

A CONTRIBUTION TO THE GENUS TRIFOLIUM IN TURKEY

M. KESKİN

S U M M A R Y

At the end of the field studies undertaken between 1994-2000 and the examination of *Trifolium* specimens kept in different herbaria and literatures regarding with the genus, seven taxa [*T. repens* L. var. *biasolettii* (Steud. ex Hochst.) Aschers. & Graebn., *T. hybridum* L. var. *elegans* (Savi) Boiss., *T. michelianum* Savi, *T. tomentosum* L. var. *lanatum* Zohary, *T. medium* L. var. *banaticum* Heuff., L. var. *lanigerum* Ser., *T. echinatum* Bieb. var. *carmeli* (Boiss.) Gibelli & Belli)] are recorded as new to the Flora of Turkey and the East Aegean Islands. New floristic records for various grid squares from Turkey are given for 29 taxa.

Ö Z E T

1994-2000 yılları arasında Türkiye'deki *Trifolium* türleri için yapılan arazi çalışmaları ile farklı herbaryumlardaki *Trifolium* türlerinin ve ilgili literatür çalışmalarının incelenmesi sonucunda, Anadolu'dan "Türkiye Florası" için 7 yeni kayıt [*T. repens* L. var. *biasolettii* (Steud. ex Hochst.) Aschers & Graebn., *T. hybridum* L. var. *elegans* (Savi) Boiss., *T. michelianum* Savi, *T. tomentosum* L. var. *lanatum* Zohary, *T.*

medium L. var. *banaticum* Heuff., *T. alpestre* L. var. *lanigerum* Ser., *T. echinatum* Bieb. var. *carmeli* (Boiss.) Gibelli & Belli)] belirlenmiştir. Ayrıca 29 takson'a ait yeni kare kayıtları verilmiştir.

Key words: *Trifolium*; new records; Turkish flora.

INTRODUCTION

The genus *Trifolium* L. is represented by 104 species in Turkey (1, 2) of which 16 are endemic. During the studies on the genus *Trifolium* of Turkey, it was found that 7 taxa [*T. repens* L. var. *biasolettii* (Steud. ex Hochst.) Aschers & Graebn., *T. hybridum* L. var. *elegans* (Savi) Boiss., *T. michelianum* Savi, *T. tomentosum* L. var. *lanatum* Zohary, *T. medium* L. var. *banaticum* Heuff., *T. alpestre* L. var. *lanigerum* Ser., *T. echinatum* Bieb. var. *carmeli* (Boiss.) Gibelli & Belli] are new records for the Flora of Turkey. In addition, various new grid squares records of 29 taxa are also given.

MATERIAL AND METHOD

Herbarium specimens have been examined in the following herbaria: ISTE, ISTF, ISTO, MARA and MARE. Material collected by author has been lodged in ISTE.

Trifolium specimens, collected between 1994-2000 from mainly around the following provinces: Malatya, Samsun, Istanbul, Hatay. Short description of the species which are new records for Flora of Turkey are given based on the examined specimens.

RESULTS AND DISCUSSION

A. NEW RECORDS OR CONFIRMATIONS FOR THE FLORA OF TURKEY AND THE EAST AEGEAN ISLANDS

These following taxa are recorded either in Zohary (3) or Katznelson & Bailey (4), or exist as specimens from Turkey kept in ISTE, ISTF, ISTO, MARA and MARE. However, these records are not cited in the Flora of Turkey and the East Aegean Islands [1, 2] or are recorded as requiring confirmation.

T. repens L. var. *biasolettii* (Steud. & Hochst.) Aschers & Graebn., Mitterleu. Fl. 6, 2: 500 (1908).

Perennial, nodding at nodes; leaves crowded at base, loosely spaced on stems; petioles hairy sometimes loosely hairy in fruiting times; leaflets 7–10 x 5–7 mm; corolla 8 mm, pink; calyx 5 mm; pedicels longer than calyx and hairy; peduncles 3–6 cm, longer than leaf, generally glabrous; flowering heads 12x15 mm; fruiting heads 18x3 mm.

var. *biasolettii* differs from the other varieties of *T. repens* by the following characters: peduncles generally glabrous, flowers pink, and petioles and pedicels hairy.

