeth of calyx blunt, unequal 24. <i>T. sylvaticum</i> Gérard ex Loisel.	
13a.	Leaflets with lateral nerves thickened and arcuate-recurved at margin. Annuals with sessile, axillary or axillary and terminal heads, about 1(-2) cm long, not or tardily disarticulating at maturity	14
13b.	Not as above	16
14a.	Teeth of fruiting calyx linear-subulate, triangular at base, almost twice as long as tube, membranous at margin, stellately spreading. Corolla up to twice as long as calyx 30. <i>T. dalmaticum</i> Vis.	
14b.	Teeth of fruiting calyx broader. Corolla as long as or slightly longer than calyx	15

- 15a. Teeth of flowering calyx as long as tube or shorter, broadly lanceolate, not subulate and not membranous, those of fruiting calyx as long or slightly longer than tube. Fruiting heads cuneate at base
28. *T. scabrum* L.
- 15b. Teeth of flowering calyx lanceolate-subulate or subulate, much longer than tube, those of fruiting calyx densely ciliate-hirsute. Fruiting heads broad at base, not cuneate 29. *T. lucanicum* Gasp. ex Guss.
- 16a. Corolla shorter than calyx 17
- 16b. Corolla longer than calyx 18
- 17a. Heads globular or ovate, often sessile or short-peduncled, often in pairs. Stems appressed-hairy 31. *T. gemellum* Pourr. ex Willd.
- 17b. Heads oblong or cylindrical, more or less long-peduncled, solitary. Stems patulous-hairy 33. *T. ligusticum* Balb. ex Loisel.
- 18a. Throat of fruiting calyx closed by a 2-lipped callosity 19
- 18b. Throat of fruiting calyx open, glabrous or hairy 22
- 19a. Fruiting calyx teeth (all or part) narrower at base than above; fruiting calyx 1 cm or more long 65. *T. obscurum* Savi
- 19b. Fruiting calyx teeth not as in above 20
- 20a. Heads provided at base with a 6-7-lobed membranous involucre. Calyx tube not urceolate 60. *T. cinctum* DC.
- 20b. Heads not as in above 21
- 21a. Lower calyx tooth ovate, triangular to broadly lanceolate; fruiting calyx tube glabrous 71. *T. scutatum* Boiss.
- 21b. Lower calyx tooth lanceolate to subulate; calyx tube hairy
72. *T. plebeium* Boiss.
- 22a. Wings of corolla appressed-hairy throughout or near auricles only. Calyx teeth connivent in fruit, markedly unequal
27. *T. trichopterum* Panč.
- 22b. Wings of corolla glabrous. Teeth of calyx equal 23
- 23a. Flowers about 1.3 cm long 4. *T. pallidum* Waldst. & Kit.
- 23b. Flower 6-9 mm 24
- 24a. Fruiting calyx cylindrical or campanulate. . . **T. pulchellum* Schischkin
- 24b. Fruiting calyx urceolate, globular or spindle-shaped 25. *T. striatum* L.
- 25a. Corolla shorter than or as long as calyx 26

*Doubtful species, cf. M. Zohary (1972) A revision of the species of *Trifolium* sect. *Trifolium* (Leguminosae). III. Taxonomic treatment (continuation). Candollea 27/2 (sub prelo).

25b.	Corolla considerably longer than calyx	35
26a.	Teeth of fruiting calyx lanceolate, all or part considerably narrower at base than at middle; fruiting calyx about 1 cm long 65. <i>T. obscurum</i> Savi	
26b.	Teeth of fruiting calyx not as above	27
27a.	Wings of corolla hairy, at least near auricle. Teeth of calyx plumose	28
27b.	Wings of corolla glabrous. Teeth of calyx plumose or not	29
28a.	Teeth of calyx equal, about twice as long as tube, erect or spreading 40. <i>T. affine</i> C. Presl	
28b.	Teeth of calyx as long as or shorter than tube, connivent 26. <i>T. bocconeii</i> Savi	
29a.	Throat of calyx closed by a 2-lipped callosity	30
29b.	Throat of calyx open, glabrous or hairy	31
30a.	Calyx much shorter than 1 cm 31. <i>T. gemellum</i> Pourr. ex Willd.	
30b.	Calyx 1 cm or longer 43. <i>T. angustifolium</i> L.	
31a.	Fruiting calyx with stellately spreading teeth. Leaflets mostly truncate	32
31b.	Fruiting calyx with erect or connivent teeth	33
32a.	Teeth of fruiting calyx united at base by a broad, membranous, collar-like, seam. Stems appressed-hairy. Heads mostly cylindrical 32. <i>T. phleoides</i> Pourr. ex Willd.	
32b.	Teeth of fruiting calyx without a broad, membranous, collar-like seam at base. Stems patulous-hairy. Heads globular or ovoid 31. <i>T. gemellum</i> Pourr. ex Willd.	
33a.	Teeth of fruiting calyx mostly plumose and 2 or 3 times as long as calyx tube. Corolla not or slightly exerted from calyx tube and much shorter than teeth. Fruiting heads white or reddish. . . 39. <i>T. arvense</i> L.	
33b.	Not as in above	34
34a.	Throat of calyx glabrous. Prostrate alpine plants . . . 41. <i>T. saxatile</i> All.	
34b.	Throat of calyx hairy. Erect, South-African plants 42. <i>T. stipulaceum</i> Thunb.	
35a.	Teeth of calyx blunt, mostly ending in one or more rough bristles	36
35b.	Teeth of calyx sharp-pointed, mostly ending in a glabrous tip	40
36a.	Teeth of calyx equal or very nearly so	37
36b.	Teeth of calyx distinctly unequal, the lower considerably longer than other	38
37a.	Teeth of fruiting calyx about twice as long as tube, finely plumose. Ovary stipitate 51. <i>T. prophetarum</i> Hossain	

- 37b. Teeth of fruiting calyx about as long as tube, not plumose
44c. T. purpureum Loisel. var. *pamphylicum* (Boiss. & Heldr.) Zoh.
- 38a. Corolla white or pinkish. Stems repeatedly and dichotomously branched, appressed-pubescent. Calyx covered with white, silky hairs. Leaflets narrowly oblanceolate, oblong-obovate or obovate; upper leaves opposite *50. T. haussknechtii* Boiss.
- 38b. Not as above 39
- 39a. Calyx covered with coarse, almost patulous bristles. Upper leaflets almost elliptical, about twice as long as broad. Littoral procumbent plants with almost globular, about 1 cm long flowering heads.
45. T. blancheanum Boiss.
- 39b. Calyx covered with shiny hairs (often of two kinds: appressed and spreading). Stems patulous- or antrorsely pubescent. Leaflets oblong-obovate, the lower sometimes emarginate *46. T. roussaeianum* Boiss.
- 40a. Throat of fruiting calyx entirely open or slightly narrowed by an inwardly intruding, epidermal or callous, hairy or glabrous ring 41
- 40b. Throat of fruiting calyx entirely closed by a 2-lipped callosity, sometimes leaving only a narrow slit between lips. 46
- 41a. Fruiting heads not disarticulating at maturity, 1-1.3 cm broad. Throat of calyx with a ring of short hairs. Seeds about 2 mm long. Lower calyx tooth of lower flowers often somewhat oblique or irregularly bifid. Calyx teeth not purple-tipped. Cultivated and subsponaneous
58. T. alexandrinum L.
- 41b. Fruiting heads readily disarticulating at maturity, 0.8-1 cm broad. Seeds usually smaller. Calyx teeth not as above 42
- 42a. Throat of calyx provided with a ring of long spreading hairs 43
- 42b. Throat of calyx glabrous or sparingly appressed-hairy 45
- 43a. Flowers pink *56. T. meironense* Zoh. & Lern.
- 43b. Flowers white or cream-coloured 44
- 44a. Calyx teeth triangular at base, all 3-nerved with purple tips, tube of fruiting calyx white between nerves *54. T. apertum* Bobrov
- 44b. Calyx teeth narrow, usually 1-nerved, not purple-tipped; fruiting calyx tube covered with a tuft of long grey or brownish hairs
55. T. berytheum Boiss. & Bl.
- 45a. Lower calyx tooth twice as long as the rest; throat of calyx widely open; all calyx teeth purple-tipped *57. T. vavilovii* Eig
- 45b. Lower calyx tooth shorter than above; throat of calyx with a callous ring, half open, calyx teeth not purple-tipped *53. T. salmoneum* Mout.
- 46a. Annuals. Fruiting heads globular or somewhat ovoid, 1-1.5 cm. Fruiting calyces very dense, adnate to one another at base and to rhachis, and not

- separating at maturity from rhachis. Flowers pink or white to cream-coloured and then often with a keel pinkish at tip; teeth of fruiting calyx erect, divergent or rarely somewhat stellately spreading. Uppermost leaves opposite 47
- 46b. Heads and calyx not as above 49
- 47a. Fruiting calyx with 1-nerved or nerveless teeth and glabrous or almost glabrous, white tube. 69. *T. echinatum* M. B.
- 47b. Fruiting calyx with 3-nerved teeth and hairy, green tube
68. *T. latinum* Seb.
- 48a. Fruiting calyx tube obconical or campanulate, not constricted at throat, white, usually glabrous; all or shorter calyx teeth shorter than tube. Wings of corolla narrower and mostly shorter than keel 49
- 48b. Calyx not as above; fruiting calyx tube urceolate and strongly constricted at throat 50
- 49a. Heads provided with an involucre of membranous bracts
60. *T. cinctum* DC.
- 49b. Heads without involucre of bracts 59. *T. squamosum* L.
- 50a. Teeth of fruiting calyx equal or very nearly so 51
- 50b. Teeth of fruiting calyx distinctly unequal 55
- 51a. Fruiting calyx teeth (all or part of them) narrower at base than at middle; fruiting calyx 1 cm or more long 65. *T. obscurum* Savi
- 51b. Fruiting calyx teeth broader at base than at middle 52
- 52a. Fruiting calyx teeth triangular, about half as long as tube. Fruiting heads about 0.8-1 cm broad. Peduncles appressed-hairy
62. *T. daveauanum* Thell.
- 52b. Fruiting calyx teeth triangular-lanceolate to lanceolate, considerably longer than above 53
- 53a. Calyx teeth almost as long as tube, narrowing abruptly into a subulate tip from a 2 mm broad base; tube appressed-hairy to almost glabrous. Corolla as long as or shorter than calyx 63. *T. miegeanum* Maire
- 53b. Calyx teeth tapering slowly into a subulate tip; tube patulous-hairy 54
- 54a. Fruiting heads globular or semiglobular, rather dense. Calyx tube almost globular in fruit, shorter than teeth. 67. *T. leucanthum* M. B.
- 54b. Fruiting heads spicate, calyces rather remote. Fruiting calyx tube elongated, much longer than teeth 61. *T. juliani* Batt.
- 55a. Fruiting heads about 2 cm broad. Corolla almost not exceeding the longest calyx tooth. Fruiting calyx teeth 3-5-nerved; tube and teeth covered with rough tuberculate hairs. 64. *T. squarrosum* L.

- 55b. Fruiting heads about 1 cm broad. Corolla much exceeding the longest calyx tooth. Fruiting calyx teeth 1-3-nerved; tube not covered with hairs tuberculate at base 66. *T. constantinopolitanum* Ser.
- 56a. Leaflets, all or most of them, obovate or very short-elliptical, usually about as long as broad, rarely up to about twice as long as broad 57
- 56b. Leaflets linear-elliptical or oblong-oblongate to lanceolate, mostly more than twice as long as broad 70
- 57a. Stipules ovate or obovate, rounded or somewhat tapering above, but never ending in a mucro or an awn or a cusp-like appendage 58
- 57b. Stipules ending with a long-mucronate or aristate or caudate or cuspidate free upper part 61
- 58a. Corolla not or scarcely exerting from calyx. Throat of calyx closed by a thick tuft of hairs; teeth equal. Annuals 22. *T. stellatum* L.
- 58b. Corolla much exerting from calyx. Throat of calyx open or closed by a 2-lipped callosity. Annuals or perennials 59
- 59a. Calyx teeth ovate-triangular, the lower one about 5 mm broad in fruit. Throat of calyx closed by a 2-lipped callosity. Corolla pink to white, 3 times as long as calyx. Annuals 70. *T. clypeatum* L.
- 59b. Calyx teeth subulate or lanceolate-subulate, not exceeding 2 mm in width; throat of calyx not closed by a 2-lipped callosity 60
- 60a. Alpine, rhizomatous, appressed-pubescent perennials. Nerves of leaflets thickened and recurved. Heads sessile 11. *T. wettsteinii* Dörf. & Hay.
- 60b. Lowland or montane, patulous-pubescent annuals. Nerves not thickened, directed upwards. Heads pedunculate 23. *T. incarnatum* L.
- 61a. Calyx or calyx tube usually glabrous 62
- 61b. Calyx, or at least calyx tube, usually hairy 63
- 62a. Teeth of calyx longer than tube 6. *T. medium* L.
- 62b. Teeth of calyx shorter than tube 10. *T. velebiticum* Deg.
- 63a. Calyx teeth blunt 64
- 63b. Calyx teeth sharp-pointed 67
- 64a. Free parts of stipules abruptly narrowed into a setaceous-aristate tip. Flowers usually crimson or pink (rarely white) 1. *T. pratense* L.
- 64b. Free parts of stipules gradually narrowed into a lanceolate-subulate cusp 65
- 65a. Calyx large, 1.5 cm long or more 7. *T. pignanii* Brogn. & Bory
- 65b. Calyx much smaller 66
- 66a. Annuals. Leaves all along the stems and branches. Stems appressed-hairy 4. *T. pallidum* Waldst. & Kit.

- 66b. Perennials. Leaves all or most of them arising from base of stem, which is covered with dead stipules 3. *T. noricum* Wulf.
- 67a. Teeth of calyx glabrous or glabrescent, all 1-nerved, all or part of them with membranous margins at base. Stems sparingly appressed-pubescent. Leaflets obovate, one to one and a half as long as broad. Corolla twice as long as calyx 8. *T. heldreichianum* (Gib. & Belli) Hausskn.
- 67b. Not as above 68
- 68a. Leaflets elliptical to ovate, all or almost all retuse and less than twice as long as broad. Flowers white or yellow. Calyx half as long as corolla
15. *T. canescens* Willd.
- 68b. Plants differing from above by one or more characters 69
- 69a. Corolla cream-coloured, not or almost not exceeding the calyx teeth or the longest calyx tooth. Leaves all crowded in a rosette; leaflets short-elliptical or ovate, scarcely twice as long as broad; free part of stipules lanceolate-subulate. Heads up to 2 cm. Subalpine plants
16. *T. davisii* Hossain
- 69b. Corolla purple, 3 times as long as calyx. Free part of stipules foliaceous, lanceolate 18. *T. caudatum* Boiss.
- 70a. Teeth of calyx sharp-pointed 71
- 70b. Teeth of calyx blunt 76
- 71a. Free parts of stipules leaf-like, oblong-lanceolate, not subulate, 0.6-2 cm broad; leaflets ovate to rhombic. Lower calyx tooth 5-nerved. Heads large, about 3 x 2 cm, often subtended at base by a series of small, membranous or green but well discernible bracts. Flowers up to 3 cm long. 12. *T. longidentatum* Nab.
- 71b. Free parts of stipules not as in above. Heads and calyx not as above 72
- 72a. Calyx tube usually glabrous 6. *T. medium* L.
- 72b. Calyx tube hairy 73
- 73a. All or upper teeth of fruiting calyx triangular-ovate, many-nerved. Upper leaves opposite. Annual 64. *T. squarrosum* L.
- 73b. Teeth of fruiting calyx linear, subulate or filiform 74
- 74a. Lower tooth of fruiting calyx up to 1.5 cm, bent downwards. Heads sessile or subsessile, involucrate, up to 3 cm across. Leaflets of middle and upper leaves elliptical, mucronate or acute. Flowers 1.5-2 cm, pink or white-yellowish, turning reddish 14. *T. caucasicum* Tausch
- 74b. Not as above 75
- 75a. Flowers about 1.5 cm. Heads mostly ovoid, sessile, 1.5-3 cm long. Leaflets oblong to elliptical, usually up to 3 cm long, all except the uppermost obtuse and often retuse 13. *T. ochroleucum* Huds.

- 75b. Flowers up to 2.5 cm. Heads ovoid-oblong, elongating in fruit, up to 4-7 cm, usually long-peduncled. Leaflets of middle and upper leaves oblong to linear. 19. *T. pannonicum* Jacq.
- 76a. Corolla about as long as calyx, i.e. not or very slightly exceeding the longest calyx tooth 77
- 76b. Corolla distinctly longer than calyx 82
- 77a. Perennials, mostly montane or subalpine. Leaflets 1 cm or more broad. Calyx teeth unequal. Stems appressed-hairy. Head 2 cm or more broad 78
- 77b. Not as above 79
- 78a. Flowers purple. Stems leafy 2. *T. mazanderanicum* Rech. fil.
- 78b. Flowers yellow or cream-coloured. Most of the leaves radical
16. *T. davisii* Hossain
- 79a. Stems patulous-pubescent. Calyx teeth much longer than tube
5. *T. diffusum* Ehrh.
- 79b. Stems appressed-hairy 80
- 80a. Calyx teeth equal or almost so. Uppermost leaves opposite 81
- 80b. Calyx teeth distinctly unequal. All leaves alternate
43. *T. angustifolium* L.
- 81a. Calyx up to 1.5 cm long 52. *T. dasyurum* C. Presl
- 81b. Calyx 6-7 mm long 51. *T. prophetarum* Hossain
- 82a. Perennials. Stems appressed-hairy. Petioles shorter than stipules, often as long as adnate parts of stipules; leaflets linear-oblong, sparingly hairy at margins. Corolla purple 9. *T. patulum* Tausch
- 82b. Annuals or perennials. Not as above 83
- 83a. Throat of fruiting calyx open or with a hairy ring only. Subalpine caespitose perennials with patulous-hairy stems. Heads about 3 cm across. Corolla white or cream-coloured or tinted with purple, 2-3 times as long as calyx 84
- 83b. Throat of fruiting calyx closed by a 2-lipped callosity. Plants not as above 85
- 84a. Lower flowers of head subtended by small bracts inside the involucre formed by the upper leaves. Leaflets oblong or elliptical
3. *T. noricum* Wulf.
- 84b. Flowers without bracts. Leaflets ovate. Calyx tube often glabrous
7. *T. pignantii* Brogn. & Bory
- 85a. Perennials. Heads ovoid, up to 5 cm long and 3-4 cm broad. Leaflets elliptical to oblong. 17. *T. trichocephalum* M. B.
- 85b. Annuals. Heads narrower or smaller 86

- 86a. Calyx covered with appressed, silky, shiny hairs. Corolla white or pink. Leaflets linear-elliptical or oblanceolate 50. *T. haussknechtii* Boiss.
- 86b. Hairs of calyx not appressed-silky and not shiny 87
- 87a. Stems appressed-pubescent 88
- 87b. Stems patulous- or subpatulous-pubescent 89
- 88a. Leaflets elliptical, oblong to linear, 2-5 x 0.3-1 cm. Corolla purple or purple with pink. Fruiting heads ellipsoidal or cylindrical
44. *T. purpureum* Loisel.
- 88b. Leaflets oblong-cuneate, 1-1.5 x 0.2-0.5 cm. Heads ovoid or obovoid. Flowers pink or flesh-coloured 49. *T. dichroanthoides* Rech. fil.
- 89a. Flowers white, slightly or not at all exserting from calyx. Heads, also the fruiting ones, not exceeding 2.5 cm. Flowering heads 1-coloured
48. *T. palaestinum* Boiss.
- 89b. Flowers lilac to pale purple, much longer than above, at least in fruiting stage. Flowering heads 2-coloured 47. *T. dichroanthum* Boiss.

Synopsis of subsections

I. Subsect. *Trifolium*

1. *Trifolium pratense* L.
2. *T. mazanderanicum* Rech. fil.
3. *T. noricum* Wulf.
4. *T. pallidum* Waldst. & Kit.
5. *T. diffusum* Ehrh.

II. Subsect. *Intermedia* (Gib. & Belli) Bobrov

6. *Trifolium medium* L.
7. *T. pignantii* Brogn. & Bory
8. *T. heldreichianum* (Gib. & Belli) Hausskn.
9. *T. patulum* Tausch
10. *T. velebiticum* Deg.
11. *T. wettsteinii* Dörfl. & Hay.

III. Subsect. *Ochroleuca* Gib. & Belli (pro stirpe)

12. *Trifolium longidentatum* Náb.
13. *T. ochroleucum* Huds.

14. *T. caucasicum* Tausch
15. *T. canescens* Willd.
16. *T. davisii* Hossain
17. *T. trichocephalum* M. B.
18. *T. caudatum* Boiss.
19. *T. pannonicum* Jacq.

IV. Subsect. *Alpestris* Gib. & Belli (pro stirpe)

20. *Trifolium rubens* L.
21. *T. alpestre* L.

V. Subsect. *Stellata* Gib. & Belli (pro stirpe)

22. *Trifolium stellatum* L.
23. *T. incarnatum* L.
24. *T. sylvaticum* Gérard ex Loisel.

VI. Subsect. *Stenosemium* (Čelak.) Aschers. & Greabn.

25. *Trifolium striatum* L.

VII. Subsect. *Trichoptera* Gib. & Belli (pro stirpe)

26. *Trifolium bocconeii* Savi
27. *T. trichopterum* Panč.

