

## Revision of the Genus *Verbascum* L. (Group A) in Turkey

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**Abstract:** This study presents the morphology of the genus *Verbascum* L. taxa "Group A" in Turkey. For three taxa new modification and combinations were carried out. The descriptions of taxa belong to genus *Verbascum* in group A in Flora of Turkey have been revised. The stamens number, understand that, are not enough for distinguishing the *Verbascum* taxa group in given Flora of Turkey.

**Key words:** Scrophulariaceae, *Verbascum*, revision, morphology, Turkey

### INTRODUCTION

The genus *Verbascum* was considered as *Arcturus* by Belli in 1601. It was reduced to synonym of *Blattaria* by Morison in 1715. In 1753, Linneaus named specimens with 4 stamens as *Celsia* L. and specimens with 5 stamens as *Verbascum* L. Some taxa which belong to genus *Celsia* were renamed as *Allonsoa* by Ruis. and Pav. in 1786, *Scrophularia* by Wydler in 1828, *Thapsandra* by Griseb. in 1844, *Janthe* by Griseb. in 1844, *Triguera* by Dunal in 1852, *Alectra* by Schintz in 1889. In 1891, Kuntze combined the genus *Celsia* under *Verbascum* again (Linneaus, 1753; Schrader, 1813, 1823; Franchet, 1868, 1875).

In 1843, Fischer and Meyer separated *Verbascum natolicum* which has oblong-cylindrical capsule and published it under the genus *Staurophragma*. In 1891, *Celsia* and *Staurophragma* were combined under the genus *Verbascum* by Kuntze. But, it was separated again as *Celsia* and *Verbascum* by Murbeck (1925). The genus *Staurophragma* was used again by Huber-Morath (1971). However, the genera *Celsia* and *Staurophragma* were combined under *Verbascum* by some authors (Murbeck, 1925, 1933; Huber-Morath, 1971, 1978).

The identification key of *Verbascum* with *Staurophragma* and *Celsia*, which are accepted synonyms of the genus *Verbascum* by Huber-Morath (1978), are given below.

- Fertile stamens 4; placenta bifid, stalked .....*Staurophragma*.
- Fertile stamens 4-5; placenta entire, sessile
  - Each bract with a single flower in its axil; stamens 4, rarely 5 .....*Celsia*.

- Each bract with 2 or more flower in its axil; stamens 5, rarely 4 .....*Verbascum*.

This family is represented by 280 genera and about 3000 species in the world 30 genera and 466 species are reported in Turkey (Watson and Dallwitz, 1991; Huber-Morath, 1978). *Verbascum* is represented by 360 taxa in the world and 236 taxa in Turkey (Heywood, 1978; Huber-Morath, 1978; Vural and Aydoğdu, 1993; Karavelioğullari *et al.*, 2004; Özhatay, 2006; Kaynak *et al.*, 2006). *Verbascum* group A, is separated before having 4 stamens and stalked bifid placentation from the others groups. The group A is represented by 45 taxa in Turkey and others neighbouring countries. The general distribution of the species with 4 stamens is given in Table 1 (Ferguson, 1972; Fedchenko, 1955; Huber-Morath, 1981; Feinbrun-Dothan, 1978a, b; Meikle, 1985; Täckholm, 1974).

Genus *Verbascum* have two section (*Bohtrospermae* Murb. and *Aulacospermae* Murb.) in the world. All turkish species of *Verbascum* belong to sect. *Bohtrospermae* Murb.

The differentiation key of these two sections are given below

- Seeds are longitudinal corrugated .....  
....Sect. *Aulacospermae* Murb.
- Seeds are transversal corrugated alveolate.....  
.....Sect. *Bohtrospermae* Murb.

As seen in Table 1, Turkey is richer in Group A members which other countries and Europe. So, Turkey is the most suitable centre for solving taxonomic problems for this genus.

Table 1: Comparison of number of species belonging to genus *Verbascum* group A and the number of endemic species in different countries

Countries	Turkey	Europe	Russia	Iran	Palestine	Cyprus	Egypt
Total species	234	99	51	49	20	6	4
with 4 stamen	25	17	5	18	5	2	-
Endemic	17	-	-	10	-	-	-

Although, the taxa in group A are distributed in all regions of Turkey, they are localised especially in the Mediterranean and East Anatolia regions.