Type: Described from Europe

Distribution in Turkey: A1(E) Kırklareli: 12 km E of Demirköy, 400m, 1963, Orshan 55666 (HUI), A2(A) Istanbul: Maltepe, Başibüyük Mah., 1.vii. 2000, M. Keskin 2442 (ISTE)!

T. hybridum L. var. *elegans* (Savi) Boiss., Fl. Or. 2: 146 (1872).

Perennials, 10-40 cm, prostrate – ascending; peduncles 2-10 cm, hairy; flowering heads 15-17 x 15-17 mm; corolla white – pink, 6-7 mm; calyx 2-3 mm; pedicels hairy.

var. *elegans* is distinguished from var. *hybridum* and var. *anatolicum* by the following characters: stems prostrate – ascending, heads, corolla and calyx smaller than the other varieties.

Type: Specimen from env. of Pisa (PI ?)

Distribution in Turkey: A2(A) Istanbul: Alemdağ., 17.v.2000, M. Keskin 2404 (ISTE)! A2 Bursa: Uludağ., Elma çukuru, 13.v.1944, M. Başarman 2823 (ISTF)! A6 Samsun: Kavak, Azaklı village, 10.vi.2000, M. Keskin 2430 (ISTE)! A9 Kars: Yalnızçam, 2160 m, 1964, Zohary & Plitmann 2488 - 7 (HUI).

The author should note that Flora of Turkey includes var. *elegans* within var. *hybridum*, and explain why he has resurrected this taxon.

T. michelianum Savi, Fl. Pis. 2:159 (1798), (3/447).

Annual, 10-40 cm; stems glabrous, striate and fistulose; leaflets obovate - elliptic, 10–25 x 8-20 mm, glabrous; peduncles 15-55 mm, longer than subtending leaf; inflorescence to 25 mm; corolla pink – creamish white, 9-11 mm; bract membranous, 2 mm, subulate - lanceolate; pedicels longer than calyx tube, generally 3 x tube, glabrous; calyx 6 mm; teeth of calyx 4 mm, almost equal, subulate - acute, glabrous; pod longer than tube of calyx, 6mm, hairy at apex; seed 1–2 (-4).

Type: Italy, circa Bientinum (Herb. Micheli, FI)

T. michelianum is related to *T. balansae* but differs in the following characteristics: Stem fistulose (solid & smooth in *balansae*), corolla 9-11 mm (10-13 mm in *balansae*), calyx teeth and pedicels at least 3 times longer than tube (teeth two times longer than tube, pedicels nearly equal in *balansae*). *T. balansae* is regarded as a variety of *T. michelianum* [as *T. michelianum* Savi var. *balansae* (Boiss.) Azn., in Mag. Bot. Lap. L2: 161 (1913)].

Distribution in Turkey: A2(A) Istanbul: Alemdağ., 17.v.2000, M. Keskin 2399 (ISTE)! B1 Izmir: Izmir – Bergama road, 15 km W. of Foça, Crawford, CPI 45858, B8 Muş: 15 km E. of Muş, Katznelson & Bailey, CPI 45856, HUI.

T. tomentosum* L. var. *lanatum Zohary, in Zoh. & Heller, Israel J. Bot. 19: 328 (1970) et Fl. Pal. 2: 457 (1972).

Annual, 3-10 cm; leaflets 4-7 x 2-4 mm, obovate; heads generally sessile, lanate, vesicular veins not easily visible, rarely slightly visible; inflorescence 3-4 x 3-4 mm; corolla pink, 3 mm; calyx 2 mm; fruting 8 x 8 mm; fruting calyx 4 mm; teeth of upper lip minute and spreading.

T. tomentosum var. *lanatum* differs from the others sessile and usually lanate heads, minute, lanceolate, spreading calyx teeth of upper lip.