VIII. Subsect. *Scabroidea* Gib. & Belli (pro stirpe)

28. *Trifolium scabrum* L.
29. *T. lucanicum* Gasp. ex Guss.
30. *T. dalmaticum* Vis.

IX. Subsect. *Phleoidea* Gib. & Belli (pro stirpe)

31. *Trifolium gemellum* Pourr. ex Willd.
32. *T. phleoides* Pourr. ex Willd.
33. *T. ligusticum* Balb. ex Loisel

X. Subsect. *Lappacea* Gib. & Belli (pro stirpe)

34. *Trifolium hirtum* All.
35. *T. cherleri* L.

- 36. *T. lappaceum* L.
- 37. *T. barbeyi* Gib. & Belli
- 38. *T. congestum* Guss.

XI. Subsect. *Arvensia* Gib. & Belli (pro stirpe)

- 39. *Trifolium arvense* L.
- 40. *T. affine* C. Presl
- 41. *T. saxatile* All.
- 42. *T. stipulaceum* Thunb.

XII. Subsect. *Angustifolia* Gib. & Belli (pro stirpe) emend. Zoh.

- 43. *Trifolium angustifolium* L.
- 44. *T. purpureum* Loisel.
- 45. *T. blancheanum* Boiss.
- 46. *T. roussaeanum* Boiss.
- 47. *T. dichroanthum* Boiss.
- 48. *T. palaestinum* Boiss.
- 49. *T. dichroanthoides* Rech. fil.
- 50. *T. haussknechtii* Boiss.
- 51. *T. prophetarum* Hossain
- 52. *T. dasyurum* C. Presl

XIII. Subsect. *Alexandrina* Zoh.

- 53. *Trifolium salmoneum* Mout.
- 54. *T. apertum* Bobrov
- 55. *T. berytheum* Boiss. & Bl.
- 56. *T. meironense* Zoh. & Lern.
- 57. *T. vavilovii* Eig
- 58. *T. alexandrinum* L.

XIV. Subsect. *Squamosa* Zoh.

- 59. *Trifolium squamosum* L.
- 60. *T. cinctum* DC.

XV. Subsect. *Urceolata* Zoh.

- 61. *Trifolium juliani* Batt.
- 62. *T. daveauanum* Thell.
- 63. *T. miegeanum* Maire
- 64. *T. squarrosum* L.

- 65. *T. obscurum* Savi
- 66. *T. constantinopolitanum* Ser.
- 67. *T. leucanthum* M. B.

XVI. Subsect. *Echinata* Zoh.

- 68. *Trifolium latinum* Seb.
- 69. *T. echinatum* M. B.

XVII. Subsect. *Clypeata* Gib. & Belli (pro stirpe)

- 70. *Trifolium clypeatum* L.
- 71. *T. scutatum* Boiss.
- 72. *T. plebeium* Boiss.

Enumeration

I. *Trifolium* subsect. *Trifolium*. *Pratensia* Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 300. 1889, pro stirpe.

Perennials or annuals. Calyx 10-nerved, teeth as long as tube or shorter, the lower often longer; throat open, provided with an epidermal protuberance or/and with a hairy ring. Corolla marcescent, usually much longer than calyx.

1. *Trifolium pratense* L., Sp. Pl.: 768. 1753. *Typus*: herb. Cliff. 375 (BM). Described from Europe.

Hab.: Meadows, grassy plots, roadsides, by water, glades etc.

Gen. distr.: All Europe (except extreme North), Western Asia, the Mediterranean region (except its SE part). Very widespread and mostly cultivated throughout the entire northern hemisphere and elsewhere.

T. pratense is extremely polymorphic and not less than 40 binomials have been published from the "Formenkreis" of this species. There are, however, very few experimental data that testify to the constancy of these "species" and those which have been reduced to subspecies or varieties. Although there is a large body of knowledge on this widely cultivated clover, which is perhaps the oldest one under cultivation, it still calls for an authoritative taxonomist-breeder to decide upon the taxonomy of this species, which, no doubt, requires a particular treatment.

The present author was unable to undertake such a critical examination of the exceedingly numerous forms, so that the following subdivision into the 6 varieties

is only a tentative one, and does not embrace all the forms recorded in literature which very often overlap and intergrade. In future it will be necessary to find out more reliable characters to assess the systematic rank and value of the infraspecific taxa.

- 1a. Calyx altogether (incl. teeth) glabrous *1f. var. rhodopeum*
- 1b. Calyx (at least along the teeth) hairy 2
- 2a. Stems 20-40 cm, not fistulous, decumbent or ascending, densely appressed white-hairy, rarely almost glabrescent *1a. var. pratense*
- 2b. Stems glabrous above or all over, or densely covered with patulous hairs 3
- 3a. Stems 40-100 cm, mostly erect, thick and fistulous, sparingly hairy to glabrous. Heads large, often in pairs. Teeth of calyx mostly reddish. Leaflets up to 3-5 cm long, often spotted. *1c. var. sativum*
- 3b. Plants not as above 4
- 4a. Stems short, 10-30 cm, decumbent or ascending, arcuate, more or less densely patulous-villose or hirsute, rarely appressed-hairy. Stipules hairy all over. Heads many-flowered, up to 3 cm across. Calyx densely hairy, often reddish. Corolla white to dirty white, sometimes yellowish or reddish. Plants growing often in alpine and subalpine meadows
1e. var. alpinum
- 4b. Plants not as above 5
- 5a. Stems much branched, patulous-hairy. Leaflets 3-4 x 1-1.5 cm, those of lower leaves oblong-obovate, not retuse, those of upper ones lanceolate, acute; stipules herbaceous, long, glabrous. Heads large and dense, involucrate. Corolla carmine-red. *1b. var. americanum*
- 5b. Stems mostly appressed-hairy above and patulous-hairy below. Leaflets much smaller than above, those of the uppermost leaves lanceolate, denticulate; stipules with a long ciliate cusp. Heads rather small, often pedunculate. All teeth of calyx mostly longer than tube. Corolla yellowish-white or pink *1d. var. maritimum*

1a. *T. pratense* L. var. *pratense*.

= *T. pratense* L., l.c.

= *T. pratense* L. var. *anatolicum* Freyn, Bull. Herb. Boiss. 3: 177. 1895.

= *T. pratense* L. var. *spontaneum* Willk., Führer: 535. 1863.

= *T. pratense* L. var. *collinum* Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 302. 1889.

= *T. pratense* L. var. *sylvestre* Ducomm., Taschenb.: 169. 1869.

= *T. pratense* L. subsp. *eupratense* Aschers. & Greabn., Syn. Mitteleur. Fl. 6/2: 548. 1908, var. *spontaneum* Willk., l.c.

= *T. pratense* L. var. *geminum* Rouy, Fl. Fr. 5: 119. 1889.

- = *T. fontanum* Bobrov in Fl. URSS 11: 251. 1941.
- = *T. borysthenicum* Gruner, Bull. Soc. Nat. Mosc. 41, 2: 140. 1869.

The number of forms or races that have been distinguished among the populations of this variety is very large. Part of them is recorded in Ascherson & Graebner (1908), Hegi (1923-1924), Savulescu & Rayss (1952) and others. They are based mainly on vegetative characters. Neither the descriptions of these taxa nor the cumbersome nomenclature can be critically treated or even fully recorded here.

Selected specimens. **Sweden:** Göteborg Landvetter s.n. Buaras 1930, *Borgvall* (H.U.J.). **Czechoslovakia:** Olomouc in pratis inter Řepčín et Horka 220 m, 1933, *Otruba 831* (H.U.J.). **Switzerland:** between Buffalo and Ofen Pass 1950, *Feinbrun* (H.U.J.). **France:** Montpellier, Castelnau Crês, 1931, *Eig* (H.U.J.). **Italy:** In cultis, alt. 5 m, pr. Lussinpiccolo, 1923, *Lusina* (H.U.J.). **Turkey:** Prov. Zonguldak, Keltepe above Karabük Pastures 1300 m, 1963, *Davis & Kodde 560* (E). **Iran:** Takestan to Sandjan about 20 km E of Sandjan 1740 m, 1965, *Danin & Plitmann 65929* (H.U.J.). **Transcaucasia:** Azerbajdzhan distr. Vank-Disak, prope p. Gadrut in horto 1935, *Heideman* (H.U.J.). **Afghanistan:** Prov. Kabul, between the Unai and Hajigak Passes, wet meadow 2950 m, 1962, *Hedge & Wendelbo 4588* (H.U.J.).

- 1b. *T. pratense* L. var. *americanum* Harz, Bot. Centrabl. 45: 106. 1891.**
- = *T. pratense* L. var. *expansum* (Waldst. & Kit.) Hausskn., Mitt. Bot. Ver. Thür. N.F. 5: 72. 1893; Aschers. & Graebn., l.c.: 555.
 - = *T. pratense* L. var. *majus* Boiss., Fl. 2: 115. 1872.
 - = *T. expansum* Waldst. & Kit., Pl. Rar. Hung. 3: 263, t. 237. 1807.
 - = *T. diffusum* sensu Baumg., Enum. 2: 372. 1816, non Ehrh. 1792.

Selected specimens. **Portugal:** Porto de Sfos Sladeira de Leima 1952, *Fernandes & al. 4264* (H.U.J.). **France:** Boisserau, Montpellier 1930, *Eig* (H.U.J.). **Italy:** In pratis humidiusculis pr. Romani 1922, *Lusina* (H.U.J.). **Greece:** Cephalonia, Mt Menos 1934, *Guiol 287* (H.U.J.). **S Russia:** Aktubinskaia Gub. env. of Telmir, bank of R. Telmir 1926, *Iljin & al.* (H.U.J.). **Turkey:** Distr. Bingöl, 20 km E of Bingöl, oak forest 1800 m, 1963, *Zohary 473124* (H.U.J.). **Iran:** Elburz Mts, about 100 km N of Karaj, *M. & D. Zohary 734* (H.U.J.). **Transcaucasia:** Pr. Nachitschevan inter segetes 1934, *Prilipko* (H.U.J.).

- 1c. *T. pratense* L. var. *sativum* Schreb. in Sturm., Deutschl. Fl. 4: 15, t. 236. 1804;**
 Gib. & Belli l.c.: 302; Aschers. & Graebn. l.c.: 552.
- = *T. pensylvanicum* Willd., Enum, Hort. Berol.: 793. 1809.
 - = *T. sativum* (Sturm.) Crome ex Boenn., Prodr. Fl. Monast.: 222. 1824.
 - = *T. pratense* L. var. *fistulosum* Schur ex Schur, Enum. Pl. Trans.: 154. 1866, pro syn.
 - = *T. baeticum* Boiss., Voy. Bot. Midi Esp. 2: 726. 1845.
 - = *T. bracteatum* Schousb. in Willd., l.c.: 792.

Selected specimens. Scotland: Canty Bay, N. Berwick 1956, *Currie 0748* (HJ). **Finland:** Karelia austr. par Vehkalahti, Pyhältö in area ad domum 1960, *Fagerström* (HJ). **Spain:** in montibus supra Algesiras 1849, *Boiss. & Reut.* (K, isotype of *T. baeticum*). **Turkey:** Bosphorus, *Bercos-Adopal 1905* (G); SW of Trabzon, grassy western slopes 1600 m, *Henipman 1805* (G). **Iran:** Hamadan, foot of Mt Alvand, irrigated plots, by runnels, 2100 m, 1965, *Darin, Baum & Plitmann 65-876* (HJ). **Afghanistan:** Kuram Valley, *Harsukh 14867* (K). **Tunisia:** Makter in humidis 1903, *Murbeck* (G). **Morocco:** Entre Khasbet et Hadjab et Dar Kaid 1918, *Benoist* (G).

Also seen from Iraq, Canada and elsewhere. Recorded from SW Spain, Sicily, etc.

1d. *T. pratense* L. var. *maritimum* Zabel, Arch. Ver. Freunde Naturg. Meklenburg 14: 31. 1859.

- = *T. pratense* L. var. *villosum* Wahlenb., Fl. Gothob.: 73. 1824, non DC. 1805.
- = *T. pratense* L. var. *australe* Freyn, Verh. Zool.-Bot. Ges. Wien 27: 309. 1878.
- = *T. pratense* L. var. *hirsutum* Pahnsh., Arch. Naturk. Liv.-Est. -u. Kurl. ser. 2, 9: 287, 1881? non var. *hirsutum* Boiss. 1840.
- = *T. seravschanicum* Ovcz. ex Bobrov in Fl. URSS 11: 252. 1947.

Selected specimens. Portugal: Ponte do Ratiço entre Murça e Palheiros 1955, *Fernandes & al. 5430* (HJ). **Spain:** Tardad, Villalba (Lugo) 1951, *Orosa* (HJ). **Transcaucasia:** Distr. Norachen, village Achura 1947, *Chalilov* (HJ).

1e. *T. pratense* L. var. *alpinum* Hoppe in Sturm., Deutschl. Fl. 8, 32: t. 512. 1812.

- = *T. pratense* L. var. *frigidum* Gaudin, Fl. Helv. 4: 582. 1829, subs. illegit.
- = *T. pratense* L. var. *nivale* Koch, Syn. Fl. Germ. 168. 1837, subs. illegit.
- = *T. pratense* L. subsp. *nivale* (Sieb. ex Koch) Aschers. & Graebn., Syn. Mitteleur. Fl. 6/2: 557. 1908.
- = *T. nivale* Sieb. ex Koch, l.c. pro syn.

Specimens seen. Switzerland: Grödner Joch, 2100 m, 1928, *Bojko* (HJ).

1f. *T. pratense* L. var. *rhodopeum* Velen., Sitzb. Böhm. Ges. Wiss. 29: 8. 1894.

Specimens seen. Bulgaria: In pratis alpinis ad Levoroso 1895, *Stribrny* (HJ). Also recorded from Tirol, Jugoslavia, etc.

2. *Trifolium mazanderanicum* Rech. fil., Ann. Naturhist. Mus. Wien 51: 401. 1941.

Typus: Iran: distr. Mazanderan, Lichtungen der Laubwälder im Talar-Tal c. Abbasabad und Cahi, c. 400 m, 1937, *Rechinger 2031* (holo.: W).

Hab.: Forest clearings.

Gen. distr.: Iran (endemic).

Reminds of *T. pratense* at first glance and differs not very sharply from it by the relatively short corolla (not or slightly exceeding calyx teeth), the leaves, the calyx, etc. However, in the light of the enormous polymorphism of *T. pratense*, the independence of this binomial should still be reexamined.

3. *Trifolium noricum* Wulf. in Roem., Arch. Bot. 3: 387. 1805. *Typus*: In alpinis Carinthiae superioris (*Wulf. & Hoppe*, n.v.).

Hab.: Rock fissures, on alpine and subalpine slopes; alpine meadows.

Gen. distr.: Switzerland, Austria, Italy, Jugoslavia, Albania, Greece.

- 1a. Wings of corolla glabrous. Leaflets of upper leaves 2-3 × 1-1.2 cm, elliptical to ovate-lanceolate. Head up to 4 cm in diameter
3a. var. noricum
- 1b. Wings of corolla pilose. Leaflets smaller. Heads smaller *3b. var. ottonis*

3a. *T. noricum* Wulf. var. *noricum*.

= *T. noricum* Wulf. in Roem., Arch. Bot. 3: 387. 1805; Koch, Syn. Fl. Germ. ed. 2: 186. 1843; Boiss., Fl. 2: 116. 1867.

= *T. noricum* Wulf. f. *biceps* Beck, Ann. Naturh. Hofmus. Wien 11: 72. 1896.

= *T. noricum* Wulf. var. *hirsuta* Wettst., Alban. 38. 1892.

= *T. noricum* Wulf. var. *praetutianum* (Guss. ex Ser.) Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 315. 1889.

= *T. praetutianum* Guss. ex. Ser. in DC., Prodr. 2: 202, 1825; err. typogr. "*prutetianum*".

= *T. praetutianum* Guss. var. *brevitrichum* Bald., Riv. Coll. Bot. Alb.: 48. 1898-1899.

Icon.: Reichenb., Icon. 22: t. 2136, f. 1, 1-3. 1903.

Selected specimens. Switzerland: Glacier du Rhône 1886, *Thomas* (K). **Austria:** Kärnthen 1907, *Korb* (W). **Italy:** Loc. Venetia, Prov. di Udine in pascuis montis Lodma, alt. 1900-2000 m, 1903, *Porta* (K). **Jugoslavia:** Montenegro (G). **Albania:** Korob 1918, *Kümmerle* 1918 (K). **Greece:** Epirus orientalis, in rupibus calcareis cucuminis Mt Tsumerka, 1893, *Halácsy* (W).

3b. *T. noricum* Wulf. var. *ottonis* (Sprun. ex Boiss.) Zoh., *comb. nova*.

= *T. ottonis* Sprun. ex Boiss., Diagn. ser. 1, 2: 28. 1843 et Fl. 2: 116. 1872.

Dwarf, alpine, caespitose perennials. Leaves obovate-elliptical, 0.3-1 × 0.2-0.5 cm. Head about 1.5 cm. Calyx teeth half as long as tube. Wings of corolla pilose.

Selected specimens. Greece: in summis m. Veluchi 7000 ft, 1887, *Heldreich 3291* (G); in m. Velugo 7200 ft, *Spruner* (holo.: G).

4. ***Trifolium pallidum*** Waldst. & Kit., Pl. Rar. Hung. 1: 35, t. 36. 1800-1801; Boiss., Fl. 2: 125. 1872. **Typus:** (Hungary) In pratis et arvis planioris Banatus et Comitatus Bihariensis inter Magno Varadinum & Szent Jobb.
 = *T. pratense* L. subsp. *pallidum* (Waldst. & Kit.) Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 309, 414, t. 3. 1889.
 = *T. villosum* J. & C. Presl, Delic. Prag. 48. 1822.
 = *T. flavescens* Tin., Pugill. 1: 15. 1817.

Icon.: Reichenb., Icon. 22: t. 2133, f. 2, 3. 1903; Waldst. & Kit., l.c.: t. 36; Roch., Pl. Ban. t. 14, f. 30. 1828, as *T. procerum*.

Hab.: Grassy places, rocks and boulders.

Gen. distr.: Belgium, Hungary, Romania, France, Italy, Balkan Peninsula, Turkey, SW Russia, N Africa.

Selected specimens. Italy: Pâturages des terrains argileux près de Pisa (Toscane) 1857, *Savi 241* (HUI). **Jugoslavia:** Zwischen Fiume und Volosca längs der Strasse bei Vragna, *Noë 1362* (HUI). **Greece:** Hauteur de Pylos Messenia 1844, *Heldreich 167* (G). **Crete:** Platania 1883, *Reverchon* (G). **Rhodes:** Bord des chemins, près Salakos 1870, *Bourgeau 44* (P). **Turkey:** Prov. Aydin, Sansum Dağ 10 km S of Davutlar 280 m. *Pinus nigra* forest, S. slope 1962, *Dudley D 34964* (HUI). **Algeria:** El Afroun pr. Alger 1875, *Cosson* (G). **Morocco:** Forêt entre Ozron et Toumhadit 1918, *Benoist 647* (G).

The species varies both in size of vegetative parts (e.g. leaves and stems and density of indumentum), in flower colour, length of calyx teeth, etc.

5. ***Trifolium diffusum*** Ehrh., Beitr. Naturk. 7: 165. 1792; Boiss., Fl. 2: 125. 1872. **Typus:** Described from material cultivated in Ehrhardt's Garden, Göttingen.
 = *T. pratense* L. subsp. *diffusum* (Ehrh.) Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 313. 1889.
 = *T. purpurascens* Roth, Catal. 1: 91. 1797.
 = *T. ciliosum* Thuill., Fl. Env. Par. ed. 2: 380. 1799.

Icon.: Gib. & Belli, l.c. t. 3, f. 3.

Hab.: Forests and forest clearings, meadows.

Gen. distr.: British Isles, Germany, Czechoslovakia, Hungary, Romania, Portugal, Spain, France and Corsica, Italy and islands, Balkan Peninsula, S Russia, Turkey and Transcaucasia.

Selected specimens. Hungary: Hadju, Debreczen 1914, *Rapaico 661* (Fi). **Romania:** Dobrudscha 1872, *Sintenis 701* (K). **Portugal:** Castello Branco, Monte da Massana 1882, *Ricardo da Cunha 1506* (HUI). **Spain:** Sommet de la Sierra de Segura 1850, *Bourgeau 637* (G). **France:** Prés à Sorede (Pyrénées) 1903, *Conill* (G).

Greece: Agrapha in reg. inf. m. Pindi 1885, *Heldreich* (G). **Bulgaria:** In collibus Philippopolium 1886 m, *Stribrny* (P). **Turkey:** Distr. Muş betw. Muş and Tatvan, deciduous oak forest 1300 m, 1964, *Zohary & Plitmann 2160-50* (HUI). **Transcaucasia:** Armenia, distr. Migri 3-4 km ad NW pr. Kartschevan, in silvis 1400-1500 m 1934, *Karjagin* (HUI).

II. Trifolium subsect. **Intermedia** (Gib. & Belli) Bobrov, Act. Inst. Bot. Acad. Sci. URSS, ser. 1, 6: 283. 1947.

Perennials. Calyx tube 10 (rarely 12-20)-nerved, usually glabrous, rarely hairy; lower tooth of calyx longer than upper one, all more or less spreading in fruit; throat of calyx closed by a callosity. Corolla marcescent, much longer than calyx.

6. Trifolium medium L., Amoen. Acad. 4: 105. 1759. **Typus:** Hb. Linn. 930/27. Described from England.

Hab.: Forests and among scrub; in cultivated hillsides; also in meadows and pastures up to 2000 m; also cultivated.