The genus *Verbascum* was previously revised by Huber-Morath (1978) for the Flora of Turkey, after that seven species and nine hybrids have been described (Davis *et al.*, 1988; Ekim *et al.*, 2000; Sutorı, 2001, 2004; Karavel *et al.*, 2004; Özhatay, 2006; Kaynak *et al.*, 2006).

The reasons for choosing the genus *Verbascum* “Group A” in the present study, are:

- Some taxa in group A, were only known from type collections and some were known only from one locality although they are not endemic. There was no information about their population.
- Some taxa were evaluated as different species in Flora of Turkey, although having poor taxonomic characters among them. For example, *V. pyroliforme* and *V. dudleyanum* are regarded as different species due to the difference in their habitat features and the number of flowers. *V. flabellifolium* and *V. trapifolium* are regarded as different species due to the presence of glandular hairy basal leaves or not. *V. orientale* and *V. brachysephalum* are regarded as different species due to the difference in their pedicel length.
- *V. transcaucasicum*, *V. bornmuellerianum*, *V. bourgeauanum* haven't any information about their fruit features, both in the Flora of Turkey and their original publications.
- No recent collections and have not been recollected until now. These are *V. rupicola* (1912), *V. transcaucasicum* (1913), *V. gaillardotii* (1955), *V. suworowianum* var. *papillosum* (1956), *V. sorgerae* (1966) and *V. bornmuellerianum* (1966).
- Some taxa with 4 stamens in group A are also cited in the others groups with 5 stamens. For instance: *V. oreophilum* K. Koch found both group A and group C. In addition, although *V. macrocarpum* Boiss. was placed in group B and *V. pyramidatum* Bieb. placed in group C, are placed in group A. There are taxonomic problems in the group identification key given in the Flora of Turkey. To dedect the correct groups and solve the problems related to these taxa necessitated the revision of this genus. It is impossible to revise the genus completely because due to the larger of species. Therefore, only one group (Group A) was chosen for revision.

## MATERIALS AND METHODS

The fruiting and flowering materials of *Verbascum* Group A were collected from May to September between 2001 and 2005.

Type specimens or photos of the related species in herbaria were also investigated (AEF, ANK, EGE, GAZI, HUB, ISTF, ISTE, KNYA, VANF G, GB, P, K, B, E).

Threatened categories of some taxa were revised according to IUCN, 2001.

**Morphological studies:** In this study, the following taxonomic characters were used: The length of plant, type of hairs; structure of basal and cauline leaves; stem branching or not; inflorescence shape; structure of lower and upper bracts; number of bracteoles and their structure; length of pedicels; structure of calyx; diameter of corolla, its colour, size of lobes, hairy situation, length of tube; number of stamen, structure of filament, hairy situation, colour of hairs, length and type of anther, structure of ovary, structure of style; structure of stigma, structure of fruit and its hairs situation.

Measurements were made under a stereo-microscope and carried out 10 times on at least 10 specimens collected from different regions and belonging to different herbaria and used their average. Some species have narrow distribution, therefore, their measurements were carried out on 10 different specimen that were collected from the same region. General characteristics of species were given with maximum and minimum limits for the variations.

Some specimens of group A are gift to ANK, HUB, EGE, ISTE, Hb.YILDIRIMLI, G, BRNO herbaria.

Author names were checked from the Brummitt and Powell (2001) and <http://www.ipni.org/index.html>.

All the studies are investigated for their descriptions original publications and descriptions of taxa in group A in other sources are investigated.

**Taxonomic treatment of the *Verbascum* “Group A”:** Annual, biennial or perennial, 10-180 cm, with pellucid, short stalked glandular, stellate, articulate, puberulent, pilose, strigose hairy or glabrous. Basal leaves 1-45×0.4-25 cm, ovate, cordate, lanceolate, oblong, obovate, flabellate, semicircular, pinnatifid-pinnatisect, entire, crenate, dentate, serrate, undulate, repand. Stem cylindrical, sometimes angular, fragile, robust, simple, branched. Cauline leaves 0.6-26×0.2-8 cm, oblong, lanceolate, ovate,