Type: Palaestine, Samaria, betw. Wadi Ara and Um el Fahm, 1963, Zohary (holo HUI)

Distribution in Turkey: A2(A) Istanbul: Maltepe, Başbüyük district, 13.v.2000, M. Keskin 2388a (ISTE)!, C4 Antalya: Konyaaltı, on shore rock, 23.v.1950, M. Heilbronn & A. Atilla, ISTF 9819!, C5 Mersin: Anamur, Anamur - Gilindere, 1956, Davis & Polunin D. 26015 (HUI), C5 İçel: Tarsus, Dağlarbaşı village, 26.iv.1953, O. Karahan, ISTF 12363!

T. medium* L. var. *banaticum Heuff., Enum. Pl. Banat., in Verh. Zool. - Bot. Ges. Wien 8: Abh. 89 (858).

Differs from *T. medium* var. *medium* in all calyx teeth usually more or less longer than tube.

Type: Described from Banat

Distribution in Turkey: A4 Kastamonu: Ilgaz Da., Beşdeğirmenler village, around Handüzü, Muhsar Kuşçu series, 2100 m, 20.ii.1985, H. G. Gültekin, MARA 1287!

T. alpestre L. var. **lanigerum** Ser., in DC., Prodr. 2: 194 (1825).

Perennials, stems generally loosely and patulous hairy; leaflets 30-45 x 7-8 mm.

The taxon is distinguished from var. *alpestre* in being patulous hairy.

Type: Described from Europe

Distribution in Turkey: A1(E) Kırklareli: Kofçaz road, 23 km from Kırklareli, among *Quercus*, 3.viii.1975, A. Baytop ISTE 32479!

T. echinatum Bieb. var. **carmeli** (Boiss.) Gibelli & Belli, Mem. Accad. Sci. Torino Ser. 2. 39: 377 (1889).

Annuals to 70 cm, stems adpressed hairy at upper parts; leaflets 15-32 x 5-13 mm, adpressed hairy; inflorescence 15-20 x 10-12 mm, ovate; calyx tube 2-3 mm; longer tooth (4-)5-6 mm, long setulose - plumose; corolla cream; keel generally mauve at tips.

Type: Palaestine, Fauces Carmeli, April - May 1846, Boissier (G)

Distribution in Turkey: C6 Hatay: Yayladağ., Kışlak village, residence of old primary school garden, 24.v.1997, M. Keskin 1102 (ISTE)! C8 Mardin: towards Mardin, 14 km S. of Çınar, Katznelson & Bailey CPI 46294

var. *carmeli* differs from var. *echinatum* in its longer calyx tube (2-3 mm), longer teeth (5-6 mm), longer leaflets (15 mm or more) and bicoloured keel (mauve at tip).

B. NEW FLORISTIC RECORDS FOR GRID SQUARES (Flora of Turkey and the East Aegean Islands vol./page)

T. repens L. var. **repens** (3/392)

B4 Ankara: Yamanlar, 24.v.1974, H. Bağda, ISTE 1521!

T. repens L. var. **macrorrhizum** (Boiss.) Boiss. (3/394)

A2(E) Istanbul: Sultanahmet, Dikilitaş around, 10.viii.1999, M. Keskin 2272 (ISTE)! A2(A) Istanbul: Maltepe, Başbüyük Mah. 2.vii.1999, M. Keskin 2275 (ISTE)! Istanbul: Alemdağ., 17.v.1999, M. Keskin 2403 (ISTE)! A6 Samsun: Kavak, Azaklı village, 2.v.2000, M. Keskin 2369 (ISTE)! B7 Malatya: Pütürge, Sahil village, 1.vi.1999, M. Keskin 2219 (ISTE)!

T. repens L. var. **orphanideum** (Boiss.) Boiss. (3/394)

A2(A) Istanbul: Alemdağ., in woodland, 17.v.2000, M. Keskin 2400 (ISTE)!

T. hybridum L. var. **anatolicum** (Boiss.) Boiss. (3/395)

C1 Muğla: Sandras mountain, Çiçekbaba 2100 m, 14.vii.1978, N. & E. Özhatay, MARA 4229!