Gen distr.: British Isles, Norway, Sweden, Finland, Germany, Switzerland, Austria, Poland, Czechoslovakia, Hungary, Romania, Portugal, Spain, France, Italy, Balkan Peninsula, W Russia, Turkey, Iran, Transcaucasia, and elsewhere.

Extremely polymorphic. The following varieties include the bulk (but probably not all) of the forms met with in this species.

- | | | |
|-----|--------------------------------------------------------------------------------------------------------------------------|------------------------------|
| 1a. | Calyx 20(13)-nerved, with teeth much longer than tube. Lower flowers of head often accompanied by bracts up to 3 mm long | |
| | | <i>6c. var. sarosiense</i> |
| 1b. | Calyx 10(14)-nerved | 2 |
| 2a. | Stems with spreading hairs above | <i>6d. var. pseudomedium</i> |
| 2b. | Stems appressed-hairy or glabrescent above | 3 |
| 3a. | Upper calyx teeth as long as tube or shorter | <i>6a. var. medium</i> |
| 3b. | Upper 4 calyx teeth longer than the tube | <i>6b. var. banaticum</i> |

6a. T. medium L. var. **medium**.

= *T. medium* L., l.c.; Huds., Fl. Angl.: 284. 1762.

= *T. medium* L. subsp. *flexuosum* (Jacq.) Aschers. & Graebn. var. *typicum* Aschers. & Graebn., Syn. Mitteleur. Fl. 6/2: 567. 1908.

= *T. medium* L. var. *majus* Boiss., Fl. 2: 114. 1872.

= *T. medium* L. var. *ericalycinum* Hausskn., Mitt. Thür. Bot. Ver. 5: 2. 1887.

= *T. medium* L. subsp. *skorpili* Velen., Sitzb. Böhm. Ges. Wiss. 29: 7. 1894.

- = *T. bithynicum* Boiss., Diagn. ser. 1, 9: 21. 1849.
 = *T. alpestre* Poll., Hist. Pl. Palat. 2: 335. 1777, non L. 1763.

Icon.: Reichenb., Icon. 22: t. 2135, f. 1-2: 1-6. 1903.

Calyx 10-nerved, glabrous, lower calyx tooth one to two and a half times as long as tube or shorter.

Selected specimens. **Finland:** Nylandia, par Esbo, Gammelgard Jura in margine viae 1960, *Nordström* (HUI). **Poland:** Ojców, pov. Olkusz, in prato silvatico 1952, *Wróblówna & al. 435b* (HUI). **Switzerland:** Davos-Platz Graubunden, 1600 m, 1918, *Schibler* (HUI). **Spain:** Catalogne: Pyrénées à Ripoll, 680 m, 1913, *Sennen* (HUI). **France:** Haute-Savoie, Forêt des Senbuis, 1000-1200 m, 1931, *Eig* (HUI). **Italy:** Prope Torre Alfina in Latio 1900, *Pappi* (HUI). **Bulgaria:** Pr. Nova Mahala 1895, *Stribrny* (HUI). **Russia:** Distr. of Moskva, Ostankino 1946, *Ewtuchova 3690* (HUI). **Turkey:** Above Artvin, N slope; forest and forest remnants, 940 m, 1964, *Zohary & Plitmann 2561-37* (HUI). **Transcaucasia:** Azerbajdzhan, distr. She-macha pr. pag. Marjevka ad marginem sup. silvae 1934, *Heideman & Beideman* (HUI); pr. Baku 1930, *Grossheim* (HUI).

6b. *T. medium* L. var. *banaticum* Heuff., Enum. Pl. Banat., in Verh. Zool.-Bot. Ges. Wien 8: Abh. 89. 1858.

= *T. medium* L. subsp. *banaticum* (Heuff.) Hendryck, Preslia 28: 405. 1956.

Calyx glabrous; upper calyx teeth longer than tube.

Selected specimens. **Switzerland:** Canton Vaud: Prairie au Sentier, Vallée de Joux 1931, *Eig* (HUI). **Romania:** Banatus, distr. Severin in herbosis montis Allion pr. oppidum Orsovo, alt. c. 300 m, 1942, *Borzo & al. 2446* (HUI). **Portugal:** Carris de Famalicao num lameiro 1951, *Fernandes & al. 3764* (HUI). **Turkey:** Env. of Istanbul, Jeni Schiffleck (près de Alemdagh) 1900, *Aznavour* (G).

6c. *T. medium* L. var. *sarosiense* (Hazsl.) Savul. & Rayss, Fl. Rum. 5: 208. 1952.

= *T. medium* L. subsp. *sarosiense* (Hazsl.) Simonkai, Enum. Fl. Transs.: 180. 1887.

= *T. sarosiense* Hazsl., Ejsz. Magyer.: 76. 1864; Neilr., Diagn. Ung. Slav.: 35. 1867; Janka, Trif.-Lot. Europ., in Termész. Füzet. 8/3: 159. 1884.

= *T. flexuosum* Jacq. subsp. *sarosiense* (Hazsl.) Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 333. 1889.

Icon.: Reichenb., Icon 22: t. 2158. 1903.

Calyx glabrous or hairy, 20(12-20)-nerved. Corolla dark red.

Selected specimens. **Romania:** Transilvania: Ad margines silvarum frondosarum pr. opp. Rodna, solo trachitico 800-1000 m, *Porcius 3203* (P).

6d. **T. medium** L. var. **pseudomedium** (Hausskn.) Halác., Consp. Fl. Gr. 1: 378. 1900.

= *T. pseudo-medium* Hausskn., Mitt. Thür. Bot. Ver. 5: 70. 1887.

= *T. medium* L. subsp. *balcanicum* Velen., Fl. Bulg.: 135. 1891.

Stems with spreading hairs above. Calyx tube 10-nerved, glabrous or sparingly hairy; upper calyx teeth longer than tube.

Selected specimens. Greece: Mt Korax, pr. Musinitza 1800, *Leonis* 375 (K).

For a more extensive treatment on the subdivision of *T. medium* the reader is referred to the various European floras. There is however such a divergence of opinions on the amount, naming and rank of the infraspecific taxa of this species that only a meticulous experimental study can cast some light on this question.

7. **Trifolium pignantii** Brogn. & Bory in Fauché & Chaub., Expéd. Sci. Morée 3, 2 (Bot.): 219 n° 1029. 1832; Vis., Fl. Dalm. 3: 295. 1850-52; Boiss., Fl. 2: 115. 1872. **Typus:** In montibus supra Patras (Pignant) (n.v.). Prob. in Fi. = *T. pallidum* Bory & Chaub., Fl. Pelop. 50, t. 28, f. 2. 1838, non Waldst. & Kit. 1800-1801.

= *T. fulcratum* Griseb., Spicil. Fl. Rumel 1: 26. 1843.

= *T. pichleri* Vis. ex Pichler (ed. P. Honi), Oesterr. Bot. Z. 19: 156. 1869, nom. nud.

= *T. flexuosum* Jacq. var. *piignantii* (Fauché & Chaub.) Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 330. 1889.

Icon.: Fauché & Chaub., l.c. Atlas: t. 26, f. 2. 1835-38.

Hab.: Forest, up to 1000 m and over.

Gen. distr.: Jugoslavia, Albania, Greece, Bulgaria.

Selected specimens. Jugoslavia: Dalmatia, in Kastanienhaine zw. Castelnuova und Meligere in der Bucht von Cattaro 1928, *Vetter* (HUI). Greece: Thessalia, Malakasi, in mte Sina 1896, *Freyn* 1393 (P). Bulgaria: Bistrica Gorna Dzumaga 1100 m, 1931, *Stojanoff & al. s.n.* (B).

8. **Trifolium heldreichianum** (Gib. & Belli) Hausskn., Mitt. Thür. Bot. Ver. N. F. 5: 72. 1893 (c.f. Gruenberg-Fertig, Israel J. Bot., in press). **Typus:** (Greece) In memorosis quercinis Pindi Dolopici reg. infer. in ditone mon. Korona 1885, *Heldreich* (lecto.: W).

= *T. flexuosum* Jacq. subsp. *heldreichianum* (Hausskn.) Gib. & Belli, l.c.

= "*T. heldreichianum* Hausskn." Hayek, Prodr. Fl. Penins. Balc. 1: 870. 1926.

= *T. heldreichianum* Hausskn. ex Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 333. 1889, pro syn. *T. heldreichii* Hausskn. in Sched. & in litt.; ex Nyman, Consp. Fl. Europ. Suppl. 2, 1: 90. 1889, nom. nud.

Icon.: Gib. & Belli, l.c.: t. 5. f. 3 & 3bis.

Hab.: Fields and mountain slopes up to 1700 m.
Gen. distr.: Albania, N Greece, Bulgaria, Turkey.

Selected specimens. **Albania**: in campis ad Sesce sub. m. Bali prope Andrijevica *Baldacci* 260 (W). **Greece**: Agrapha (Dolopia veterum); in reg. sup. Pindi mon. Korona, alt. 5500 ped., substratu schistoso 1885, *Heldreich* (W, K). **Bulgaria**: in prolis alpinis Zovorova 1875, *Stribrny* (K); Mt Rhodopa supra pagum Iasmos (Jasi-Köj) c. 500 m, 1936, *Rechinger fil.* 9538 (K). **Turkey**: Prov. Bursa, in reg. inf. mont. Keschish dagh (Ula dagh) 200-300 m, 1889, *Bornmüller* 4316 (K).

9. *Trifolium patulum* Tausch, Syll. Soc. Bot. Ratisb. 2: 245. 1826-28; Vis., Fl. Dalm. 3: 294. 1850-52; Boiss., Fl. 2: 114. 1872; Janka, Trif.-Lot Europ., in Termész Füzet. 8/3: 158. 1884. **Typus**: Probably in LE (n.v.).
 = *T. medium* Griseb., Spicil. Fl. Rumel. 1: 25. 1843, non L. 1759.
 = *T. longestipulatum* Ebel, Zwelf Tage Monten. Dalm. 2: 84. 1844, non Loisel.
 = *T. flexuosum* Jacq. subsp. *patulum* (Tausch) Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 333. 1889.

Icon.: Ebel, l.c.: t. 4, f. 2; Reichenb., Icon. 22: t. 2132, f. 1: 1. 1903.
Hab.: Woodland and scrub.
Gen. distr.: Italy, Jugoslavia, Albania, Greece.

Selected specimens. **Jugoslavia**: Dalmatia, bei Cattaro 1872, *Pichler* (G). **Albania**: in umbrosis sylvarum Rumia ad V. Mikulia ditio Primorise 1898, *Baldacci* (K). **Greece**: in monte Malevo, Laconiae prope Hagios Petros, 3000 ft, 1857, *Orphanides* (G).

10. *Trifolium velebiticum* Deg., Mag. Bot. Lap. 10: 113. 1911, incl. var. *gracile* Deg.
Typus: Dalmatia in humosis inter saxa aridissima montis Velebit alt. 900 m, 1905 (B).

Hab.: Rocks of mountains.
Gen. distr.: NW Jugoslavia, Albania.

Specimens seen. **Albania**: in castaneis ad monasterium Visoki Decani, 600-800 m, *Rechinger fil. & al.* 1933, 1416 (S).

11. *Trifolium wettsteinii* Dörf. & Hay., Oesterr. Bot. Z. 70: 16. 1921. **Typus**: NO Albania, Gipfelregion des Pashtrick, 1918, *Zerny* (W).

Hab.: Alpine rocks.
Gen. distr.: Jugoslavia, Albania.

Specimen seen. NO Albanien: Alpentriften in der Gipfelregion des Pashtrick, c. 1800-1900 m, 1918, *Zerny* (W).

III. *Trifolium* subsect. *Ochroleuca* Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 351. 1889, pro stirpe.

Perennials. Calyx 10-nerved; teeth linear-subulate, often indurated in fruit, with triangular base, 1-3-nerved, unequal, stellately spreading or otherwise diverging in fruit; throat of calyx closed by a 2-lipped or annular callosity. Corolla rather large (1.5-3 cm), mostly yellowish-white.

12. *Trifolium longidentatum* Nábělek, Publ. Fac. Sci. Univ. Masaryk Brno 35: 69, 76, f. 7/6, t. 3, f. 4. 1923. **Typus:** in Kurdistaniae Turcicae distr. Hakkari: mons Maidanoke, supra pagum Hasithe dit. Gulamerik 1800 m, 20.6.1910, *Nábělek* 2848.

Hab.: Subalpine meadows.

Gen. distr.: Turkey (endemic).

Selected specimens. Turkey: Prov. Van, distr. Satak Kavussahap dağ, 9000 ft, slopes 1954, *Davis* 23070 (E); prov. Bitlis, Van, 10 km SE of Pelli, 9000 ft, 1958, *Davis* 22533 (E).

13. *Trifolium ochroleucum* Huds., Fl. Angl.: 283. 1762; "*ochroleucon*"; L., Syst. Nat. ed. 12, 3: 233. 1768; Ledeb., Fl. Ross. 1: 544. 1843 p.p.; Boiss., Fl. 2: 116. 1872; sensu Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 352. 1889, non L. 1768. **Typus:** (England) "Habitat in pratis et pascuis siccioribus, in comitatibus Essexiensi, Cantabrigiensi, frequens" (BM).

= *T. dipsaceum* Camus, Cat. Pl. Fr.: 64. 1888, non Thuill. 1789-90.

= *T. cinerascens* Kit. (ed. Kanitz), Linnaea 32: 619. 1863, subs. illegit.

= *T. roseum* J. & C. Presl, Delic. Prag.: 50. 1822.

= *T. ochroleucum* Huds. var. *roseum* (J. & C. Presl) Guss., Fl. Sic. Prodr. 2: 498. 1828; Gib. & Belli, l.c.

Icon.: Schlecht., Lang. & Schenk, Fl. Deutschl. 23: t. 2373. 1885; Jacquin, Fl. Austr. 1: t. 40. 1773; Ross-Craig, Draw. Brit. Pl. 7: 26. 1954.

Hab.: Grassy patches in forest, among shrubs and roadsides, 400-2000 m.

Gen. distr.: British Isles, Germany, Czechoslovakia, Switzerland, Austria, Hungary, Romania, Poland, Portugal, E Spain, France, Italy, Yugoslavia, Greece, Bulgaria, S Russia, Turkey, Iran, Algeria, Morocco, and elsewhere.

Selected specimens. Czechoslovakia: Montes Bile Karpaty; in declivibus graminosis, pr. Velka 1934, *Weber* (HUJ). **Romania:** Transilvania, distr. Turda, in foena-

tis subsalsis prope oppid. Turda, 357 m, 1940, *Ghiuta & Todor 2445* (HUI). **Portugal:** Villar Formoso: Alto de Raza 1884, *Ricardo da Cunha 1508* (HUI). **Spain:** Barcelona, massif du Tibidabo, Riesa de Vallpidiera 1926, *Sennen* (HUI). **France:** Prairies argileuses à Rohrbach-les-Bitche 1837, *Schultz 51* (HUI). **Italy:** Eurusia in nemorosis collium agri Florentini 1875, *Levier* (G); Sicily, in montosis sylvaticis, Palermo alla Pizzuta, *Todaro 391* (HUI) as var. *roseum* J. & C. (Presl) Guss. **Jugoslavia:** Fiume, *Noë 1365* (G); Illyria, in nemorosis Tergesti, *Tommasini* (G). **Turkey:** Prov. Çoruh (Artvin), Borcka Hopa 450 m, 1957, *Davis & Hedge D 29866* (K). **Iran:** 12 km W of Astera, 3000 ft, 1929, *Cowan & Darlington 2503* (K). **Caucasus:** Bei Gudaur auf Alpenwiesen 1873, *Rehmann* (G). **Algeria:** Oran, Djebel Nador 1918, *Faure* (G). **Morocco:** Moyen Atlas, Daiët Ochlef, côteaux calcaires boisés, 1800 m, 1923, *Jahandiez 588* (G); prairies sèches au Djebel, localité Zanda (Grand Atlas) 1927, *Jahandiez 366* (P, type of var. *abbreviatum* Maire, inedit.).

Rouy refers to this species a form named by him (var. α) *pallidulum* (Jord.) Rouy, Fl. France 5: 124. 1899 = *T. pallidum* Jord., Pugill.: 56. 1852, which differs from the typical form by the calyx tube less constricted at throat, by the very long lower calyx tooth which is twice as long as calyx tube and the shorter corolla not much exceeding the calyx and by the light yellow to white colour of the corolla.

Lindberg describes *T. ochroleucum* subsp. *lamprotrichum* in Ofvers. Finska Vetensk. Soc. Förh. 48: 55. 1906: Stems glabrous except for the uppermost part which has an appressed indumentum. Leaflets of the larger leaves 3.5-5 x 1.2-1.6 cm, slightly crenulate above; free part of stipules subulate, 2-3 cm long. Calyx dark coloured with obsolete nerves and with shining hairs. I have not seen the type specimen, but from the description it seems that this taxon should be included within the scope of this very polymorphic species which deserves an experimental treatment.

The East Mediterranean material has generally much shorter leaves and approaches in this regard *T. caudatum*.

- 14. *Trifolium caucasicum*** Tausch, Syll. Soc. Bot. Ratisb. 2: 245. 1826-28; Boiss., Fl. 2: 156. 1872, p.p.; Zoh. in Davis, Fl. Turk. 3: 420. 1970. **Typus** (Georgia) Ex agro Georgipolitani Caucasi (photo LE).
 = *T. pannonicum* sensu M. B., Fl. Taur.-Cauc. 2: 212. 1808, non L. 1771, nec Jacq. 1767.
 = *T. ochroleucum* sensu M. B., l.c.: 211, non Huds. 1762, nec L. 1768.
 = *T. cassium* Boiss., Diagn. ser. 1, 9: 23. 1849, et Fl. 2: 117. 1872.
 = *T. squarrosum* sensu M. B., l.c.: 214, non L. 1753; Boiss. l.c.: 117.
 = *T. inaequale* sensu Grossh., Fl. Kavk. 2: 279. 1930, non Lojac. 1878.
 = *T. marschallii* Rouy, Fl. Fr. 5: 114. 1889, non Savi 1808-10.

Icon.: Bobrov, Act. Inst. Bot. Acad. Sci. URSS ser. 1/6: 267. 1947.

Hab.: Grassy places in mountains; woods and scrub.

Gen. distr.: Turkey, Syria, Caucasus.

Selected specimens. Turkey: Amanus Mts, western slopes between Karagouz and Bagajak, 200-800 m, Pinetum 1932, *Eig & Zohary 105* (HUI); ibidem, descent de Bakladja à Karagouz 1000-1400 m, Gabbres de serpentines 1932, *Delbès 133* (HUI); Taurus Mts, env. of Gözne (NW of Mersin) 1000-1100 m, maquis 1931, *Eig & Zohary 233* (HUI). **Syria:** "In silvaticis regionis inferioris montis Cassii", 1846, *Boissier* (lectotype of *T. cassium* G, isotype K); about 45 km N of Lattakie, deep shady wadi, Quercetum cerris 1932, *Eig & Zohary 472* (HUI).

T. caucasicum Tausch is very near to *T. ochroleucum* Huds. or *T. pannonicum* Jacq. and therefore has been largely confused with them. Our specimens from Turkey agree exactly with the Russian specimens for which I have seen the phototype.

T. cassium Boiss. is doubtless *T. caucasicum* Tausch, not seen by Boissier who in his flora records *T. cassium* Boiss., *T. squarrosum* M. B. and *T. caucasicum* Tausch as separate species. Gibelli & Belli seem not to be right in interpreting *T. caucasicum* (*T. cassium*) as a hybrid between *T. ochroleucum* and *T. pannonicum*.

15. *Trifolium canescens* Willd., Sp. Pl. 3: 1369. 1802; Boiss., Fl. 2: 117. 1872.

Typus: (Turkey) Habitat in Cappadocia, Via seg. 14204 (holo.: B).

= *T. hohenackeri* Jaub. & Sp., Ill. Pl. Or. 2: 55. 1845.

Icon.: Bot. Mag. 19, t. 1168. 1809; Jaub. & Sp., l.c.: t. 140.

Hab.: Subalpine meadows, riverbanks, up to 2600 m.

Gen. distr.: Turkey, Iran, Transcaucasia.

Selected specimens. Turkey: Prov. Rize: vallée sous-alpine de Djimil vers 2000 m, 1866, *Balansa 1403* (G); distr. Amasya, 6 km W of Cakiralan, forest of *Quercus cerris*, c. 700 m, 1963, *Zohary & Orshan 10761* (HUI). **Iran:** Prov. Mazandaran: in valle fluvii Chalus, 2000-2600 m, Pal-e Zanguleh 1948, *K. H. & F. Reehinger 6335* (K, P). **Transcaucasia:** In montosis et proclivibus Georgiae Caucasicae 1834 (type of *T. hohenackeri* Jaub. & Sp., G.); Georgia, pr. Tiflis, distr. Borzhom pr. pagum Bakuriani, 1500 m in pratis, 1925, *Kozlovsky 338* (G).

16. *Trifolium davisii* Hossain, Not. Roy. Bot. Gard. Edinb. 23: 403. 1961. Typus:

Turkey, d. Bahçe, Dumanli dağ above Haruniye, 700-900 m, *Davis & Hedge D 26861* (holo.: E; iso.: BM, K).

Hab.: Open woodland and amongst scrub, up to 1000 m.

Gen. distr.: Turkey (endemic).

Specimens seen. Turkey: Hatay Dörtyol 1000 m, *Coode & Jones 411* (E).