linear, lyrate, pinnatifid, pinnatisect, bipinnatisect, entire, crenate, serrate, dentate. Inflorescence raceme or panicle. Lower bracts ovate, lanceolate, cordate, lanceolate-linear, pinnatifid, pinnatisect, entire, crenate, serrate, dentate. Upper bracts linear, lanceolate, cordate, ovate, entire, crenate, serrate, dentate, 2 or more flowers. Pedicels 1-35 mm long. Bracteoles absent or present (2-3). Calyx 1-10 mm, almost divided to the base or to 4/3 into, lobes linear, linear-lanceolate, lanceolate, lanceolate-narrowly oblong, ovate, ovate-lanceolate, oblong, oblong-lanceolate, oblong spatulate, oblong-linear, mucronate to acute, obtuse. Corolla 10-40 mm diam, yellow, yellowish, bluish-green, brownish-purple, with or without pellucid glands, gland-dotted, short stalked glandular, stellate-tomentose or glabrous outside, tube 0.5-4 mm length. Stamens 4 [-5(-7)] [5 stamens: *V. natolicum*, *V. nudicaule*, *V. transcausicum*, *V. gaillardotii*, *V. oreophilum* (-7)], rarely with an antherless 5th staminode (*V. natolicum*, *V. nudicaule*). two anterior filaments woolly to anthers or glabrous near apex. All anthers reniform or two anterior anthers decurrent. Ovary globose, ovoid, oblong-cylindrical, pyriform, sometimes glabrous. Style filiform, sometimes glabrous. Stigma capitate or spatulate, sometimes glabrous. Capsule 2-25×1.5-7 mm, oblong-cylindrical, ovoid, globose, elliptic, sometimes glabrous.

**Some valuation of taxonomic characters:** The most important features of Group A is number of stamen. But after this study, it show that, this characters are not stabile. Some species, listed in group A, have 4 and 5 stamens. The important taxonomically characters of the group A are discussed below.

**Basal leaves:** Ovate, obovate, cordate, lanceolate, oblong, flabellate, semicircular, pinnatifid-pinnatisect.

**Bracteol:** Three taxa have bracteoles others haven't in Group A.

**Corolla:** The color of corolla and indumentum have taxonomic importance.

**Filament:** The color of hairs and indumentum have taxonomic importance.

**Anthers:** All of anthers are generally reniform. Two anthers are decurrent in four taxa.

**Shape of capsule:** Capsule is oblong to cylindrical in *V. natolicum* and ovate, globose or elliptic in others.

**Key to the Turkish species of the *Verbascum* "Group A":**

- 
1. Perennial; woody at base; intricately branched..... 44. *helianthemoides*
  1. Annual, biennial or rarely perennial, herbaceous; not intricately branched
    2. Basal leaves divided
      3. Basal leaves eglandular
        4. Terminal lobe of basal leaves distinctly larger than lateral; two anterior anthers decurrent .....18. *levanticum*
        4. Terminal lobe of basal leaves±similar; all anthers reniform
          5. Lower bracts undivided; corolla glandular outside ..... 15. *luciliae*
          5. Lower bracts pinnatifid; corolla glabrous outside .....13. *nudicaule*
      3. Basal leaves glandular
        6. Lobes of basal leaves entire, terminal lobe±similar to others; filaments hairy up to anthers.....3. *orientale*
        6. Lobes of basal leaves serrate-dentate, terminal lobe distinctly larger; two anterior filaments glabrous near apex
          7. Biennial; basal leaves 4-10 pairs; cauline leaves 2-20 cm .....17. *agrimoniifolium*
          7. Perennial; basal leaves 1-2 pairs; cauline leaves 1-1.5 cm.....16. *rupicola*
    2. Basal leaves undivided
      8. Bracteoles present
        9. Plant eglandular
          10. Filaments with whitish-yellow hairs
            11. Basal leaves 20-90×4-30 cm; bracts with (1-) 2-11 flowers; calyx 2×2.5 mm; outside of corolla and capsule glabrous.....159. *calvum*
            11. Basal leaves 4-12×1.5-4 cm; bracts with one flower; calyx 5-8 mm; outside of corolla and capsule hairy ..... 70. *infidelium*