T. michelianum Savi var. **balansae** (Boiss) Azn. (3/397)

B1 İzmir: Dikili, 23.v.1950, Heilbronn, ISTF 9304!

T. retusum L. (3/397)

A6 Samsun: Kavak, Azaklı village, 7.vi.2000, M. Keskin 2428!

T. grandiflorum Schreber (Syn. **T. speciosum** Willd.) (3/398)

B3 Konya: Atakent, 28.v.1974, G. Dökmeci & Y. Doğantaş, ISTE 28727!

T. mesoginatum Boiss. (3/400)

B1 İzmir: Kadifekale, 24.v.1941, Heilbronn & Başarman, ISTF 6109! C6 Hatay: Yayladağ., road to Harbiye, 17.v.1982, A.&T. Baytop, ISTE 7044b! Hatay: Yayladağ., Kışlak village, 23.v.1998, M. Keskin 1790 (ISTE)!

T. spadiceum L. (3/401)

B7 Sivas: Kızıldağ, Refahiye to İmranlı, 2160 m, A. Baytop & A. Meriçli, ISTE 33613!

T. campestre Schreber (3/404)

B7 Malatya: Pütürge, Sahil village, 23.vii.1999, M. Keskin 2079 (ISTE)!

T. patens Schreber (3/405)

A3 Bolu: Koru motel, 30.viii.1972, P. Uotila 20129, ISTE 34354!

T. micranthum Viv. (3/405)

A1(E) Edirne: Keşan, Mecidiye village, 19.iv.1994, N. Özhatay & A. J. Byfield 330, ISTE 66434!

T. glomeratum L. (3/406)

A6 Samsun: Kavak, Azaklı village, 7.iv.2000, M. Keskin 2426 (ISTE)! B1 Çanakkale: Bayramiç, from Uzunoluk to Çırpılar 2 km, 30.iv.1994, N. Özhatay & al. ISTE 66307! C1 Muğla: Bodrum, Turgut reis, Doru mountain slopes, 16.iv.1984, E. Tuzlacı, ISTE 53790! C2 Aydın: from Dalama 6,6 km, 24.iv.1992, A. J. Byfield 56, ISTE 64882!

T. suffocatum L. (3/406)

A1(E) Edirne: Keşan, Mecidiye village, 19.iv.1994, N. Özhatay & A. J. Byfield 353, ISTE 66462! A2(E) İstanbul Demirci village, iv.1993, A. J. Byfield 164, ISTE 65769! İstanbul: from Arnavutköy to Bebek, 9.iv.1993, A. J. Byfield 193, ISTE 65793! A3

Sakarya: W. of Karasu shore, N. of Acarlar lake, 10.v.1995, A. J. Byfield 1635, ISTE 68984! B1 Çanakkale: from Yenice to Kireç tepe, 29.iv.1992, N. Özhatay & A. J. Byfield, ISTE 66599! C2 Muğla: from Çine to Yatağan 15 km, 24.iv.1992, A. J. Byfield 46, ISTE 64872! Muğla: from Taşlıca to Bozukkale, 8.iv.1993, A. J. Byfield, ISTE 69384!

T. fragiferum L. var. **fragiferum** (3/409)

B1 İzmir: Narlıdere, 14.vi.1966, A. Baytop & al. ISTE 10023! C2 Muğla: Fethiye, Seki yaylası, 28.v.1946, Heilbronn & Başaran, ISTF 6228! C6 Hatay: Yayladağ., Kışlak village, 15.vi.1998, M. Keskin 1863! Adana: Adana, 19.vi.1998, M. Keskin 1866 (ISTE)!

T. physodes Stev. & Bieb. var. **psilocalyx** Boiss. (3/410)

C2 Burdur: from Armutlu to Dirmil, 1150 m, 2.vi.1965, B. Tutel & al., ISTF 20307!

T. resupinatum L. var. **majus** Boiss. (3/412)

B7 Tunceli: Ovacık – Dikili, 23.xi.1950, M. Heilbronn, ISTF 1284!

T. tomentosum L. var. **tomentosum** (3/413)

B7 Malatya: Pütürge, Sahil village, 2.i.1999, M. Keskin 2070 (ISTE)!