The difference between *T. davisii* and its next allied *T. canescens* is as follows:

<i>T. davisii</i>	<i>T. canescens</i>
Leaflets of the radical leaves ovate, retuse.	Leaflets of the radical leaves usually broadly elliptical and deeply notched.
Floral leaves distinctly petiolate.	Petioles of the floral leaves very short, much shorter than the stipules.
Calyx teeth 9-12 mm long	Calyx teeth 5-7 mm long.
Corolla as long as or very slightly longer than calyx.	Corolla nearly twice as long as calyx.

The above differentiating characters are almost all quantitative and can scarcely satisfy the requirements for specific rank, so that the independence of this species remains questionable until experimental studies will prove its constancy.

- 17. *Trifolium trichocephalum*** M. B., Fl. Taur.-Cauc. 2: 212. 1808 et 3: 508. 1819; excl. syn. Steven [*T. armenium* Willd.]; Boiss., Fl. 2: 118. 1872; Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 361. 1889, pro hybrido; Bobrov, Act. Inst. Bot. Acad. Sci. URSS ser. 1, 6: 266. 1947. **Typus:** (Georgia) in Caucasi iberici alpestribus, 1800 m, *C. Mussin-Puschkin* (photo LE).
= *T. trichocephalum* M. B. var. *macrophyllum* Hossain et var. *lonchophyllum* Hossain, Not. Roy. Bot. Gard. Edinb. 23: 407. 1961.

Icon.: Gib. & Belli, l.c.: t. 9, f. 3; Bobrov, l.c.: 267. f. 3.

Hab.: Meadows, woods and swampy soil in higher altitudes.

Gen. distr.: Turkey, N Iran, Caucasus, Transcaucasia.

Selected specimens. **Turkey:** Prov. Erzerum, 14 miles from Horasan towards Karanzgan, 2000 m, 1957, *Davis & Hedge D 29507* (E); prov. Agri: 2 km SW of Hamuz (Murat Valley) 1670 m, sloping meadows 1966, *Davis 44021* (E); prov. Van, 30 km from Başkale to Hozop, S of pass, 2600 m, meadows of stream, 1966, *Davis 45922* (E); Grand Ararat, about 8500 ft, 1910, *B. V. D. Post 3120* (G). **Iran:** Inter Teheran and Tabriz 1859, *Bunge* (P). **Transcaucasia:** Armenia, Tiflis, *Wittman 232* (E).

- 18. *Trifolium caudatum*** Boiss., Diagn. ser. 1, 9: 22. 1849 et Fl. 2: 116. 1872. **Typus:** (Turkey) "In herbidis pratis superioris montis Mesogis supra Tralles in Lydia", June 1842, *Boissier* (holo.: G).
= *T. caudatum* Boiss. var. *groseanum* Aschers. & Sint. ex Boiss., Fl. Suppl.: 166. 1888.

Icon.: Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: t. 5. 1889.

Hab.: Woods and forest clearings calcareous soils.

Gen. distr.: Turkey (endemic).

Selected specimens. Turkey: Lydia in monte Güme-Dagh (Mesogis) supra oppidum Tere (Tyrria 600-700 m) 1906, *Bornmüller 9284b* (E); Bithynia, Brussa in reg. subalpina montis Olympi 900-1200 m, 1899, *Bornmüller 4318* (E); Taurus; Giosna, 1100 m, Kalkboden 1895, *Siehe 114* (E); prov. Troja, Mt Ida, in sylvis prope Kareikos 1883, *Sintenis 631* (E, isotype of var. *grosseanum* Aschers. & Sint. ex Boiss., Fl. Suppl. l.c.).

Boissier's descriptions both in the Diagnoses (l.c.) and in the Flora (l.c.), do not fit the whole variational range of this species which is very near to *T. ochroleucum* (and by no means to *T. pratense* as stated by Boissier); the latter has an open calyx throat and blunt teeth. *T. ochroleucum* differs at the first glance from *T. caudatum* by its appressed indumentum, its longer leaflets, its smaller heads and flowers, the flower colour, etc. The foliaceous shape of the stipules is not a constant character and can therefore not serve a marker between var. *caudatum* and var. *grosseanum* Aschers. & Sint. ex Boiss. Despite the above characters, it is worthwhile to examine the relations between *T. caudatum* and *T. ochroleucum* experimentally.

19. *Trifolium pannonicum* Jacq., Obs. Bot. 2: 21, t. 42. 1767; L., Mant. Alt. 2: 276. 1771. **Typus:** Hungary, Circa pagum Siglisberg (BM?).

Hab.: Meadows, forest clearings and steppes.

Gen. distr.: Germany, Poland, Czechoslovakia, Hungary, Romania, France, Italy, Balkan Peninsula, URSS, Turkey.

- 1a. Leaves usually large, 6-7 x 0.8-1.2 cm, the lower elliptical to lanceolate, the uppermost lanceolate, acute or mucronate. Head not involucrate, long-peduncled. Teeth of calyx not stellately divergent
19a. subsp. pannonicum
- 1b. Leaves much shorter and narrower, oblong-lanceolate to linear, 1.5-3 x 0.2-0.5 cm. Heads mostly involucrate. Teeth of calyx stellately divergent or deflexed *19b. subsp. elongatum*

19a. *T. pannonicum* Jacq. subsp. *pannonicum*.

= *T. pannonicum* Jacq., l.c.

= *T. armenium* auct. nonnul. non Willd. 1809.

= *T. pannonicum* "L". var. *rubrocalycinum* Podpera, Verh. Zool.-Bot. Ges. Wien 52: 646. 1902.

Icon.: Jacq., l.c.: t. 42; Reichenb., Icon 22: t. 2138. 1903.

Selected specimens. Poland: Ad pedem Carpatorum orientalium in pratis 1929, *Panow 42* (HUI). **Czechoslovakia:** Rossia subcarpatica: montes Svidovec, in pratis

submontanis supra Kevelov, 800 m, 1929, *Domin & Deyl 67* (HJ). **Hungary:** Monora, *Barth* (K). **Romania:** Transilvania, distr. Cojocna in locis graminosis ad oppidum Cluj, 1921, *Prodan 555b* (HJ). **Jugoslavia:** Unter Krain Gerganzberg, *Freyer* (K). **Italy:** Prov. Torino 1908, *Ferrari & al. 1075* (K).

19b. *T. pannonicum* Jacq. subsp. *elongatum* (Willd.) Zoh. in Davis, Fl. Turk. 3: 422. 1970. Typus: (Turkey) Habitat in Galatia, *Sestini 14203* (holo.: B; iso.: G).
 = *T. elongatum* Willd., Sp. Pl. 3, 2: 1369. 1802.
 = *T. armenium* Willd., Enum. Pl. Hort. Berol.: 793. 1809.
 = *T. olympicum* Hornem. ex Hook., Bot. Mag., t. 2790. 1827.
 = *T. sulphureum* C. Koch, Linnaea 19: 63. 1846.

Icon.: Bot. Mag., l.c.; Jaub. et Sp., III. Pl. Or. 2: t. 139. 1845.

Selected specimens. **Turkey:** Bithynia, in reg. inf. montis Olympi supra Brussa (Bursa) 300-500 m, 1899, *Bornmüller 4320* (K, P, G); Sandshak Gumüşkane, Moaddas dagh in pratis silvat. 1894, *Freyer 5963* (G); Armenia, Habitat in Armenia (B, holotype of *T. armenium* Willd.).

The distinction between the above two varieties is not always possible. There are transitions especially in size and shape of leaves, in the length of peduncles, etc.; see also Hossain (1961). Intermediates between the two recorded varieties are the specimens: Turkey, prov. Kars, Sarikamis 2100 m. *D. 30802* (E) and Bithynia, *Bornmüller 4320* (E).

IV. *Trifolium* subsect. *Alpestris* Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 334. 1889, pro stirpe; Aschers. & Graebn., Syn. Mitteleur. Fl. 6/2: 574. 1908.

Perennials. Calyx 20 (very rarely 10 or 12-15)-nerved; lower tooth of calyx longer than tube; throat of calyx narrowed by a hairy ring but not closed. Standard almost as long as wings. Pod altogether membranous.

20. *Trifolium rubens* L., Sp. Pl. 768. 1753. Typus: Hb. Cliff. 375. Described from Switzerland.

Hab.: In mountain forests, forest edges, stony slopes, among bush.

Gen. distr.: Germany, Poland, Czechoslovakia, Switzerland, Austria, Hungary, Romania, Spain, France, Italy, Jugoslavia, Albania, C and S Russia, Turkey.

- 1a. Calyx tube and often also stems and leaves glabrous. *20a. var. rubens*
- 1b. Calyx tube, stems and leaves hairy *20b. var. villosum*

20a. *T. rubens* L. var. *rubens*.

= *T. rubens* L., Sp. Pl. 768. 1753; Boiss., Fl. 2: 113. 1872; Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 337, 1889; Aschers. & Graebn., Syn. Mitteleur. Fl. 6/2: 575. 1908.

Icon.: Jacq., Fl. Austr. 4: t. 385. 1790; Reichenb., Icon. 22: t. 2137, f. 1-11. 1903; Gib. & Belli, l.c.: t. 5, f. 6.

Selected specimens. **Germany:** Kalbergen in Thüringen, *Fest 267* (HUI). **Czechoslovakia:** Montes Bile Karpaty in declivibus stepposis collis Hajova prope Lipov 1934, *Weber* (HUI); Moravia: Mer.-Or. Uh. Ostroh. Carpati albi, Velko c. 460 m, 1933, *Podpera & Uxor 832* (HUI). **Switzerland:** Vaud, Pied du Jura: près du Signal d'Orbe, prés sec, 505 m, 1951, *Villaret 12156* (HUI). **Austria:** Pr. Lienz 1865, *Ausserdorfer* (K). **Hungary:** In monte Mecsek 1915, *Maly* (K). **Romania:** Transilvania, distr. Cajocna in herb. montanis ad stationem viae ferreae Cajocna-Boj, c. 400 m, 1924, *Nyarady 557* (HUI).

20b. *T. rubens* L. var. *villosum* Vis. & Sacc., Cat. Pl. Vasc. Veneto: 260. 1869; var. β Bertol., Fl. It. 8: 170. 1851, phras. descript.; "var. *villosum* Bert." Gib. & Belli, l.c.; Aschers. & Graebn., Syn. Mitteleur. Fl. 6/2: 575. 1908.

= *T. rubens* L. var. *hirsutum* Loeske ex Spribille, K. Gymn. Inowrazlaw Wiss. Beil. Progr. No. 142: 14. 1888, nom. prov.

Specimens recorded: **Italy:** Ex olivetis di Romana, Montinio. **Turkey:** In lapidosis sylvaticis siccis circa Byzantium (Sestini ex Sibth.) Boiss., l.c.

21. *Trifolium alpestre* L., Sp. Pl. ed. 2: 1082. 1763. **Typus: Hb. Linn. 930/28, photo. Described from Europe.**

Hab.: Pastures, meadows, forest clearings in the montane belt.

Gen. distr.: Denmark, Germany, Poland, Switzerland, Austria, Hungary, Spain, France, Italy, Balkan Peninsula, S Russia, Turkey, Iran, Caucasus.

- | | | |
|-----|----------------------------------------|------------------------------|
| 1a. | Calyx 20-nerved | 2 |
| 1b. | Calyx 10(11-12)-nerved | <i>21c. var. durmitoreum</i> |
| 2a. | Indumentum of stem appressed | <i>21a. var. alpestre</i> |
| 2b. | Indumentum of stem patulous | <i>21b. var. lanigerum</i> |

21a. *T. alpestre* L. var. *alpestre*.

= *T. alpestre* L., Sp. Pl. ed. 2: 1082. 1763; Boiss., Fl. 2: 113. 1872; Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 334. 1889.

- = *T. alpestre* L. var. *eualpestre* Aschers. & Graebn., Syn. Mitteleur. Fl. 6/2: 576. 1908.
- = *T. alpestre* L. var. *distachyum* Ser. in DC., Prodr. 2: 194. 1825.
- = *T. alpestre* L. var. *glabratum* J. C. von Klinggräff, Fl. Preuss.: 98. 1848.
- = *T. alpestre* L. var. *sericeum* Hausskn., Mitt. Thür. Bot. Ver. N.F. 8: 23. 1895.

Icon.: Jacq., Obs. Bot. 3: t. 64. 1768; Reichenb., Icon. 22: t. 2135, f. 3, 7-12. 1903.

Selected specimens. Czechoslovakia: Moravia: Mer. Or. Uh. Ostroh. Carpati albi; ad oppid. Velka sub summo monte Machova 550 m, 1933, *Podpera & Uxor 829* (HUI). **Switzerland:** Forêts sur les grès Vosgiens aux env. de Bitche Jum., *Schultz 23* (HUI). **Bulgaria:** Mt. Vitoša in petrosis supra pagum Dragalevci c. 1000 m; solo silicioso 1951, *Stojanov 47* (HUI). **Turkey:** Prov. Kars: Ziyaret Dağ above Yalnizçam 2300 m, rocky igneous slopes 1957, *Davis & Hedge D 30320* (HUI). **Iran:** Persia, *Szowits 556* (G). **Caucasus:** In alpe Kasbek ad fl. Terek 1881, *Brotherus 239* (G). **Transcaucasia:** Azerbajdzhan, distr. Kedabek, inter pag. Kedabek mont. Karadagh 1939, *Chalilov* (HUI); Armenia, Pratis subalpinis, Jelidja 1926, *Schelkovnikov* (HUI).

- 21b. *T. alpestre* L. var. *lanigerum* Ser. in DC., Prodr. 2: 194. 1825.**
- = *T. alpestre* L. var. *villosum* Čelak., Prodr. Fl. Böhm.: 667. 1875.

Selected specimens. Switzerland: Vaud, Pied du Jura: route Moiry-Juriens: La Bossenaz sur Ferreyres, bois de chênes coupés, alt. 660 m, 1951, *Villaret 12147* (HUI). **France:** Prairies au nord de la commune à St Sarlin pr. Maupienne (Savoie) 1854, *Didier 1646* (WAG). **Greece:** Epirus, Mt Olytsika, 1929, *Guiol 1081* (HUI).

- 21c. *T. alpestre* L. var. *durmitoreum* Rohlena, Sitzb. Böhm. Ges. Wies. 17: 24. 1903.**

Recorded from Montenegro am Durmitor oberhalb Zabljak (Aschers. & Graebn., l.c.: 578) and also from other places.

- V. *Trifolium* subsect. *Stellata* Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 293. 1889, pro stirpe, emend. Zoh.**

Annuals. Calyx 10-nerved; teeth of fruiting calyx more or less equal in length spreading at maturity, as long as or longer than tube; throat of calyx closed by a hairy ring. Corolla about as long as calyx, rarely somewhat longer. Leaflets obovate to obtriangular; stipules ovate, more or less dentate, not cuspidate.

22. *Trifolium stellatum* L., Sp. Pl.: 769. 1753. **Typus:** Hb. Cliff. 375. Syntypes from Sicily and Italy.

Hab.: Roadsides, fields and among dwarf shrubs.

Gen. distr.: British Isles, Portugal, Spain, France, Italy, Balkan Peninsula, Turkey, Syria, Lebanon, Palestine, Iraq, Iran, Caucasus, Transcaucasia, Egypt, Libya, Tunisia, Algeria, Morocco, Madeira, Canary Islands, and elsewhere.

- | | | |
|-----|----------------------------------------------|------------------------------|
| 1a. | Flowers white or pink | 2 |
| 1b. | Flowers yellow | 22c. var. <i>xanthinum</i> |
| 2a. | Plants patulous-hairy | 3 |
| 2b. | Plants appressed-hairy | 22b. var. <i>adpressum</i> |
| 3a. | Corolla about as long as calyx | 22a. var. <i>stellatum</i> |
| 3b. | Corolla somewhat longer than calyx | 22d. var. <i>longiflorum</i> |

22a. *T. stellatum* L. var. *stellatum*.

= *T. stellatum* L., Sp. Pl.: 669. 1753; Boiss., Fl. 2: 121. 1872; Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 293. 1889.

Icon.: Reichenb., Icon. 22: t. 2143, f. 1-10. 1903.

Selected specimens. **Hungary:** 1823, *Sadler* (W). **Portugal:** Prope Almodo 1840, *Welwitsch* 482 (W). **Spain:** Prope Cadiz 1873, *Winkler* (W). **France:** Friches autour du bois Serres pr. Carcassonne 1885, *Baichere* 1128 (W). **Italy:** In herbis agri Neapolitani 1841, *Heldreich* (W). **Crete:** 4 km S of Mires on the way to Kali-Limenes, *Thymus-Andropogon* batha, 100 m, 1964, *Zohary & Orshan* 24/4/3 (HUI). **Turkey:** Constantinopol 1845, *Noë* (W). **Syria:** Aleppo 1841, *Kotschy* 56 (G). **Lebanon:** Env. of Eden, 1856, *Blanche* 3060 (G). **Palestine:** Jerusalem, Mt Scopus 1931, *Amdursky* 137 (HUI). **Iraq:** Zawita 1956, *Guest* 15393 (K). **Transcaucasia:** Daghistan, pr. Derbent versus pagum Sabnova 1902, *Alexeenko* 68 (G). **Iran:** Kazerun plain near Bushire 1928 (K). **Egypt:** Betw. Matruh and Barran 1932, *Shabetai* 41 (K). **Algeria:** Saida 1893, *Blanche* 90 (W). **Morocco:** Pr. Xanen, *Font Quer* 199 (BM). **Madeira:** In pascuis Cabo Gircio 1865-66, *Mandon* 64 (G). **Canary Islands:** Between Tenerra and Taburienta 1913, *Sprague & Hutchinson* 1354 (HUI).

22b. *T. stellatum* L. var. *adpressum* Turrill, Kew Bull. 1924: 327. 1924. **Typus:** Turkey: Thymbra in collibus, 3.5.1883, *Sintensis* 175 (lecto.: K; isolecto.: E).

Selected specimens. **Greece:** Dodecanese: Patmos, rough, stony hillside near Scala 1962, *Gathorne-Hardy* 150 (E). **Iraq:** Rowanduz gorge 1932, 2026 (K). **Iran:** Railway gorge n. Khorramabad 1200 m, 1936, *Trott* 394 (K).

Also known from Italy, Sicily, Albania, Aegean Islands, Cyprus, etc.

22c. *T. stellatum* L. var. *xanthinum* (Freyn) Bald., Nuov. Giorn. Bot. Ital. n.s. 6: 155. 1899. **Typus:** Greece, in Aetolien, Berge Arapokephales, nr. Agrinion 22.5.1878, *Heldreich & Klissura*; 21.5.1878, *Heldreich* (syntypes: E).
= *T. xanthinum* Freyn, Bot. Centralbl. 1: 308. 1880.

Specimens seen. Greece: Laconia borealis in districto Alagonia c. Megali-Anastova, 1889, *Zahn 1527a* (W). **W Anatolia:** Distr. Agdin; S side of Bafa Göl., 100 m, *D. 40748* (E).

22d. *T. stellatum* L. var. *longiflorum* Griseb., Spicil. Fl. Rumel. 1: 19. 1843. **Typus:** No exact typification could be made.

Icon.: Sibth. & Sm., Fl. Graec. 8: t. 750. 1833.

Selected specimens. France: 1847, *Kralik 230* (WAG); Corsica 1849, *Kralik 16550* (WAG). **Turkey:** "In regione semperviridi Bithyniae et Thraciae alt. 0-1200 m, copiose in campis siccis prope Modania..." etc., fide Hossain, l.c.: 434. 1961. **Palestine:** Upper Galilee, Metula, Eocene hills, terra rossa, 1963, *Zohary & Plitmann 12/21* (HUI).

23. *Trifolium incarnatum* L., Sp. Pl.: 769. 1753. **Typus:** Hb. Linn. 930/32. Described from Italy.

Hab.: Fields, pastures, meadows, roadsides.

Gen. distr.: British Isles, Portugal, Spain, France, Italy and Islands, Balkan Peninsula, Turkey.

Includes the following 2 varieties:

- 1a. Corolla blood-red, rarely white, equalling the calyx. Stems stout. Heads dense *23a. var. incarnatum*
- 1b. Corolla usually yellowish-white, rarely pink, much exceeding the calyx. Heads rather loose. Stems slender. Stems and petioles usually appressed-hairy. *23b. var. molinerii*

23a. *T. incarnatum* L. var. *incarnatum*.

= *T. incarnatum* L., Sp. Pl.: 769. 1753; Boiss., Fl. 2: 122. 1872.

= *T. stellatum* L. subsp. *incarnatum* (L.) Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 296. 1889.

= *T. incarnatum* L. var. *sativum* Ducomn., Taschenb.: 169. 1869.

= *T. stellatum* L. subsp. *incarnatum* var. *elatius* Gib. & Belli, l.c.

Icon.: Reichenb., Icon. 22: t. 2145, f. 2, 5-12. 1903.

Widely cultivated and more or less naturalized.

Selected specimens. Portugal: Coimbra, Mainca, nos campos cultivados 1954, *Matos & al.* (HUI). **Jugoslavia:** Belgrad Wieden 1888, *Bornmüller* (HUI).

Also seen and recorded from almost all European countries.