- 10. Filaments with purple-violet hairs
  - 12. Cauline leaves decurrent.....126. *V. sinuatum* var. *sinuatum*
  - 12. Cauline leaves not decurrent.....23. *V. sinuatum* var. *gaillardotii*
- 9. Plant glandular
  - 13. Lower bracts triangular-ovate, cordate; tube of corolla 4 mm; style 13 mm long .....24. *freynii*
  - 13. Lower bracts lanceolate; tube of corolla 1-2 mm; style 8-10 mm length
    - 14. Filaments with whitish-yellow hairy ..... 70. *infidelium*
    - 14. Filaments with purple-violet hairy ..... 25. *transcaucasicum*
- 8. Bracteoles absent
  - 15. Basal leaves glabrous
    - 16. Stem glabrous or sometimes strigose; filaments 1-3 mm, two anterior glabrous near apex; stigma spatulate. .... 6. *pyroliforme*
    - 16. Stem sparsely glandular; filaments 3-4 mm, woolly up to anthers, stigma capitate..... 7. *coronopifolium*
  - 15. Basal leaves hairy
    - 17. Basal leaves with stellate hairs
      - 18. Capsule 9-25 mm, oblong-cylindrical, usually glabrous sometimes glandular ..... 1. *natolicum*
      - 18. Capsule 3-8 mm, ovate-ellipsoid, stellate hairy
        - 19. Petiole of basal leaves 1-4 cm; upper cauline leaves cordate or ovate-cordate; upper bracts longer than pedicels or rarely subequal .....51. *pyramidatum*
        - 19. Petiole of basal leaves 3-15 cm; upper cauline leaves lanceolate-oblong; upper bracts shorter than pedicels ..... 22. *oreophilum*
    - 17. Basal leaves without stellate hairs
      - 20. Basal leaves flabellate or semicircular
        - 21. Basal and cauline leaves eglandular; lower bracts 1-3 cm length. ....4. *cilicium*
        - 21. Basal and cauline leaves glandular; lower bracts up to 0.2-1 cm length
          - 22. Cauline leaves entire; two anterior filament glabrous near apex, .....5. *trapifolium*
          - 22. Cauline leaves crenate; filaments hairy up to anthers .....11. *serpenticola*
  - 20. Basal leaves ovate, cordate, lanceolate, oblong, obovate, pinnatifid- pinnatisect
  - 23. Two anterior anthers decurrent
    - 24. Basal leaves glandular; corolla yellowish, bluish green, brownish purple, glandular outside
      - 25. Corolla bluish green or brownish purple.....19. *bugulifolium*
      - 25. Corolla yellow
        - 26. Pedicels 2-25 mm; bracts shorter than pedicels .....28. *blattaria*
        - 26. Pedicels 3-8 mm; bracts longer than pedicels .....29. *macrocarpum*
    - 24. Basal leaves eglandular; corolla yellow, purplish near tube, glabrous or articulate hairy outside
      - 27. Petiole of basal leaves 3-7.5 cm; corolla glabrous outside; two anterior filament glabrous near apex .....20. *ponticum*
      - 27. Petiole of basal leaves 8-11 cm; corolla articulate hairy outside; filaments hairy right up to anthers.....21. *bornmuellerianum*
- 23. All anthers reniform
  - 28. Basal and cauline leaves glandular hairy
    - 29. Cauline leaves and lower bracts entire; two anterior filaments woolly up to anthers or glabrous near apex
      - 30. Filaments hairy up to anthers.....10. *bourgeauanum*

30. Two anterior filaments glabrous near apex ...55. *adenophorum*
29. Cauline leaves crenate, dentate; lower bracts dentate; two anterior filaments glabrous near apex
31. Lower bracts 5-8 mm; style 9-12 mm; stigma spatulate.....12.  
*sorgerae*
31. Lower bracts 15-20 mm; style 6-7 mm; stigma capitate .....14.  
*suworowianum*
28. Basal and cauline leaves eglandular
32. Basal leaves lanceolate-obovate, lanceolate-oblong, dentate or crenulate, pinnatisect; lobes of calyx oblong-spatulate, linear-oblong
33. Capsule globose, glandular hairy .....14. *suworowianum*
33. Capsule elliptic-ovate, stellate hairy..... 55. *adenophorum*
32. Basal leaves and lobes of calyx not as above
34. Basal and cauline leaves lanate; pedicels 4-6 mm; calyx glabrous; corolla pellucid-punctate outside; style 4-5 mm, stigma 2 mm, spatulate; capsule 2-3 mm .....9. *basivelatum*
34. Basal and cauline leaves puberulent or branched hairy; pedicels 10-30 mm; calyx hairy; corolla without pellucid-punctate, glabrous or sometimes sparsely glandular hairy outside; style 7-8 mm; stigma 0.5-1 mm, capitate; capsule 3-7 mm
35. Basal and cauline leaves branched hairy; calyx 3-4 mm .....2.  
*spodiotrichum*
35. Basal and cauline leaves puberulent; calyx 2-5 mm .....8.  
*serratifolium*