T. glanduliferum Boiss. var. **glanduliferum** (3/414)

A2(A) İstanbul: form Alemdağ to Kurtköy, S. of Ömerli barrage, 2.vi.1995, A. J. Byfield 2272 & R. Fitzgerald, ISTE 69626!

T. strictum L. (3/414)

A1 (E) Kırklareli: 10 km. N. of Kırklareli, Kızılcık Deniz village, 15.vi.1972, N. Uluocak, ISTE 23860! A1(A) Balıkesir: Marmara island, distr. Çınarlı village, 6.v.1997, E. Tuzlacı, ISTE 69626! B2 Balıkesir: Susurluk ,sugar fab., meadow, v.1995, A. J. Byfield, ISTE 69027!

T. pratense L. var. **pratense** (3/415)

B6 Sivas: Yıldızeli, 20.vii.1978, A. Baytop & al., ISTE 40903!

T. pratense L. var. **americanum** Harz. (3/415)

A2(E) İstanbul: Belgrad forest, 18.xi.1962, T. Gözler & N. Tanker, ISTE 7165! A2(A) Kocaeli: Yalova, 7.xi.1945, Başarman, ISTF 5234! B3 Konya: Akşehir: Sultan mountains, upper Atakent, 4.vii.1973, G. Dökmeci & A. Aytaç, ISTE 32549!

T. pratense L. var. **sativum** Schreber (3/416)

A2(E) İstanbul: Yıldız park, 19.v.1983, A. Baytop, ISTE 50295! A3 Kocaeli: Keltepe: 6 km from Maşukiye, 500 m, E. Özhatay & al., MARA 2302! A4 Ankara: Ankara, cultivated land, 20.iii.1945, H. Bağda, ISTE 15171!

T. pallidum Waldst. & Kit. (3/416)

A6 Samsun: Kurupelit, around students dormitory, 17.v.1996, M. Keskin 809! B6 Sivas: from Gürün to Pınarbaşı, 28 km from Gürün, İncesu around, 1610 m, 27.vii.1982, E. Tuzlacı, MARE 1336!

T. medium L. var. **medium** (3/418)

B7 Erzincan: Refahiye, around Düvar, 15.vii.1974, I. Şanlı, ISTO 17419!

T. stellatum L. var. **adpressum** Turrit (3/424)

B1 İzmir: Bergama, Akrapol, 22.iv.1950, Heilbronn, ISTF 9261!

T. stellatum L. var. **xanthinum** (Frey) Bald. (3/425)

A2(E) İstanbul: from Zekeriyaköy to Uskumruköy, 7.vii.1991, E. Tuzlacı, MARE 3149!
C1 Aydın: Kuşadası, 22.iv.1973, H. Germen & S. Kuş, ISTF 26937!

T. striatum L. (3/426)

A6 Samsun: Kavak, Azaklı village, 10.vi.2000, M. Keskin 2433 (ISTE)! Samsun: Kurupelit, around Fen-Ed. Fak., 16.v.1996, M. Keskin 631 a (ISTE)!

T. echinatum Bieb. var. **echinatum** (3/441)

A6 Samsun: Samsun, 11.v.2000, M. Keskin 2373 (ISTE)!

Acknowledgement: I would like to thank to the curators of the following herbaria for the permission to examine the specimens: ISTE, ISTF, ISTO, MARA and MARE. I would like also to thank to Prof. N. Özhatay from Department of Pharmaceutical Botany of İstanbul University for her advice and MSc. S.Koçak for his help.

REFERENCES

1. Davis, P.H., Flora of Turkey and the East Aegean Islands, Vol.3, 384–448, University Press, Edinburgh (1970).
2. Davis, P.H., Mill, R.R. & Tan, K., Flora of Turkey and the East Aegean Islands, Vol. 10 (supplement I), University Press, Edinburgh. (1988).
3. Zohary, M. & Heller, D. "The Genus *Trifolium*", Jerusalem (1984).
4. Katsnelson, J.&Bailey, "CSIRO Plant Introduction Review" Vol.5 (1968)