- 23b. *T. incarnatum* L. var. *molinerii* (Balb. ex Hornem.) Ser. in DC., Prodr. 2: 190. 1825. **Typus:** Described from Italy (n.v.).**
 = *T. molinerii* Balb., Cat. Hort. Acad. Taurin. App. 1: 17. 1813, nom. nud.
 = *T. molinerii* Balb. ex DC. in Lam. & DC., Fl. Fr. ed. 3, 5: 556. 1815, pro syn.
 = *T. molinerii* Balb. ex Hornem., Hort. Hafn. 2: 715. 1815.
 = *T. noëanum* Reichenb. ex Mert. & Koch in Röhling, Deutschl. Fl. ed. 3, 5: 265. 1839, pro syn.
 = *T. stramineum* C. Presl, Fl. Sic. 1: XX. 1826.
 = *T. stellatum* L. subvar. *stramineum* (C. Presl) Gib. & Belli, l.c.: 298.

Icon.: Syme, Engl. Bot. 3: t. 353. 1864.

Hab.: Meadows and roadsides.

Gen. distr.: Mainly W, S and C Europe.

Selected specimens. Romania: Banatus distr., Caraş-Severin 300 m, 1923, *Borza & al.* 560 (HUI). **France:** env. of Montpellier, Castelnau-Crès roadsides 1931, *Eig* (HUI). **Italy:** Alpe Apuane Prov. Lucca, Weiden am Weg von Stazzema zum Monte Procinto, c. 600 m, 1948, *Koch 48/229 A* (HUI). **Jugoslavia:** Croatien, Vrebae, *Schlosser* (W); Fiume auf Wiesen, *Noë 1366* (G, syntype of *T. noëanum* Reichenb.). **Turkey:** Distr. Constantinopol (Istanbul), entre Tachamlidja et Dodourlou 1891, *Aznavour 643* (G).

Also seen from other Mediterranean countries.

- 24. *Trifolium sylvaticum* Gérard ex Loisel., Desv. Journ. Bot. 2: 367. 1809 et Fl. Gall. ed. 2, 2: 124 n. 40. 1828. **Typus:** Described from S France (n.v.).**
 = *T. smyrnaeum* Boiss., Diagn. ser. 1, 2: 25. 1843 et Fl. 2: 121. 1872 "*smyrneum*"; Hossain, Not. Roy. Bot. Gard. Edinb. 23: 418. 1961.
 = *T. lagopus* Pourr. ex Willd., Sp. Pl. 3: 1365. 1802, non Garsault, Fig. Pl. Anim. Med. t. 602. 1764, nom. inval. nec Gouan, Fl. Monsp. 105 n. 20. 1765, subs. illegit.; Gib & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 349. 1889.
 = *T. hervieri* Freyn, Bull. Herb. Boiss. 1: 543. 1893.
 = *T. lagopus* Pourr. var. *smyrnaeum* (Boiss.) Bornm., Bot. Jahrb. 59: 475. 1925, comb. inval.
 = *T. bonnevilliei* Mout., Fl. Djebel Druze 127, t. 8, f. 1. 1953.

Icon.: Cusin, Herb. Fl. Fr. 6: t. 1100. 1870; Gib. & Belli, l.c.: t. 6, f. 3, 1889; Mout., l.c.: t. 8, f. 1.

Hab.: Hillsides and montane valleys.

Gen. distr.: Belgium, Portugal, Spain, France, Balkan Peninsula, Turkey, Syria, Iraq, etc.

Selected specimens. **Portugal:** Base do Monte de S. Bartolomeu, pr. Bragança; terras em pousio, 1958, *Fernandes & al.* 6345 (HUI). **Spain:** Catalogne, Vilarnadal et S. Clemente, friches, 1907, *Sennen* 256 (HUI); Sierra de Comeruna 1892, *Reverchon* (K, isotype of *T. hervieri* Freyn). **Albania:** In umbrosis sylvarum ditio Primarije ad v. Mikulic 1898, *Baldacci* 61 (P). **Bulgaria:** In collinis prope Vranja, 700 m, 1894, *Adamović s.n.* (P). **Turkey:** Smyrne, dans les champs en friche 1954, *Balansa* 159 (W); in montibus circa Smyrnam, mons Corax, jugum Sipyleum, supra Bournabat, Maio-Junio 1842, *Boissier* (G, lectotype of *T. smyrnaeum* Boiss.); Uşak, 5 miles from Uşak on road to Gire, open dry pasture 1965, *Coode & Jones* 2539 (E). **Syria:** Djebel Druze, Tel Chihane 1943, *Mouterde* (HUI, as *T. bonnevillei*). **Iraq:** Distr. Sulaimaniya, Kurdistan, Montes Avroman ad confines Persiae in dit. pagi Tawillo 1957, *Rechinger* 12432 (W).

The reasons forwarded by Hossain (l.c.) against the identity of *T. smyrnaeum* with *T. sylvaticum* are not convincing. I have seen specimens from Portugal and Spain which agree well with *T. smyrnaeum* Boiss., Rouy (Fl. France, 1899), Briquet (Fl. Corse, 1913), and others also synonymize the illegitimate name of *T. lagopus* Pourr. with *T. sylvaticum* Gérard ex Loisel. which is the earliest valid name for this species.

VI. Trifolium subsect. **Stenosemium** (Čelak.) Aschers. & Graebn., Syn. Mitteleur. Fl. 6/2: 527. 1908.
 = Sect. *Stenosemium* Čelak., Oesterr. Bot. Z. 24: 75. 1874.
 = *Eleuterosemium* Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 261. 1889, pro stirpe.

Annuals. Calyx tube 10-nerved, almost globular in fruit, teeth not reflexed at maturity; throat open, but somewhat narrowed by an epidermal thickening. Corolla persistent; standard free from other petals and from stamens.

25. Trifolium striatum L., Sp. Pl.: 770. 1753; Godr. in Gren. & Godr., Fl. Fr. 1: 412. 1848-49; Boiss., Fl. 2: 130. 1872; Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 261. 1889. **Typus:** Hb. Linn. 930/45 (syntypes from Germany, France and Spain).
 = *T. conicum* Pers. fide Savi, Obs. Trif.: 41. 1808-10, non Lag. 1816, nec Kit. ex Nyman, 1878.
 = *T. kitaibelianum* Ser. in DC., Prodr. 2: 194. 1825.
 = *T. tenuiflorum* Ten., Prodr. Fl. Nap. 1: XLIV. 1811-15, et Fl. Nap. 5: 141 no. 2610, t. 177, f. 1. 1835-38.
 = *T. cylindricum* Wallr., Beitr. Fl. Hercyn., in Linnaea 14: 619. 1840.
 = *T. striatum* L. var. *spinescens* Lange, Linnaea 12: 361. 1857, et in Willk. & Lange, Prodr. Fl. Hisp. 3: 362. 1877.
 = *T. striatum* L. var. *kitaibelianum* (Ser.) Heuff., Verh. Zool.-Bot. Ges. Wien 8: Abh. 89. 1858.

- = *T. striatum* L. var. *brevidens* Lange, Naturhist. Forenz. Vidensk. Meddel. 2, Aart VII: 363. 1860-65.
- = *T. striatum* L. var. *prostratum* Lange, Bot. Tidskr. 3: 124. 1860.
- = *T. striatum* L. var. *elatum* Lojac., Tent. Monogr. Trif. Sic.: 124. 1878, et Fl. Sic. 1, 2: 92. 1891.
- = *T. striatum* L. var. *strictum* Dreyer ex Lange, Haandb. Dansk. Fl. ed. 4: 832, 1888.
- = *T. incanum* auct. non J. & C. Presl. 1822.
- = *T. striatum* L. var. *elongatum* Rouy, Fl. Fr. 5: 101. 1899.
- = *T. striatum* L. var. *nanum* Rouy, l.c.
- = *T. striatum* L. var. *longiflorum* Halác., Consp. Fl. Gr. 1: 393. 1901.
- = *T. striatum* L. var. *incanum* (J. & C. Presl) Aschers. & Graebn., Syn. Mitteleur. Fl. 6/2: 528. 1908.
- = *T. striatum* L. var. *macrodontum* Boiss., l.c.

Icon.: Reichenb., Icon. 22: t. 2151, f. 1, 1-10. 1903; Gib. & Belli, l.c.: t. 1. 1889; Ross-Craig, Draw. Brit. Pl. 7: pl. 31. 1954.

Hab.: Roadsides, wastes, pastures, etc.

Gen. distr.: British Isles, Denmark, Scandinavia, Germany, Switzerland, Hungary, Romania, Portugal, Spain, France, Italy, Sicily, Balkan Peninsula, S Russia, Crimea, Turkey, Iraq, Iran, Transcaucasia, Tunisia, Algeria, Morocco, Madeira, Canary Islands, and elsewhere.

Selected specimens. **Denmark**: Jylland, Bjørnsknude 1890, *Raunkiaer* (HJ). **Germany**: Dresden, *Hübner 266* (G). **Switzerland**: Basch, *Lerasche* (G). **Hungary**: Ca. Budam, Herb. *Rainer-Haerbad* (G). **Romania**: Reg. Constanta, raion Istria in foenetic ad marg. merid. oppid. Istria (Babadag) 1956, *Todor & al. 93* (HJ). **Spain**: Sierra de Sigura 1890, *Bourgeau* (G). **France**: Roches et champs secs des collines exposés au soleil près de Bitche (Moselle) 1853, *Schultz 34* (HJ). **Sicily**: In montosis, *Gasparrini* (W); in herbosis Ficuzza 1856, *Huet du Pavillon 46* (G). **Bulgaria**: In graminosis ad agrorum margines, prope Kalofer (Thrace) 1871, *Janka* (G). **Turkey**: Near Istanbul, Belgrad forest, Fagetum 1963, *Zohary 5663* (HJ); Sultandagh, Aksheher 1899, *Bornmüller 4342* (G). **Cyprus**: Prodhromus 1320 m, 1855, *Merton 2393* (K). **Iran**: Lahijan, dry banks 1937, Miss *N. Lindsay 822* (K). **Transcaucasia**: Azerbaidzhan, Lenkoran 1946, *Chalilov* (HJ); Abchasia, Suchumkale 1908, *Markovicz 363* (G). **Algeria**: Blida, pentes de l'Atlas, au-dessus de la ville 1881, *Meyer 1169bis* (G). **Canary Islands**: Teneriffae ad caenobium St Diego del Monte (G).

Obs.: This is an exceedingly polymorphic species and its variability is discussed at length by Gibelli & Belli l.c., and by Ascherson & Graebner, l.c.

The present author follows strictly Gibelli & Belli in looking on most of the taxa established on this variability as habitat forms not worthy to be ranked as varieties, especially because of the many transitions between the forms. At any rate, only a critical (experimental) study of the wealth of forms included in the species under discussion, may decide on the constancy and taxonomic value of these forms.

VII. *Trifolium* subsect. ***Trichoptera*** Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 274. 1889, pro stirpe; Aschers. & Graebn., Syn. Mitteleur. Fl. 6/2: 535. 1908.

Annuals. Calyx 10-nerved; teeth as long as tube or shorter; throat open but hairy. Corolla persistent, shorter or longer than calyx; wings of corolla finely pilose, especially near auricles.

26. *Trifolium bocconeii* Savi, Atti Accad. It. 1: 191 f. 1, 201. 1808-10; "*boccone*".
Typus: Probably Florence (G, one of the syntypes).

Hab.: Fields, roadsides, open maquis and dwarf-shrub formations.

Gen. distr.: British Islands, Portugal, Spain, France, Italy, Balkan Peninsula, Turkey, Syria, Tunisia, Algeria, Morocco, Canary Islands.

- 1a. Upper leaflets cuneate-oblong. Corolla not or slightly exceeding calyx teeth. *26a. var. bocconeii*
- 1b. Upper leaflets linear or narrowly oblong. Corolla twice as long as calyx
26b. var. tenuifolium

26a. *T. bocconeii* Savi var. ***bocconeii***.

- = *T. bocconeii* Savi, l.c.; Godr. in Gren. & Godr., Fl. Fr. 1: 411. 1848-49; Boiss., Fl. 2: 132. 1872; Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 274. 1889.
- = *T. collinum* Bast., Suppl. Fl. Maine-et-Loire: 5. 1812.
- = *T. gemellum* sensu Lapeyr., Hist. Abr. Pyrén.: 437. 1813, non Pourr. ex Willd. 1802.
- = *T. semiglabrum* Brot., Phytogr. Lusit. 1: 155, t. 63, f. 2. 1816.
- = *T. bocconeii* Savi var. *pomelii* Maire in Sched. Herb. Paris.
- = *T. bocconeii* Savi var. *gracile* Rouy, Fl. Fr. 5: 102. 1899.
- = *T. bocconeii* Savi var. *cylindricum* Rouy, l.c.
- = *T. bocconeii* Savi var. *macedonicum* Adamović, Denkschr. Akad. Wiss. 74: 130. 1904.

Icon.: Boccone, Mus. Piant. 1: 104. 1697; Gib. & Belli, l.c.: t. 1, f. 4; Reichenb., Icon. 22: t. 2149, f. 1, 1-8. 1903; Ross-Craig, Draw. Brit. Pl. 7: 30. 1954.

Hab.: Fields, roadsides, open maquis and dwarf shrub formations.

Gen. distr.: British Isles, Portugal, Spain, France, Sardinia, Italy, Sicily, Balkan Peninsula, Turkey, Syria, Tunisia, Algeria, Morocco, Canary Islands.

Selected specimens. Portugal: Coimbra: Penedo da Meditação 1950, *Matos & Matos* (HUI). **Spain:** Montes de Toledo, dry ground, *Quercus ilex* scrub 930 m, 1959, *M. Y. Sandwith* 5602 (K). **France:** Prov. Var: Bord des champs et des bois, etc., près de Pierrefeu 1865, *Chamberon* 1048 (HUI). **Sardinia:** Arroundiss. de Tempis 1882, *Reverchon* 314 (W). **Italy:** Toscana, Monte Pisano 1862, *Savi* 1164 *ter?* (G). **Sicily:** In vineis et campis aridis agri Panormitani 1840, *Heldreich* (G).

Jugoslavia: Polo, Mt Toibom 1901, *Untchy* (W). **Greece:** Athos, *Frivaldszky* (W). **Bulgaria:** Mazedonia in herbis saxosis Mt Kortiac 1908, *Adamović* (W). **Turkey:** Prov. Istanbul: Calendie près de Yinikeny 1895, *Aznavour* (G). **Algeria:** Env. d'Alger, Corteaux du Hamma, lieux herbeux, 800 m, 1953, *d'Alleizette* (HUI). **Morocco:** Tanger, Djebel Kebir, *Schousboe 33* (K).

The two forms distinguished by Rouy, l.c., are intergrading with one another and with the typical form *T. bocconeii* var. *macedonicum* Adamović needs further study.

- 26b. *T. bocconeii* Savi var. *tenuifolium* (Ten.) Griseb., Spicil. Fl. Rumel. 1: 23. 1843. **Typus:** Described from Italy (probably in NAP).
 = *T. tenuifolium* Ten., Prodr. Fl. Nap. XLIV. 1811-15, et Fl. Nap. 5: 145 no. 2622, t. 177, f. 3. 1835-38; Boiss., Fl. 2: 132. 1872.
 = *T. tenoreanum* Boiss. & Sprun. in Boiss., Diagn. ser. 1, 2: 26. 1843, subs. illegit.
 = *T. bocconeii* Savi subsp. *tenuifolium* (Ten.) Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 277. 410. 1889.**

Icon.: Reichenb., Icon. 22: t. 2149, f. 2, 9-16. 1903.

Hab.: Steppes, dry hillsides.

Gen. distr.: S Italy, Sicily, Balkan Peninsula, Crete.

Selected specimens. Italy: Italia austr., Tapygia in olivetis c. pagum Alessano 10-100', 1875, *Porta & Rigo 301* (P, HUI). **Sicily:** In sepibus, *Parlatore* (P). **Jugoslavia:** Dalmatia, Verrai 1905, *Calloro* (G). **Albania:** Ad Stoja in arenosis 1898, *Baldacci 62* (W). **Greece:** Agrapha (Dolopia veterum) in reg. inf. m. Pindi c. monasterium Korona 1885, *Heldreich* (W); Macedonia orientalis, distr. Kozani in montibus Pierra loco dicta Vlassia inter Velvedos et Kataphygion 500-800 m, 1956, *Rechinger 17841* (W). **Crete:** Canea 1894, *H. de Voasieu* (P).

- 27. *Trifolium trichopterum* Panč., Verh. Zool.-Bot. Ges. Wien 6: Abh. 480. 1856; Boiss., Fl. 2: 131. 1872; Aschers. & Graebn., Syn. Mitteleur. Fl. 6/2: 538. 1908. **Typus:** Jugoslavia, Boračer Felsen in Kragujevac, *Sapetza* (G?).**

Hab.: Dry stony hillsides and wastes.

Gen. distr.: Jugoslavia, Albania, Greece, Bulgaria, Turkey.

Specimens seen. Greece: above Armensko 1932, *Alston Sandwith 14* (K). **Bulgaria:** M. Sredna Gora in declivibus graminosis supra urbem Koprivstica ad c. 1050 m, 1951, *Stojanov & Achtarov 46* (HUI); M. Rila pr. monasterium Rila 1939, *Lindberg* (HUI); in asperis graniticis supra Vranja, Serb. merid. 1874, *Pančić* (G). **Turkey:** Thrace, 2000 ft, 1934, *Ottman-Euren 1460* (K).

VIII. *Trifolium* subsect. *Scabroidea* Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 286. 1889, pro stirpe; Aschers. & Graebn., Syn. Mitteleur. Fl. 6/2: 540. 1908.

Annuals. Calyx 10-nerved, pilose; teeth usually shorter than tube, the lower longer, somewhat spiny at tip; throat open but narrowed by a callose ring. Leaves with lateral nerves, thickened and recurved. Fruiting heads not disarticulating, falling off as a single dispersal unit.

28. *Trifolium scabrum* L., Sp. Pl. 770. 1753; Boiss., Fl. 2: 130. 1872; Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 286. 1889; Aschers. & Graebn., Syn. Mitteleur. Fl. 6/2: 540. 1908; Hossain, Not. Roy. Bot. Gard. Edinb. 23: 430. 1961. **Typus:** Hb. Cliff. Syntypes from the British Isles, France, and Italy.

Icon.: Reichenb., Icon. 22: 2152, f. 2, 9-16. 1903; Hegi, Ill. Fl. Mitteleur. 4, 3: 1326, f. 1410. 1923; Ross-Craig, Draw. Brit. Pl. 7: pl. 32. 1954.

Hab.: Mainly stony ground and rock crevices.

Gen. distr.: British Isles, Belgium, Netherlands, Germany, Romania, Portugal, Spain, France, Italy, Yugoslavia, Albania, Greece, Crete, Bulgaria, Crimea, Turkey, Cyprus, Syria, Lebanon, Palestine, Iraq, Iran, Egypt, Libya, Tunisia, Algeria, Morocco, Canary Islands.

Selected specimens. **Portugal:** Insula Berlanga, solo granitico pr. Peniche 1924, *Mendonca 2074* (HUI). **France:** Montpellier 1905, *Thellung 517* (HUI); pelouses agricoles près de Lardy, env. Paris 1845, *Kralik 8366* (P). **Italy:** Puglia Murgie di S. Elio 1950 (G), leg. *Scarbinutti* (HUI). **Greece:** Attica: Mt Parnas 1933, *Guiol 41* (HUI). **Crete:** 28 km E of the Lashiti Plateau on the way to Ag. Nikolaos 280 m, 1964, *Zohary & Orshan 29406* (HUI). **Rhodes:** Callithaca n. spring, rocks, slope facing the sea 1961, *Feinbrun 85* (HUI). **Turkey:** Ad vias Smyrnae 1827, *Fleischer* (K); pr. Adapazari, 45 km S od Akyazi 720 m, *Orshan 54222* (HUI). **Cyprus:** Scarinou (distr. Larnaca), shingle in river bed 1941, *Davis 1691* (E). **Syria:** Région inf. du Jebel Seman 360 m, 1908, *Haradjian 2044* (K); Mt Hermon, 1 hour from Shibba, c. 1100 m, 1924, *Eig* (HUI). **Lebanon:** Cimetière musulman aux Tell, bords du chemin Tripoli 1854, *Blanche 1188* (G). **Palestine:** Acre Plain near Kishon River, sandy soil 1962, *Zohary* (HUI). **Iran:** Lahijan, Ghilan 1937, *Lindsay 817* (K). **Algeria:** Alger 1840, *Fauché 595* (G). **Morocco:** Jebel Hadid près de Mogador 1867, *Balansa* (G). **Canary Islands:** Palma, Caldera betw. Tenerra and Taburiente 1913, *Sprague & Hutchinson 440* (HUI).

Obs.: Slight variations only have been observed in *T. scabrum*. However, the dimensions of the head vary from 0.5-1.5(-2) cm in fruit. Larger heads are found in the same specimen together with small ones. One of the most striking differences between *T. scabrum* and its allied species is the lanceolate, relatively broad and lignified calyx teeth that remain erect or spread slightly sideways; the anterior one only is often bent downwards.

- 29. *Trifolium lucanicum*** Gasp. ex Guss., Fl. Sic. Prodr. 2: 494. 1828. **Typus:** Sicily, Monte della piuna e della Rosa, *Gasparrini* (n.v.).
 = *T. scabrum* L. subsp. *lucanicum* (Gasp. ex Guss.) Rouy, Fl. Fr. 5: 109. 1899.
 = *T. scabrum* L. var. *lucanicum* (Gasp. ex Guss.) Halác., Consp. Fl. Gr. 1: 391. 1901.
 = *T. scabrum* L. var. *majus* Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 287. 1889.
 = *T. dalmaticum* sensu Boiss., Fl. 2: 131. 1872, et sensu Godr. in Gren. & Godr., Fl. Fr. 1: 411. 1848-49, non Vis. 1829.
 = *T. compactum* Post, Fl. Syr. Pal. Sin.: 239. 1883-96, et ed. 2, 1: 341. 1932; Hossain, Not. Roy. Bot. Gard. Edinb. 23: 431. 1961, p.p.

Hab.: Dry places, rocky ground, etc.

Gen. distr.: France, Italy, Balkan Peninsula, Turkey.

Selected specimens. Italy: Puglia 1841, *Gussone* (G). **Jugoslavia:** Dalmatia 1840, *Pichler* (G) (this specimen has been compared with an authentic specimen of this species by Gibelli & Belli). **Turkey:** Distr. Constantinopol, env. of Pendik 1906, *Aznavour* (G); Elmali, sur les collines 1860, *Bourgeau* (G); distr. Malatia 20-30 km, W of Malatia, *Quercus cerris* forest remnants, 1600 m, 1963, *Zohary & al.* 27521 (HJ).

T. lucanicum Gasp. ex Guss. differs from *T. scabrum* by the following characters: heads larger with broader base (not cuneate); flowers generally much more in number per head, somewhat longer; flowering calyx with cylindrical tube and subulate teeth, hirsute and ciliate all along and ending in a tuft of stiff hairs (not as in *T. scabrum*, lanceolate and ending mostly with a naked point); fruiting calyx tube prominently nerved, hairy between nerves (and not as in *T. scabrum* obscurely nerved and hairy throughout or rarely glabrous); teeth less indurated, all or part of them reflexed or spreading; corolla mostly somewhat longer than calyx. Geographically this is a NE Mediterranean species and does not reach the southern border of Turkey.

Despite these different characters, there is a series of forms connecting *T. lucanicum* with *T. scabrum*, so that the specific rank of the former is retained here tentatively only.

- 30. *Trifolium dalmaticum*** Vis., Pl. Rar. Dalm., in Flora 12, Ergänzungsbl. 1: 21. no. 31, 1829, et Fl. Dalm. 3: 293, t. 45. 1850-52, non sensu Ten. 1835, nec sensu Boiss. 1872. **Typus:** (Dalmatia) leg. *Alschinger & Freyn* (fide Gib. & Belli, l.c.: 291, PAD).
 = *T. scabrum* L. subsp. *dalmaticum* (Vis.) Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 292. 1889.
 = *T. maculatum* Host, Fl. Austr. 2: 373. 1831.
 = *T. filicaule* Boiss. & Heldr. in Boiss., Diagn. ser. 1, 9: 24. 1849, et Fl. 2: 131. 1872.
 = *T. rotundifolium* Bory & Chaub., Nouv. Fl. Pelop.: 50. 1838, non Sm. in Sibth., & Sm. 1833.

Icon.: Vis., Fl. Dalm., l.c.: t. 45 (very poor drawing).

The above description was made from a specimen which was compared by Gibelli & Belli with the authentic specimens of Visiani's collection.

Hab.: Grassy places.

Gen. distr.: Balkan Peninsula.

Selected specimens. Yugoslavia: Serbia in pascuis m. Pljackovica, 800 m, 1896, *Adamović* (HJ); Bosnia, Sehovica pr. Aphoda-Sarajevo 570 m, 1904, *Maly* (HJ); Dalmatia, *Cattaro*, Pichler (G). **Greece:** Thessalia, Malakasi in vineis 1896, *Frey* 625 (HJ); Taygeti, au-dessous du village Malta 1894, *Heldreich* 199 (G, holotype of *T. filicaule* Boiss. & Heldr.); Laconia boreo-occidentalis 1896, *Zahn* 1318 (HJ).

The three species of the *Scabroidea* group are very close to one another and probably exchange genes in their overlapping areas. Although it is quite easy to discern between them at the first glance, the distinction by qualitative characters is not always feasible because of transitional forms between the species.

The whole group calls for a more thorough experimental study.

IX. Trifolium subsect. **Phleoidea** Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 274. 1889, pro stirpe.

Annuals. Calyx 10-nerved; teeth broadened at base, spreading in fruit; throat open but narrowed by a callose or ciliate ring. Corolla persistent, not or slightly exceeding calyx.

31. Trifolium gemellum Pourr. ex Willd., Sp. Pl. 3: 1376. 1802. **Typus:** Habitat in Hispania, *Pourret* 228 (holo.: B).

Hab.: Dry hills, fields, meadows, etc.

Gen. distr.: Portugal, Spain, Algeria, Morocco.

- 1a. Branches terminating with tufts of leaves almost concealing the spherical heads. Throat of calyx open, glabrous . . . *31d. var. phyllocephalum*
- 1b. Not as above 2
- 2a. Corolla longer than calyx. All calyx teeth shorter than tube
31c. var. atlanticum
- 2b. Corolla shorter than calyx. Calyx teeth as long as or longer than tube 3
- 3a. Heads greyish-white. Calyx very densely long-hispid; throat of calyx with a broad, annular callosity *31b. var. leucocephalum*
- 3b. Heads greenish. Calyx short-hairy; throat of calyx with a narrow annular callosity *31a. var. gemellum*

31a. *T. gemellum* Pourr. var. *gemellum*.

= *T. gemellum* Pourr. ex Willd., l.c.

= *T. sphaerocephalum* Coss. in Schedae non Desf. 1799, nec *T. phleoides* Pourr. ex Willd. subsp. *gemellum* sensu Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 282. 1889, nec *T. phleoides* Pourr. ex Willd. subsp. *pseudogemellum* Thell. in Aschers. & Graebn., Syn. Mitteleur. Fl. 6/2: 539. 1908.

Icon.: C. Vicioso, Rev. Gen. Trif., in Anal. Inst. Bot. Cavanilles 11: t. 11. 1953.

Selected specimens. Spain: Sierra Morena, La Carolina 1851-2, *Lange* (P). **Algeria:** Prov. d'Oran, montagnes à Thlemcen 1842, *Durieu de Maisonneuve* (K); pelouses du Djebel Ksel, près Geryville (El Biad), sud de la prov. d'Oran 1856, *Kralik* 218 (W).

The specimens from Thlemcen are erroneously labelled *T. sphaerocephalum* Desf., this name being a synonym of *T. cherleri* L. Although the above specimens differ markedly from typical *T. gemellum* by their spherical heads, they are tentatively included within this variety.

31b. *T. gemellum* Pourr. var. *leucocephalum* Zoh. var. *nova*.

A praecedente differt: capitulis canescentibus, calycibus densissime et longe hispidis, faucis annulo calloso multo crassiore.

Holotype. Spain: Madrid, campos de la Monelra 1954, *Borja* (HUIJ).

31c. *T. gemellum* Pourr. var. *atlanticum* (Ball) Maire in Jah. & Maire, Cat. Pl. Maroc 2: 391. 1932.

= *T. atlanticum* Ball, Journ. Bot. 11: 306. 1873.

Specimens seen. Morocco: In pascuis Atlantis medii c. Iphane, solo calcareo, 1600 m, 1936, *Maire* (K).

31d. *T. gemellum* Pourr. var. *phyllocephalum* Zoh. var. *nova*.

Rami apice dense foliosi. Capitula sphaerica, foliis congestis fere occulta. Calycis dens inferior reliquis multo longior; faux calycina glabra, aperta, cum annulo tenuiter calloso.

Holotype: Algérie; pelouse à la base nord du Djebel Tongsur, près Balara 1853, *Balansa* 930 (HUIJ).

T. gemellum var. *gemellum* is a rather heterogeneous taxon. It varies chiefly in the following characters: head spherical to ovoid and oblong. A form with exclusively spherical heads represented in several herbaria under *T. sphaerocephalum* Coss. should perhaps be separated as an independent variety.

The indumentum of the calyx in this species varies from hirsute to hispid, the latter renders to the head a greyish-white colour. This form has been recorded here as var. *leucocephalum*. The throat of calyx is here constantly provided with a callose ring that varies greatly in thickness and indumentum (from hispid to glabrous). The teeth of calyx vary a good deal in proportions. The corolla does not exceed the calyx in length except in var. *atlanticum*. Length of peduncles varies likewise but this character is taxonomically not reliable. *T. gemellum* deserves a much more intensive study. The above division is only tentative.

32. **Trifolium phleoides** Pourr. ex Willd., Sp. Pl. 3: 1377. 1802; Willk. & Lange, Prodr. Fl. Hisp. 3: 370. 1877; Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 279. 1889; C. Vicioso, Rev. Gen. Trif., in Anal. Inst. Bot. Cavanilles 11: 289, t. 12. 1953. **Typus:** Habitat in Hispania, *Pourret 230* (holo.: B).
 = *T. willkommii* Chab., Bull. Herb. Boiss. 3: 145. 1895.
 = *T. phleoides* Pourr. subsp. *audigieri* Fouc., Bull. Soc. Bot. France 47: 89, t. 3. 1890.
 = *T. erinaceum* M. B., Fl. Taur.-Cauc. 3: 510. 1819.
 = *T. minae* Lojac., Nuov. Giorn. Bot. It. 15: 262. 1883.
 = *T. phleoides* Pourr. ex Willd. subsp. *gemellum* sensu Gib. & Belli, l.c.: 282.
 = *T. phleoides* Pourr. subsp. *pseudogemellum* Thell. in Aschers. & Graebn., Syn. Mitteleur. Fl. 6/2: 539. 1908.

Icon.: Fouc., l.c.: t. 3; Vicioso, l.c.: t. 12.

Hab.: Grassy places, forest clearings, among shrubs.

Gen. distr.: Germany, Portugal, Spain, France, Corsica, Sardinia, S Italy, Sicily, Greece, Bulgaria, Crimea, Turkey, N Iran, Caucasus, Algeria, Morocco.

Selected specimens. Spain: Monte Lucio in apricis pratis, *Bavo* (W); lieux herbeux du bois de la Sierra de Segura, 1850, *Bourgeau 899* (P, under *T. gemellum*); El Escorial 1876, *Hackel* (HUI). **Italy:** Lucania, Potenza in silva Pallareta, loco Montegrosso 900-1200 m, 1925, *Gavioli 2892* (HUI). **France:** Blois, les Ponts Chartrains 1871, *Franchet* (P). **Sicily:** In apricis pratis montosis, Piana dei Greci, *Todaro 289* (P). **Bulgaria:** M. Ljulin in pascuis saxosis loco Gradiste 900 m, 1951, *Achtarov & al. 163* (HUI). **Turkey:** NE Anatolia: Szandschak Gumüşkhane, Moaldas dagh in pratis silvat. 1894, *Sinteniz 5964* (W); Phrygia, Sultandagh, in subalpinis 1600 m, 1899, *Bornmüller 4332* (G). **Algeria:** Oran, dans les clairières de broussailles 1852, *Balansa 611* (W). **Morocco:** Dj. Habibi 1910-14, *Gandoger* (W); El Hajeb to Ifrane, Forest of Jaba 1100 m, 1961, *J. J. F. E. & al. 2401* (HUI).

Although *T. phleoides* is clearly distinguished from *T. gemellum*, I found some specimens which could be looked upon as intermediates between them. The transitions are mainly manifested in the occurrence of a membranous margin at the base of the calyx teeth or in the thickness of the callosity. Especially variable is the

shape of the leaflets, and it is perhaps feasible to divide the plants into forms with lanceolate and such with obovate to elliptical leaflets. It also varied in length of the peduncles.

33. *Trifolium ligusticum* Balb. ex Loisel., Fl. Gall.: 731. 1807; Boiss., Fl. 2: 120. 1872; Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 283, t. 1, f. 7. 1889; C. Vicioso, Rev. Gen. Trif., in Anal. Inst. Bot. Cavanilles 11: 305. t. 13. 1953. **Typus:** Italy, habitat in Liguria, circa Savonem.

= *T. gemellum* Savi, Atti Accad. It. 1: 202. 1808, non Pourr. ex Willd. 1802, nec Ser. 1825.

= *T. arrectisetum* Brot., Phytogr. Lusit. 1: 152, t. 63, f. 1. 1816.

= *T. conicum* Lag., Gen. Sp. Pl. 23: 305. 1816, non Pers. 1810.

= *T. lagascanum* Ser. in DC., Prodr. 2: 194. 1825.

= *T. aristatum* Willd. ex Link., Enum. Hort. Berol. Alt. 2: 262. 1822, pro syn.

= *T. broteri* Link, l.c., pro syn.

Icon.: C. Vicioso, l.c.: t. 13; Reichenb., Icon. 22: t. 2153, f. 1, 1-7. 1903.

Differs at first glance from the last two species of subsection *Phleoidea* by the following characters: stem slender, not much branching; hairs patulous; leaflets, even of the uppermost leaves, broadly obovate; heads mostly ovoid to ellipsoidal; flowers larger (5-7 mm); calyx teeth dark, 2-3 times as long as tube.

Hab.: Fields, waste plots, stony hillsides, etc.

Gen. distr.: Portugal, Spain, France, Italy, Greece, Turkey, Lebanon, Tunisia, Algeria, Morocco, Madeira, Canary Islands.

Selected specimens. **Portugal:** Castello Branco, Carvalhinha 1885, *Ricardo da Cunha* 830 (HUI). **France:** Toulon (Var) 1859, *Le Jolis* 94 (HUI). **Italy:** Roma, Insuggherata 1888, 3504 (W). **Sicily:** Ficuzza, in arenosis herbosis submontosis, *Todaro* 286 (HUI). **Turkey:** Paşabahçe Polonesköy (env. Istanbul) 1939, *Post* (G). **Lebanon:** Infra Beitmere in Pinetis 1884, *Peyron* 1512 (K, G). **Algeria:** Depart. Alger, env. d'Alger, forêt de la Réghaïa 150 m, 1953, *d'Alleizette* (HUI).

The 3 species of the *Phleoidae* subsection constitute a natural group distinguished by the short corolla (except in *T. gemellum* var. *atlanticum*); the minute calyx tube becoming urceolate at maturity; the callose ring (hairy or glabrous) of the open calyx throat. Further investigations will have to decide on the rank of the recorded species, because they no doubt exchange genes in overlapping areas.

X. *Trifolium* subsect. **Lappacea** Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 318. 1889, pro stirpe.

Annuals. Calyx 20-nerved; teeth equal or almost so, with broad 3-5-nerved base or 1-nerved, erect or slightly divergent in fruit; throat of calyx open, hairy or glabrous. Corolla marcescent, slightly to largely exceeding calyx in length.

- 34. *Trifolium hirtum*** All., Auct. Fl. Pedem. 20 (1789); Boiss., Fl. 2: 119. 1872; Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 321. 1889. **Typus:** Italy "In Monte serrato secus agros", *Allioni* (TO).
 = *T. hispidum* Desf., Fl. Atl. 2: 200, t. 209, f. 1. 1799.
 = *T. pictum* Roth, Cat. 2: 101. 1800.
 = *T. hirsutum* Ten., Fl. Nap. 5: 143. 1836-38, incl. var. *pictum* (Roth) Ten., l.c.
 = *T. oxypetatum* Heldr. & Sart. in Orph., Fl. Graec. exsicc.: 320.

Icon.: Desf., l.c.: t. 209, f. 1; Reichenb., Icon. 22: t. 2147, f. 1, 1-7. 1903; Gib. & Belli, l.c.: t. 4, f. 3.

Hab.: Fields, roadsides and dwarf-shrub formations.

Gen. distr.: Portugal, Spain, France, Corsica, Italy, Balkan Peninsula, Crete, Crimea, Turkey, Cyprus, Syria, Lebanon, Iraq, Iran, Caucasus, Tunisia, Algeria, Morocco.

Selected specimens. **Portugal:** Monte, pr. Monte du S. Bartolomeu nos Arredores de Bragança 1958, *Fernandes & al.* 6328 (HUI). **Spain:** Morena, Puerto Despenaperas 1876, *Hackel* (W). **France:** Bords des chemins des terrains schisteux au Vigau (Gard) 1862, *Tuezkiewicz* 3358 (G). **Corsica:** Niolo 1914, *Ronniger* (W). **Italy:** Pavia 1843, *Pinard* (W). **Greece:** Agrapha (Dolopia veterum): in regione inferiori m. Pindi c. monast. Korona in nemorosis quercinis 3500'-3700', 1885, *Heldreich* (W). **Bulgaria:** In desertis ad Nova Mahala 1833, *Stribrny* (G); Kalofer auf Wiesen 1874, *Pichler* 159 (W). **Crimea:** Tauria, leg. *Parreulis* 147 (W); Yalta 1898, *Golde* 313 (K). **Turkey:** Izmir: inter arboreta Smyrnae 1827, *Fleischer* (K, as *T. hispidum* Desf.); prov. Ankara: Hacikadun valley n. Keçioren 1952, *Davis & Dodds* 18729 (E). **Syria:** Nussairy Mountains, Ain Halakim, 2500-3000 ft, 1910, *Haradjian* 3504 (W). **Lebanon:** Beitmeri 1879, *Peyron* 39 (G); Beirut 1900, *Delessert* (G). **Iraq:** Kurdistania, in montis Kuh Safin reg. pag. Schaklava (dit. Erbil) 800 m, 1893, *Bornmüller* 1125 (K). **Caucasus:** Prope Helenendorf 1836, *Hohenacker* (W). **Morocco:** Tanger (G).

- 35. *Trifolium cherleri*** L., Demonstr. Pl.: 21. 1753, et Amoen. Acad. 3: 418. 1756; Boiss., Fl. 2: 119. 1872. **Typus:** Described from a plant grown at Uppsala.
 = *T. hirtum* All. subsp. *cherleri* (L.) Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 324. 1889.
 = *T. sphaerocephalum* Desf., Fl. Atl. 2: 201, t. 209, f. 2. 1799.
 = *T. phlebocalyx* Fenzl in Tchihat, As. Min. Bot. 1: 29. 1860.

Icon.: Moris, Fl. Sard. 1: t. 61. 1837; Reichenb., Icon. 22: t. 2142, f. 2, 7-15. 1903; Gib. & Belli, l.c.: t. 4, f. 4; Sibth. & Sm., Fl. Gr. 8: t. 745. 1833.

Hab.: Damp soils, grassy places and roadsides.

Gen. distr.: Portugal, Spain, France, Corsica, Italy, Sicily, Balkan Peninsula, Crete, Turkey, Cyprus, Syria, Lebanon, Palestine, Iraq, Iran, Egypt, Libya, Tunisia, Algeria, Morocco, Canary Islands.

Selected specimens. **Portugal:** prope Alcantara 1828, *Hall* (W). **Spain:** Catalogne, Vilarnadal, friches 1907, *Sennen* 257 (HUI). **France:** Var, env. d'Hyères 1904,

d'Alleizette (HUI). **Corsica:** Campo di Loro, 1911, *Thellung* (HUI). **Italy:** Env. de Rome 1855, Herb. *Pittoni* (W). **Sicily:** Palermo, *Todaro* (W). **Greece:** Saloniki, *Friedrichtal 1012* (W); Graecia 1836, *Kotschy 713* (W). **Turkey:** Env. of Smyrna 1854, *Balansa 171* (W). **Cyprus:** Platres and hillsides 1941, *Davis 3187* (HUI). **Syria:** In graminosis Djebel Muhassan Aleppo 1865, *Hausknecht* (G). **Lebanon:** Env. de Beyrouth, bord de la mer 1811, *Gaillardot 1737* (G). **Iraq:** Banks of the Bigger Zab near Kirkuk 1956, *Crigg* (K). **Algeria:** La Calle (Constantine), Mamelon de la Poudrière 1915, *Duffour 1645* (HUI). **Morocco:** Tanger, *Schousboe 34* (W).

Varies largely in habit (from 5 to 30 cm, decumbent to erect), in the size of leaflets and also in the length of the flowers which range from much shorter to much longer than calyx.

36. *Trifolium lappaceum* L., Sp. Pl.: 768. 1753. Typus: Hb. Linn. 930/28. Described from S France.

Hab.: Grassy places, fields, roadsides and among shrubs.

Gen. distr.: Azores, Portugal, Spain, France, Italy, Sicily, Jugoslavia, Greece, Crete, Rhodes, Crimea, Turkey, Cyprus, Syria, Lebanon, Palestine, Iraq, Iran, Caucasus, Tunisia, Algeria, Morocco, Madeira, Canary Islands.

- 1a. Throat of calyx ciliate *36a. var. lappaceum*
 1b. Throat of calyx naked *36b. var. zoharyi*

36a. *T. lappaceum* L. var. *lappaceum*.

- = *T. lappaceum* L., Sp. Pl. 768. 1753; Boiss., Fl. 2: 119. 1872; Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 319. 1889.
 = *T. nervosum* C. Presl, Fl. Sic. 1: XXI. 1826.
 = *T. lappaceum* L. subsp. *selinuntinum* Tin. ex Nyman, Consp. Fl. Europ. Suppl. 2: 90. 1889, nom. nud.
 = *T. lappaceum* L. var. *brachyodontulum* Hausskn., Mitt. Thür. Bot. Ver. N. F. 5: 75. 1893.
 = *T. lappaceum* L. subsp. *adrianopolitanum* Velen., Fl. Bulg. Suppl.: 80. 1898.
 = *T. rhodense* Pamp., Boll. Soc. Bot. It.: 142. 1925.
 = *T. lappaceum* L. var. *rhodense* (Pamp.) Rech. fil., Fl. Aeg.: 368. 1942.

Icon.: Reichenb., Icon. 22: t. 2142, f. 1, 1-6. 1903.

Selected specimens. **Spain:** Champs incultes à Lagos, Algarve 1853, *Bourgeau 1836* (G). **France:** Bassin Garonne à Priae, près de Moissac 1844, *Lagrèze-Fossat 835* (G). **Italy:** Roma, Macchia Mallei 1888, *Evers 8006* (G). **Sicily:** In pratis Ficuzza 1856, *Huet du Pavillon 510* (W). **Jugoslavia:** Istria, bei Polo 1909, *Kob* (G). **Crete:** Knossos 1915, *Gandoger* (G); Messara Plain, 5 km E of Mires 1964,

Zohary & Orshan 25/41 (HUI). **Rhodes:** Champs incultes, près Bastida 1870, *Bourgeau* (G). **Turkey:** Smyrna, *Boiss.* (G); Smyrna: Sur les collines incultes 1854, *Balansa 163* (G); env. de Rize, terrains argileux-calcaires 1866, *171* (G). **Cyprus:** Env. Rizokarpaso 300-500 ft, 1912, *Haradjian 205* (G). **Syria:** Mt Cassius 1909, *Haradjian 2970* (G). **Lebanon:** Dans les cultures à l'embouchure du Sarnok, Saida 1853, *Blanche 582* (G). **Palestine:** Judean Mts, W of Beit Govrin, batha 1964, *Baum & Plitmann* (HUI). **Iraq:** Shaqlava 900 m, 1947, *Gillet 8027* (K). **Iran:** Mt Elburz, pr. Derbent, in humidis 1843, *Kotschy 243* (G). **Morocco:** Environs de Keira 1867, *Balansa* (G). **Madeira:** In pascuis Gorgulho 1865-66, *Maudon 147* (G).

36b. *T. lappaceum* L. var. *zoharyi* Eig, Bull. Inst. Agr. Nat. Hist. 6: 24. 1927; Dinsmore in Post, Fl. Syr. Pal. Sin. ed. 2, 1: 334. 1932.

Selected specimens. **Lebanon:** Descent from Wadi Ain Dib towards Qammoua 1934, Bot. Dept. (HUI). **Palestine:** Esdraelon Plain, Kishon River, east of Mishmar Haemqe, field border 1963, *Zohary & Plitmann 1522522* (HUI). **Iran:** Derbent i Bassian 1867, *Hausknecht 273* (G). **Egypt:** Sinai: El Arish, wadi bed 1925, *Eig* (HUI).

37. *Trifolium barbeyi* Gib. & Belli, Atti R. Accad. Sci. Torino 22: 610, t. 8. 1887; "barbey".

Recorded by Gibelli & Belli from Aegeis, Insula Karpathos, crescit in cultis leg. *Pichler* (1883) and *Forsyth-Major* (1886) (TO).

No other specimen of this species, has so far been found by others.

38. *Trifolium congestum* Guss., Cat. Pl. Hort. Reg. in Boccadif. 65, 81, n. 17. 1821; Pl. Rar.: 311. 1826, et Fl. Sic. Prodr. 2: 489. 1828; Boiss., Fl. 2: 142. 1872; Lojac., Tent. Monogr. Trif. Sic.: 142. 1878. **Typus: Syntypes "in arvis argilosis angustam, Catanam caltanixettam (FI?).**

Icon.: Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: t. 8, f. 1. 1889.

Hab.: "Pianta estremamente argilofila" (Gib. & Belli, l.c.).

Gen. distr.: S Italy, Sicily, Malta, Balkan Peninsula, Rhodes.

Specimens seen. **Sicily:** Gergenti a Maccalulebi 1882, *Todaro* (P). **Rhodes:** Callavia nella Piano, *Fiori 230* (FI).

T. congestum is a basicarpic plant in which the fruiting heads remain on the plants until the plants vanish. Biologically, it belongs to the category of plants with topochoric dispersal. Some authors refer this species to Sect. *Micranthemum*. But by the lack of bracts and other characteristics, it fits well Sect. *Trifolium*.

XI. *Trifolium* subsect. *Arvensia* Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 266. 1889, pro stirpe.

Calyx 10-nerved, teeth densely villose or plumose, not spreading in fruit; throat open (without callosity), hairy. Corolla marcescent, not exceeding calyx.

39. *Trifolium arvense* L., Sp. Pl.: 769. 1753. **Typus: Hb. Cliff. Described from Europe.**

Hab.: Meadows, grassy places, fields, roadsides, wastes, in open pioneer plant communities.

Gen. distr.: British Isles, Denmark, Scandinavian Peninsula, Finland, Siberia, Belgium, Germany, Switzerland, Romania, Portugal, Spain, France, Italy, Balkan Peninsula, S Russia, Turkey, Cyprus, Syria, Lebanon, Palestine, Iran, Iraq, Egypt, Libya, Tunisia, Algeria, Morocco, Canary Islands, Ethiopia, etc. Also adventive in many other countries.

Exceedingly polymorphic; most forms and varieties, so far known, are doubtful as to constancy, some are largely grading into one another. The following two varieties are tentatively taken to cover the whole range of the morphologic diversity which awaits an experimental study.

- 1a. Rather robust, mostly erect plants, more or less densely appressed- or patulous-hairy. Calyx 4.5-7 mm, densely hairy; teeth 2-3 times as long as tube, plumose-hairy *39a. var. arvense*
- 1b. Delicate, mostly decumbent plants with glabrous or glabrescent stems. Calyx 3-5 mm, glabrous or sparingly hairy; teeth mostly as long as tube (rarely twice as long), often reddish and glabrous or glabrescent
39b. var. gracile

39a. *T. arvense* L. var. *arvense*.

= *T. arvense* L., Sp. Pl.: 769. 1753; Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 266. 1889.

= *T. arvense* L. var. *typicum* Beck ex Aschers. & Graebn., Syn. Mitteleur. Fl. 6/2: 531. 1908.

= *T. arvense* L. var. *crassicaule*, var. *perpusillum*, var. *capittatum* Ser. in DC., Prodr. 2: 191. 1825.

= *T. arvense* L. var. *australe* Ten., Fl. Nap. 5: 141. 1835-38.

= *T. arvense* L. var. *strictior* Mert. & Koch in Röhling, Deutschl. Fl. 5: 270. 1838.

= *T. arvense* L. var. *aetnense* Guss., Fl. Sic. Syn. 2: 336. 1844.

= *T. arvense* L. var. *longisetum* (Boiss. & Bal.) Boiss., Fl. 2: 120. 1872.

= *T. arvense* L. subsp. "*longisetosum* (Boiss. & Bal.)" Rouy, Fl. Fr. 5: 104. 1899.

= *T. arvense* L. subsp. *brittingeri* (Weitenw.) Koch var. *maritimum* (Corb.) Rouy, l.c.: 105; Aschers. & Graebn., l.c.: 533.

- = *T. arvense* L. subsp. *agrestinum* (Jord. ex Boreau) Rouy var. *alopecuroides* Rouy, l.c.: 106.
- = *T. arvense* L. var. *latifolium* Pantu, Contr. Fl. Bucur, in Anal. Acad. Rom. Mem. Sect. Sti. ser. 2, 32: 145. 1910.
- = *T. arvense* L. var. *ballii* Murb., Contr. Fl. Maroc. 1: 62. 1922.
- = *T. arvense* L. var. *cyrenaicum* Pamp., Nuov. Giorn. Bot. It. n.s. 31: 217. 1924.
- = *T. arvense* L. var. *brachyodon* Čelak, Prodr. Fl. Böhm.: 907. 1881.
- = *T. lagopinum* Jord., Pugill.: 57. 1852.
- = *T. agrestinum* Jord. ex Boreau, Fl. Centr. Fr. ed. 3, 2: 153. 1857.
- = *T. sabuletorum* Jord. ex Boreau, l.c.
- = *T. arenivagum* Jord. ex Boreau, l.c.
- = *T. longisetum* Boiss., & Bal. in Boiss., Diagn. ser. 2, 6: 47. 1859.
- = *T. brittingeri* Weitenw. in Opiz, Naturalientausch 9: 142. 1825.
- = *T. eriocephalum* Ledeb., Fl. Ross. 1: 541. 1843.
- = *T. capitulatum* Pau in Not. Bot. Fl. Esp. 1: 9. 1887.

Icon.: Reichenb., Icon. 22: t. 2146, f. 1-2, 1-11. 1903; Ross-Craig, Draw. Brit. Pl. 7: pl. 29. 1954.

Plants richly branching; branches erect to ascending, densely appressed- or patulous-hairy. Leaflets linear-oblong, often cuneate at base. Heads ovate to oblong and cylindrical. Calyx 4.5-7 mm; tube densely hairy; teeth 2 times as long as tube, densely plumose-hairy.

Distr.: All over the area of the species.

Selected specimens. **Denmark:** Sjaelland, Ørsløv 1866, *Nielsen* (HUI). **Sweden:** Uppland Ultuna, vagkant 1941, *Johansson* (HUI). **Finland:** Nylandia, par. Teuda Lapvik 1907, *Ström* 762 (G). **Czechoslovakia:** Bohemia merid. distr. Pelhrimmar in pascuis, etc., 600 m, 1962, *Ujčik* 194 (HUI). **Romania:** Bucuresti raion Stalin, in foeneticis siccis ad marginem septentr. opp. Bucuresti 1955, *Morlova & al.* 83 (HUI). **Russia:** Uchtomsk n. Moscov 1927, *Eig* (HUI). **Portugal:** S. Caldeiras 1905, *Gandoger* (G). **Spain:** Riberas del rio Tajo: Alconetor 1948, *Rivas-Galiano* (HUI). **Italy:** In incultis pr. Veglia 70 m, 1920, *Lusina* (HUI). **Greece:** Nisyros, steep uncultivated ground n. Mandraka 1963, *Gathorne-Hardy* 365 (E); Attica: Mt Parnes-Keramindi, 1928, *Guiol* 24 (HUI). **Bulgaria:** M. Vitosa in graminosis saxosis apricis 1500 m, 1951, *Efremov* 48 (HUI). **Crete:** 47 km SE of Iraklion, Quercetum pubescentis 610 m, 1964, *Zohary & Orshan* 29403 (HUI). **Turkey:** Prov. Çoruh (Artvin) above Borçka 300 m, shady banks 1958, *Davis & Hedge* D 29864 (E). **Cyprus:** Mts Troodos, Platres 1300 m, 1937, *Grizi* (HUI). **Syria:** Djebel Druz, env. of Souweida 1250 m, basalt soil 1932, *Eig & Zohary* (HUI). **Lebanon:** Mt Lebanon, env. of Sir 1934, *Student* (HUI). **Palestine:** Coastal Galilee, env. of Tsahal, sandy-clay, fallow fields, 1955, *Feinbrun* 16572 (HUI). **Iran:** Hamadan, Mt Alvand, steep slopes, granite, rocky soil 2250-2550 m, 1965, *Danin-Baum-Pitmann* 65-672 (HUI). **Armenia:** Pr. Eilar in declivibus lapidosis 1926, *Schelkovnikov* (HUI). **Transcaspia:** Kisil Arvat Karakala in valle Joldere 1901, *Frey* 1925 (G). **Libya:** Cyrenaica: In dumetis supra Barcam solo calcareo, 400 m, 1938, *Maire & Weiller* 472 (P, as subsp. *cyrenaicum* Pamp.). **Algeria:** Djurdjura, pelouses vacailleurs 1500 m, 1930, *Maire* (P). **Morocco:** In lapidosis arenaceis Anti-Atlantic in ditone Tazerovalt 500 m, 1934, *Maire & Wilczek* (P, type of var.

ballii Murb.). **Canary Islands:** Palma, Al Pass lava stream 1913, *Sprague-Hutchinson* 307 (HUJ).

39b. *T. arvense* L. var. *gracile* (Thuill.) DC., Fl. Fr. ed. 3, 4: 530 (1805). **Typus: Described from near Paris.**

= *T. gracile* Thuill., Fl. Env. Par. ed. 2: 383. 1799.

= *T. arvense* L. subsp. *gracile* (Thuill.) Rouy, Fl. Fr. 5: 107. 1899.

= *T. arvense* L. var. *glabrum* Vis., Fl. Dalm. 3: 292. 1852.

= *T. rubellum* Jord., Pugill.: 57. 1852.

= *T. arvense* L. var. *rubellum* (Jord.) Beck, Fl. N. O.: 848. 1892.

Stems glabrescent or glabrous, mostly decumbent. Leaflets linear-oblong. Heads ovoid or globular, rarely oblong. Calyx almost glabrous; teeth often reddish, glabrous or glabrescent, 1(-2) times as long as tube.

Selected specimens. Switzerland: Tessin, pelouses sèches des terrains granitiques 1878, *Boullu* 2025 (G). **France:** Env. de Lyon, champs sablonneux 1851, *Marlin* (G). **Turkey:** Trabzun, 400 ft, gritty soil 1934, *Balls* 1570 (E).

40. *Trifolium affine* C. Presl, Symb. Bot. 1: 54 t. 34. 1832, non Lejeune ex Ser. in DC., Prodr. 2: 195. 1825, pro syn. **Typus: In Hb. Presl, sine loco (grown from seeds).**

= *T. preslianum* Boiss., Diagn. ser. 1, 2: 25. 1843, et Fl. 2: 121. 1872, subs. illegit.

Hab.: In open plant communities, dry hillsides.

Gen. distr.: Bulgaria, Turkey.

Selected specimens. Bulgaria austr.: In collinis ad Skobelevo 1898, *Stribrny* 28 (HUJ). **Turkey:** Smyrna in montibus supra Bournabat, May, *Boissier* (lecto.: G); Constantinopole (Istanbul), in collibus apricis pr. Bostandjik 1906, *Aznavour* 4861 (G); montis Lydiae et Cariae 1842, *Boissier* (E).

Differs clearly from *T. arvense* by its entire leaflets, thicker heads, by the longer corolla (about as long as or rarely slightly longer than calyx) and the larger seeds.

41. *Trifolium saxatile* All., Auct. Method. Stirp. Hort. Taurin: 25. 1770-73; Misc. Taurin. 5: 77. 1774-76, et Fl. Pedem. 1: 305, 2: 1168. 1785; Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 271. 1889. **Typus: Hb. Allioni (TO n.v.).**

= *T. thimiflorum* Vill., Prosp.: 43. 1779; Godr. in Gren. & Godr., Fl. Fr. 1: 411. 1848-49.

Icon.: All., Fl. Pedem. 2: t. 15, f. 3. 1875. Gib. & Belli, l.c.: t. 1, f. 3; Reichenb., Icon, 22: t. 2151, f. 2, 11-20. 1903.

Hab.: Mainly boulders of alpine rivers and foot of glaciers.

Gen. distr.: Switzerland, Austria, France, Italy.

Selected specimens. Switzerland: Findellen Glacier, 7500 ft, 1923 (leg.?) (K).
France: Source d'Arvieran, Chamonix 1866 (K).

42. *Trifolium stipulaceum* Thunb., Prodr. Pl. Cap.: 136. 1800. **Typus:** Cape Province, Coast Saldanha bay to Port Elizabeth, *Thunberg s.n.* (UPS).
= *T. micropetalum* E. Mey., Pl. Afr. Austr.: 90. 1836.

Hab.: Grassy places, fields, sand soils n. sea.

Gen. distr.: Cape Province.

According to Gillett (1952) this is the only species of Sect. *Trifolium* occurring outside the Eastern Holarctis. This discontinuity is very remarkable, but similar discontinuities are known in some other genera.

Its inclusion in the subsection *Arvensia* fits well the external features of the latter, although it reminds also species of subsect. *Trichoptera*.

XII. *Trifolium* subsect. *Angustifolia* Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 341. 1889, pro stirpe, emend. Zoh.

Annuals. Calyx 10-nerved; teeth unequal or equal, blunt, rarely sharp-pointed, usually spreading in fruit; throat closed by a 2-lipped callosity. Flowers showy. Corolla usually considerably longer than, rarely as long as calyx, pink or purple or flesh-coloured, rarely white.

43. *Trifolium angustifolium* L., Sp. Pl.: 769. 1753. **Typus:** Hb. Cliff. 375, described from Italy.

Hab.: Fallow fields, steppes, open plants communities, meadows.

Gen. distr.: Austria, Portugal, Spain, France, Italy, Sicily, Capri, Jugoslavia, Greece, Bulgaria, Crete, Crimea, Turkey, Syria, Lebanon, Palestine, Iraq, Iran, Caucasus, Transcaucasia, Algeria, Morocco, Madeira, Canary Islands.

1a. Stems erect or ascending, usually 15-50 cm. Leaflets usually longer than petioles. Teeth of calyx sharp-pointed. Corolla usually pink or purple *43a. var. angustifolium*

1b. Stems mostly decumbent or ascending, usually up to 15 cm. Leaflets usually shorter than petioles. Corolla usually pale pink to whitish. Teeth of calyx blunt *43b. var. intermedium*

43a. *T. angustifolium* L. var. *angustifolium*.

- = *T. angustifolium* L., Sp. Pl.: 769. 1753; Boiss., Fl. 2: 122. 1872; Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 341. 1889; Aschers. & Graebn., Syn. Mitteleur. Fl. 6/2: 579. 1908.
 = *T. angustifolium* L. var. *acrogymnum* Maire in Emberg. & Maire, Pl. Maroc. Nov. fasc. 1: 3. 1929.
 = *T. angustifolium* L. var. *acrolophum* Maire in Emberg. & Maire, l.c.

Icon.: Sibth. & Sm., Fl. Graec. 8: t. 749. 1832; Reichenb., Icon. 22: t. 2144, f. 1, 1-8. 1903; Gib. & Belli, l.c. t. 6, f. 1.

Selected specimens. **Austria:** Albazia 1900, *Richter* (W). **Portugal:** Nos taludes, ao longo da via ferrea entre Verride e Marujal 1949, *Fernandes & Sousa 3137* (HUI). **Spain:** Felipi 1882, *de Xativa* (W). **France:** Beaumont en Veron, champs calcaires incultes 1883, *Tourlet 511* (W). **Italy:** Pendici di Aspa 1881, *Marchesetti* (HUI). **Sicily:** Palermo in arvis 1879, *Lojacono* (W). **Capri:** In loco graminoso 1908, *Frenckel* (HUI). **Jugoslavia:** Lessino 5 m, Steinboden 1910, *Marsevic* (W). **Greece:** Nisyros in road up outside of crater 1963, *Gathorne-Hardy 378* (E). **Bulgaria:** In desertis ad Nova Mahala 1894, *Stribrny* (W). **Crete:** 4 km S of Mires on the way to Kali Limenes 1964, *Zohary-Orshan 24/43* (HUI). **Crimea:** Yalta in nemore quecerto 1898, *Golde 212* (W). **Turkey:** Prov. Sinop, Promontory of Sinop, 10 m beside the sea, 1962, *Davis & Code 63/1146* (E); Thrace, Belgrad forest 1963, *Zohary 5662* (HUI). **Syria:** Nussairy Mts, Ain Halakim 2500-3000 ft, 1910, *Haradjian 34956* (G). **Lebanon:** Beyrouth, *Labillardiere* (G). **Palestine:** Mt Carmel 1897, *Bornmüller* (K, type of f. *brachystachys* Bornm.). **Iraq:** Jarmo 1955, *Helbaek 1032* (K). **Iran:** N Iran: Lahijan, Guilan 1937, *Lindsay 954* (K). **Caucasus:** Prope Soczy ad rupes maritimas 1926, *Malcev* (K). **Transcaucasia:** Azerbajdzhan, distr. Kjurdamir ad meridiem p. Padar, in montanis 1936, *Grossheim* (HUI). **Algeria:** Champs sablonneux au sud de la plaine d'Eghris 1852, *Balansa 449* (W); tombeau de la Chrétienne 1929 (P, holotype of var. *acrolophum* Maire). **Morocco:** Forêt de Jaba betw. Al-Hajeb and Ifrane, 18 km NW of Ifrane 1961, *De Wilde & Dorgelo 2551 B* (HUI); in Atlante rifano, Bal Ranina in Quercetis 1928 (P, holotype of var. *acrogymnum* Maire). **Madeira:** Funchal in arvis 1900, *Bornmüller 477* (W). **Canary Islands:** Teneriffa: Icad el Alto 1889, *Brunnen 1653* (W).

- 43b. *T. angustifolium* L. var. *intermedium* Gib. & Belli, Mem. Accad. Sci. Torino, ser. 2, 39: 342, 420. t. 6. 1889, non var. *intermedium* (Guss.) Gib. & Belli, l.c. nom. illegit. **Typus:** Sicilia meridionalis Terranova, *Gussone* (holo.: NAP?).**
 = *T. intermedium* Guss., Cat. Pl. Boccadif. 65, 82, no. 18. 1821, non Lapeyr. 1818; Boiss., Fl. 2: 122. 1872.

Icon.: Reichenb., Icon. 22: t. 2145, f. 1, 1-4. 1903.

Selected specimens. **Italy:** Calabria, arenos in Fuimara pr. Staisnem 1877, *Huter, Porta, Rigo 101* (W). **Sicily:** In collibus arenosis maritimis supra Scaglietti 1856, *Huet du Pavillon 44* (W); in pascuis arenosis Siciliae merid. *Gussone* (iso.: G). **Greece:** Argolis in collibus siccis inter olivetis prope Poros 1887, *Heldreich 914* (W).

Aegean Islands: Karpathos: Valatha 1883, *Barbey 191* (G). **Crete:** N Crete, 17 km W of Rethymnion on the way to Khandia, *Quercetum macrolepidis* 1964, *Zohary & Orshan 01502* (HUI). **Rhodes:** 1870, *Bourgeau* (G). **Turkey:** Urfa: 40 km from Van Sehir to Urfa, 1700 m, fallow fields 1966, *Davis 42412* (E) (doubtful). **Cyprus:** Ad Livadiam Larnacae 1862, *Kotschy* (G). **Algeria:** Env. d'Alger, Fort de l'Eau, Le Rassoute alt. 20 m, 1953, *d'Alleizette* (HUI).

The taxonomic value of var. *intermedium* is very unclear. According to the structure of the calyx teeth (with blunt points) it should definitely be referred to *T. purpureum* Loisel., and not to *T. angustifolium*. However, by the small white flowers and the narrow leaves it approaches the latter. The matter turns more complicated by the occurrence in Algeria of var. *acrolophum* Maire, a form which must be included within typical *T. angustifolium* because of the sharp-pointed calyx teeth. These forms are either hybrids or intermediate forms between *T. angustifolium* and *T. purpureum*. Thus *T. intermedium* can by no means be kept at the rank of a species.

44. Trifolium purpureum Loisel., Fl. Gall.: 484, t. 14. 1807. **Typus:** France, ad margines agrorum circa Monspelium? *Degland*.

Hab.: Fields, roadsides, open dwarf-shrub communities, stony and sandy sites.

Gen. distr.: Romania, Azores, Portugal, Spain, France, Italy, Balkan Peninsula, Crimea, Turkey, Syria, Lebanon, Egypt, Iraq, Iran, Caucasus, Libya, Tunisia, Algeria, Morocco, Madeira, Canary Islands, and elsewhere.

T. purpureum Loisel. is a rather polymorphic species, especially in Lebanon and Palestine. It varies especially in size of the head and the flowers as well as in colour of the corolla. Among the forms that are well discernible, the following are recorded here:

- 1a. Teeth of calyx equal or almost so *44c. var. pamphylicum*
- 1b. Teeth of calyx distinctly unequal 2
- 2a. Flowering heads elongated, cylindrical, 2-4 cm long or more, mostly compact. Flowers very numerous. Fruiting heads 3-6 cm long. Plants mostly erect. Leaflets mostly oblong-elliptical . . . *44a. var. purpureum*
- 2b. Flowering heads globular or ovoid or obconical, usually not exceeding 2 cm (often 1 cm only). Flowers not very numerous. Fruiting heads 1.5-2 (rarely -3) cm. Plants erect or decumbent. Leaflets narrowly elliptical to linear *44b. var. desvauxii*

44a. T. purpureum Loisel. var. **purpureum**.

= *T. purpureum* Loisel., l.c.; Boiss., Fl. 2: 123. 1872, non Gilib. 1782, nom. illegit.

= *T. loiseleuri* Rouy, Fl. Fr. 5: 111. 1889.

- = *T. angustifolium* L. subsp. *purpureum* (Loisel.) Gib. & Belli, var. *desvauxii* (Boiss. & Bl.), Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 346. 1889, p.p.
- = *T. angustifolium* L. subsp. *purpureum* (Loisel.) Gib. & Belli var. *desvauxii* (Boiss. & Bl.) Gib. & Belli subvar. *laxiusculum* (Boiss. & Bl.) Gib. & Belli, l.c.
- = *T. laxiusculum* Boiss. & Bl., in Boiss., Diagn. ser. 2, 2: 13. 1856.
- = *T. desvauxii* Boiss. & Bl. var. *laxiusculum* (Boiss. & Bl.) Boiss., Fl. 2: 123. 1872.
- = *T. purpureum* Loisel. var. *desvauxii* (Boiss. & Bl.) Post. Fl. Syr. Pal. Sin.: 236. 1883-96, p.p.
- = *T. purpureum* Loisel. var. *laxiusculum* (Boiss. & Bl.) Post, l.c.: 235; Hossain, Not. Roy. Bot. Gard. Edinb. 23: 420. 1961.

Icon.: Reichenb., Icon. 22: t. 2144, f. 2, 9-14. 1903; Loisel., l.c.: t. 14; Gib. & Belli, l.c.: t. 6, f. 2.

Selected specimens. Romania: Dobrogea, Caliacra 1926, *Nyarady 658* (W). **France:** Hérault, Montpellier 1907, *Vichet* (W). **Jugoslavia:** Serbia australis, in colle Hisar pr. Leskawatz 1890, *Dörfler* (W). **Greece:** Acarmania, pr. pagum Oropis 1893, *Halácsy* (W). **Bulgaria:** Bulgaria australis: Ad Sadovo 1892, *Stribrny* (W). **Turkey:** Prov. Mersin, distr. Anamur, Anamur-Gulindere 20 m, 1956, *Davis & Polunin D 25993* (K). **Lebanon:** Premières collines du Liban entre Saida et Beyrouth 1853, *Blanche 275a* (G). **Syria:** South of Kastel-Moauif 800 m, 1938, *Dinsmore 3879* (E). **Palestine:** Acco Plain, Acco sands near sea 1964, *Zohary & al. 601* (HUJ); Mt Carmel, Wadi Shomriya 1942, *Davis 4382* (E); above Jabbok River 500 m, 1911, *Meyers & Dinsmore 613* (G, E). **Iraq:** Jarmo 1955, *Helbaek 1538* (K); Kurdistan: supra pagum Schaqlawa 1893, *Bornmüller 1134* (W). **Iran:** Prov. Kermanshah, Ghilane e Gharb, Vijinan 1948, *Behbudi 73* (E). **Egypt:** Matruk, 250 km W of Alexandria, *Balls* (K).

- 44b. *T. purpureum* Loisel. var. *desvauxii* (Boiss. & Bl.) Post, l.c.: 236 p.p. **Typus:**** (Lebanon) Ras Beyrouth, 1850, *Blanche 342* (lecto.: G).
 = *T. angustifolium* L. subsp. *purpureum* (Loisel.) Gib. & Belli var. *desvauxii* (Boiss. & Bl.) Gib. & Belli, l.c.: p.p.
 = *T. desvauxii* Boiss. & Bl. in Boiss., Diagn. ser. 2, 2: 12. 1856; Boiss. Fl. 2: 123. 1872, p.p.

Selected specimens. Turkey: Tçel, 18 miles from Silifke towards Mersin near s.l., limestone 1965, *Coode & Jones 1079* (E); Kilios, hillsides 1936, *Post* (G). **Syria:** Djebel Druz, Kefr 1932, *Eig & Zohary* (HUJ). **Palestine:** Jerusalem 1925, *Zohary 60* (HUJ).

- 44c. *T. purpureum* Loisel. var. *pamphylicum* (Boiss. & Heldr.) Zoh. in Davis, Fl. Turk. 3: 436. 1970. **Typus:**** Turkey, in arenosis Pamphyliae ad fluvium Melas infra Monargat (Monavgat) 1846, *Heldreich* (holo.: G; iso.: K).

- = *T. pamphylicum* Boiss. & Heldr. in Boiss., Diagn. ser. 1, 9: 20. 1849, et Fl. 2: 123. 1872.
- = *T. purpureum* Loisel. subsp. *pamphylicum* (Boiss. & Heldr.) Holmboe, Stud. Veg. Cyprus, in Bergens Mus. Skr. n.r. 1, 2: 105. 1914.
- = *T. angustifolium* L. subsp. *purpureum* (Loisel.) Gib. & Belli var. *pamphylicum* (Boiss. & Heldr.) Gib. & Belli, l.c.
- = *T. pamphylicum* Boiss. & Heldr. var. *pamphylicum* Hossain; var. *dolichodontum* Hossain, Not. Roy. Bot. Gard. Edinb. 23: 421. 1961.

Specimens seen. **Crete:** Stalos, W od Chania, sand dune about 10 m from shore, 1961, *Feinbrun 510* (HUI). **Turkey:** Prov. Antalya, Karanlik Sokak 150 m, 1936, *Tengwall* (W). **Cyprus:** Ad Matis litus pr. Daolu 1880, *Sintenis & Rigo 419* (P); Nicosia-Myrton, 500 ft, common as pioneer on eroding slopes, *Chapman 579* (K).

Differs from *T. purpureum* var. *purpureum* only by the shorter flowers and the equal or almost equal calyx teeth (in var. *purpureum* and other varieties the lower tooth is much longer than the upper ones).

T. purpureum is one of the most common and handsome clovers in the Middle East, and also one of the most variable species. Only one who has examined hundreds of specimens of this species can obtain a more or less comprehensive view on the varietal make-up of the species. From *T. angustifolium* L. it is well distinguished by the character of the calyx teeth and the size of corolla, but it is closely connected to and sometimes hardly distinguishable from a whole series of binomials established chiefly by Boissier. These are: *T. blancheanum*, *T. desvauxii*, *T. laxiusculum*, *T. roussaeum*, *T. pamphylicum*. These binomials have been variously interpreted in literature. In the present study, *T. blancheanum* is regarded an independent species (see remark to that species). From the remaining four, *T. roussaeum* is considered here as a species, but with some hesitation; it has patulous-hairy stems and opposite uppermost leaves; *T. desvauxii* can, at the most, be regarded as a variety of *T. purpureum* and the same is true for *T. pamphylicum*; *T. pamphylicum* is a dwarf, tiny plant which has almost equal calyx and lanceolate-linear leaflets of the *T. arvense* type; *T. laxiusculum* is a maritime form of *T. purpureum*, hardly distinguishable from other varieties; none of them, except *T. roussaeum*, can be maintained at a specific level because of the rather quantitative nature of the characteristics. This is in strong disagreement with the procedure of Hossain (l.c.) in the regard. What has been considered here var. *purpureum* is in itself a heterogeneous assemblage of forms which awaits further analytical and experimental study. Also *T. purpureum* var. *desvauxii* is probably made up of various forms which have in common a few characteristics, namely: the small, less compact flowering and fruiting head, the smaller flowers, etc. This variety grows under poor climatic and edaphic conditions; it is artificially delineated and intergrades with var. *purpureum*. This, too, awaits further treatment as to composition and constancy.

- 45. *Trifolium blancheanum*** Boiss., Diagn. ser. 2, 2: 13. 1856. **Typus:** Lebanon, Beyrouth, bords des champs sablonneux, Avril 1850, *Blanche* (lecto.: E).
 = *T. angustifolium* L. subsp. *purpureum* (Loisel.) Gib. & Belli var. *desvauxii* Boiss. & Bl.) Gib. & Belli subvar. *blancheanum* (Boiss.) Gib. & Belli, l.c.

= *T. desvauxii* Boiss. & Bl. var. *blancheanum* (Boiss.) Boiss., Fl. 2: 124. 1872; Hossain, Not. Roy. Bot. Gard. Edinb. 23: 420. 1961.

Hab.: Sandy coast exposed to sea spray.
Gen. distr.: Lebanon, Palestine.

Specimens seen. Lebanon: Saida, bords de la mer 1854, *Gaillardot 921* (G).
Palestine: Acco Plain, Acco, light soil 1926, *Eig & al. 170* (HUI); also collected by the present author from Sharon Plain.

Trifolium blancheanum has been misinterpreted almost by all the students of the Middle Eastern flora including the author of this species. It has been confused with *T. roussaeum*, *T. laxiusculum* and others, and some authors included it within *T. purpureum*.

The present author regards *T. blancheanum* as a species well distinguished from *T. purpureum* by a series of morphological characteristics and also by its habitat. It is a prostrate to procumbent plant which occurs in the littoral spray zone of Israel and Lebanon. This habitat has had a marked influence on speciation in various taxonomical groups. The striking feature of this species are the small flowers, 1-1.2 cm, the small, almost globular flowering heads, the short fruiting heads and the small, elliptical, thick (somewhat fleshy) leaflets. We have collected this variety both in the "locus classicus" and in habitats similar to the above in northern Israel.

There are, at first glance some difficulties in distinguishing between *T. blancheanum* and a form of *T. purpureum* var. *desvauxii*, which also grows in the coastal zone at some distance from the spray zone and which has similarly small heads; but the latter is readily recognizable by its linear-lanceolate leaflets.

46. *Trifolium roussaeum* Boiss., Diagn. ser. 1, 2: 26. 1843; Hossain, Not. Roy. Bot. Gard. Edinb. 23: 422. 1961. **Typus:** Hab. in Oriente, *Rousseau* (lecto.: G); Anatolia in rupestribus Ciliciae, 1837, *Aucher 1236* (G).

= *T. desvauxii* Boiss. & Bl. var. *roussaeum* (Boiss.) Boiss., Fl. 2: 123. 1872.

= *T. angustifolium* L. subsp. *purpureum* (Loisel.) Gib. & Belli var. *desvauxii* (Boiss. & Bl.) Gib. & Belli subvar. *rousseum* (Boiss.) Gib. & Belli, Mem. Accad. Sci. Torino ser. 2, 39: 346. 1889.

= *T. purpureum* Loisel. subsp. *roussaeum* (Boiss.) Holmboe, Stud. Veg. Cyprus, in Bergens Mus. Skr. n.r. 1, 2: 105. 1914.

Hab.: Rocky ground.
Gen. distr.: Turkey (endemic).

Specimens seen. Turkey: Prov. Mersin, distr. Tarsus, gorge of Tarsus River, between Ulas and Samlar 150 m, rocky limestone slope 1957, *Davis & Hedge D 26439* (E); Moros, 800 m, *Balls 908* (E).

47. *Trifolium dichroanthum* Boiss. Diagn. ser. 1, 9: 20. 1849 et Fl. 2: 124. 1872. **Typus:** Palestine, In collibus Judeae circa Gazam 1846, *Boissier* (lecto.: G; iso.: K).

Hab.: Coastal belt, sandy soils.

Gen. distr.: S Turkey, Cyprus, Lebanon, Palestine, Egypt.

- 1a. Plants appressed-hirsute. Leaflets elliptical, (0.6-)1-1.5 cm long; heads up to 1.5 cm long. Stems not brownish *47c. var. cyprium*
- 1b. Plants patulous- or subpatulous-hirsute. Leaflets and/or heads longer than above. Stems brownish 2
- 2a. Petals pale lilac *47a. var. dichroanthum*
- 2b. Petals (incl. the young ones and at least the wings and keel) intensively purple. *47b. var. ascalonicum*

47a. *T. dichroanthum* Boiss. var. ***dichroanthum***.

= *T. dichroanthum* Boiss., l.c.

= *T. angustifolium* L. subsp. *dichroanthum* (Boiss.) Gib. & Belli, Mem. Accad. Sci. Torino, ser. 2, 39: 349. 1889.

Selected specimens. Lebanon: Beyrouth 1931, *Zohary* (HUI). **Palestine:** Sharon Plain, S of Magdiel 1927, *Naftolsky 16702* (HUI), very common. **Egypt:** Sinai: El Arish 1926, *Eig 160* (HUI).

47b. *T. dichroanthum* Boiss. var. ***ascalonicum*** Zoh. var. ***nova***. **Typus:** Palestine, Philistean Plain, n. Nitzanim, hills sandy clay soil 1962, *Zohary 101* (holo.: HUI).

Corolla intense purpurea, caetera ut in typo.

Flowers purple. Very similar to *T. purpureum*, but readily distinguished by its subpatulous indumentum, the reddish stems and calyx lobes; upper leaves opposite or rarely alternate.

This is an interesting variety also confined to the coastal plain of Israel. A further study may reveal some other characters linked with the flower colour, which together with the alternate leaves, found in some specimens, may point to its being a hybrid between *T. dichroanthum* and *T. purpureum*.

47c. *T. dichroanthum* Boiss. var. ***cyprium*** Zoh. var. ***nova***. **Typus:** Cyprus, Hartcha, 10 ft, stony field near beach, 1950, *Chapman 273* (HUI).

Flores quam in typo minores, usque ad 1.5 cm longi. Capitulum ovatum, minus. Indumentum caulium adpressum (nec patulum). Foliola elliptica, (0.6-)1-1.5 cm longa.

48. **Trifolium palaestinum** Boiss., *Diagn. ser. 1, 9: 21. 1849, et Fl. 2: 124. 1872.*
Typus: In arenosis circa Gazam Palestinae. Legi Aprili 1846, *Boissier* (holo.: G).

Hab.: Coastal belt, loamy-sandy soils.

Gen. distr.: Lebanon, Palestine.

Specimens seen. Lebanon: In Ras prope Beirut 1855, *Kostchy 1374* (W).
Palestine: Coastal Sharon Plain, Benyamina-Caesarea 1942, *Davis 4410* (E).

Rather common. Displays a particular procumbent spray ecotype; varies slightly in size of flowers.

49. **Trifolium dichroanthoides** Rech. fil., *Ark. Bot. ser. 2/1 5: 306. 1949.* **Typus:**
 Syria, Jebel Ansarieh an transitum Nebi Younes supra pagum Slenfe, 1933,
Samuelsson 5812 (holo.: W).

Hab.: Gravelly ground, mountains.

Gen. distr.: Syria (endemic).

Specimens seen. Syria: Only the type specimen cited above.

Very close to *T. roussaeum* Boiss., but differs from it by the larger flowers, by the calyx almost twice as long and the unequal calyx teeth. The indumentum is, in both of them, soft, silky, shining. The relations between these two species are still to be studied. It seems that *T. dichroanthoides* could be considered a variety of *T. roussaeum*. The relations between *T. dichroanthoides* and *T. haussknechtii* Boiss. should also be revised on the hand of more materiel (of *T. dichroanthoides*) than has been available to the present author.

50. **Trifolium haussknechtii** Boiss., *Fl. 2: 125. 1872; Hossain, Not. Roy. Bot. Gard. Edinb. 23: 423. 1961.* **Typus:** Syria, in graminosis montis Gebel Muhasan prope Aleppo, 1865, *Haussknecht* (lecto.: G; iso.: in K and W, labelled as *T. lasiocalycinum* Boiss. & Hausskn.).

Hab.: Grassy places, steppes, scree.

Gen. distr.: Turkey, Syria, Iraq.

- 1a. Leaflets usually narrowly oblanceolate, 1.5-2.5 x 0.2-0.4 cm
50a. var. *haussknechtii*
 1b. Leaflets obovate to oblong, 0.8-1 x 0.3-0.4 cm . . . 50b. var. *candollei*

50a. *T. haussknechtii* Boiss., var. *haussknechtii*.
 = *T. haussknechtii* Boiss., l.c.

Specimens seen. Turkey: Diarbakir: 5 km S of Diarbakir town, 650 m, 1957, *Davis & Hedge 28750* (E). Env. Hammath 1913, *Haradjian 1824* (K).

50b. *T. haussknechtii* Boiss. var. ***candollei*** (Post) Hossain, Not. Roy. Bot. Gard. Edinb. 23: 423. 1961. **Typus:** Turkey, prope Aintab (Herb. Post BEI).
= *T. candollei* Post, Journ. Linn. Soc. Lond. Bot. 24: 425. 1888.

Specimens seen. Turkey: pr. Urfa, c. 20 km from the turning to Sürüç towards Urfa, 600 m, 1957, *Davis & Hedge D 27886* (K). **Syria:** Env. of Muslemie 1931, *Zohary* (HUI). **Iraq:** Jebel Sindjar 330 m, rocks with red soil between them, 1933, *Eig & Zohary* (HUI).

51. *Trifolium prophetarum* Hossain, Not. Roy. Bot. Gard. Edinb. 23: 421. 1961.
Typus: Palestine, Mt Gilboa, Beith Alfa, *Davis 4142* (holo.: E; iso.: K).

Hab.: Batha, steppes and roadsides.

Gen. distr.: Palestine (endemic).

Specimens seen. Palestine: Jerusalem, roadsides 800 m, 1808, *Dinsmore 3162* (E); also found in Galilee and in the Jordan Valley.

This species is well delineated, though it varies greatly in size of flowers; its extreme forms resemble *T. arvense* in appearance, but it differs from the latter by a number of diagnostic characteristics. Most of our material has long been kept under a small-flowered form of *T. dasyurum*.

52. *Trifolium dasyurum* C. Presl, Symb. Bot. 1: 53, t. 33. 1832?. **Typus:** Described from Crete.

= *T. formosum* Urv., Mém. Soc. Linn. Paris 1: 350. 1822, non Savi 1808-10; Boiss., Fl. 2: 124. 1872.

= *T. formosum* Urv. var. *minus* Post, Fl. Syr. Pal. Sin.: 236. 1883-96.

= *T. velivolum* Paine, Pal. Expl. Soc. Statement 3: 103. 1875.

Icon.: C. Presl, l.c.: t. 33.

Hab.: Batha and fields, stony ground, semi-arid areas.

Gen. distr.: Greece, Aegean Islands, Turkey, Cyprus, Syria, Palestine, Iraq, Iran, Egypt, Libya.

Selected specimens. Turkey: Prov. Urfa, Sürüç-Urfa, c. 20 km from the turning to Sürüç, 600 m, 1957, *Davis & Hedge D 27983* (K). **Cyprus:** Near Agios Epiktitos (E of Kyrenia) 60 m, 1956, *Casey 1706* (K). **Syria:** 74 km SW of Damascus, basaltic stones and rocks 950 m, 1933, *Eig & Zohary 617* (HUI). **Palestine:** Judean Mts, Deir Amar, garigue 1954, *Jaffe 17064* (HUI). **Iraq:** Jebel Bashiqaq betw. Fadhilyed

and Bashiqah (NE of Mosul) c. 500 m, between rocks 1933, *Eig & Zohary* (HUI). **Iran:** 16 m, S Burugird 1350 m, 1929, *Cowan & Darlington 1073* (K). **Egypt:** Selum, sandy soil 1952, *Shabetai 39* (K). **Libya:** Cyrenaica: Benghazi, 1883, *Ruhmer 100* (HUI).

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(To be continued)