**1- *Verbascum natolicum* (Fisch. and C.A. Mey.) Hub.-Mor., *Bauhinia* 5(1): 14 (1973).**

=*Stauropragma natolicum* Fisch. and C.A. Mey., **Ind. Sem. Horti Petrop. 9: 90 (1843) incl. var. *davisanum* Hub.-Mor., *Bauhinia* 1(1): 63 (1955).**  
**Type: Described from Anatolia (LE).**

Biennial, 50-115 cm, much branched. Stem thick, terete, with stellate and stalked glandular, soon glabrescent. Basal leaves 8-22.5×0.4-2.5 cm, oblong-lanceolate, cuneate, entire, acute. Lower cauline leaves 1-6×0.5-1 cm, oblong, linear-lanceolate, lanceolate, entire, acute-acuminate. Upper cauline leaves 0.5-3×0.3-1 cm, triangular-ovate, subcordate, entire, acuminate. Inflorescence raceme, panicle. Lower bracts 4-7×2-3 mm, triangular-ovate, cordate, entire, acuminate. Upper bracts 3-4×1-2 mm, ovate-linear, entire, acuminate. Pedicels 1-8 mm, ebracteolate. Calyx 2-6 mm, divided to ¾ into lobes linear, linear-lanceolate, acute. Corolla 25-40 mm diam, yellow, lobes 8-10 mm, glabrous outside, tube 2 mm length. Stamens usually 4, 6-8 mm, rarely with an antherless 5<sup>th</sup> staminode. Filaments 5-6 mm, usually purple-violet sometimes mixed white and purple-violet, two anterior glabrous near apex. Anthers 1-2 mm, reniform. Ovary 4-7×1-3 mm, oblong-cylindrical. Style 7-10 mm, filiform. Stigma 1-2 mm, capitate. Capsule 9-25×3-5 mm, oblong-cylindrical, usually glabrous, sometimes sparsely stalked glandular.

Fl: 5-7, Fr: 6-7

**Habitat:** Limestone rocks and scree, volcanic slopes, steppe, stony slopes, rocky place, 600-1900 m.

**Examined specimens**

**A8 Erzurum:** Erzurum-Tortum 44. km, 1900 m, 12.06.2001, *FAK* 3088 (GAZI, HUB, ANK, BRNO); Oltu-Olur, Co<sup>o</sup>kunlar village, 1045 m, 11.07.2002, N 40° 45 38', E 42° 10 44', *FAK* 3360 (GAZI, ISTE, Hb. YILDIRIMLI); Erzurum-Tortum, 40. km, 1900 m, 12.06.2001, *FAK* 3088 (GAZI, EGE, G).

**A9 Kars:** Kağızman-Todan (Esenkır), 1410 m, 10.06.2001, *FAK* 3076 (GAZI); Göle-<sup>a</sup>enkaya, 19. km, 1360 m, 19.08.2005, *FAK* 3486 (GAZI); Erzurum-Artvin 110. km, 600 m, 11.06.2001, *FAK* 3087 (GAZI).

**B5 Kayseri:** Talas, 1230-1270 m, Balansa, *ibid. Hub.-Mor.* 10611 (E photo); Pazarören-Tomarza 15. km, 1330 m, 10.06.1987, *Nydegger* 19256 (GAZI); Korumaz mountain, Küçükbüyüküz village, 1300-1350 m, 03.06.2001, *MEU* 1632 (GAZI); Pınarbaşı-Malatya 68. km, 1700 m, 03.06.2001, N 38° 46 44', E 36° 58 13' *FAK* 3008 (GAZI); *ibid.* 11.07.2001, *FAK* 3114 (GAZI); *ibid.* 15.07.2002, *FAK* 3377 (GAZI); Pınarbaşı-Sarız 7. km, 1580 m, 24.06.2002, *M. Sağıroğlu* 2090 (GAZI); Kırşehir: Çiçekdağı, Küçüktefleğ-Çepni, 850 m, 19.05.1995, *FAK* 2177 (GAZI); Yozgat: Şefaati, Karanlık stream, 900 m, 14.05.2002, N 39° 32 06', E 34° 43 24', *FAK* 3164 (GAZI); Mustatbeydağ, 940 m, 01.07.2002, *Ü. Budak* 1149 (GAZI); <sup>a</sup>efaati, 1000 m, 09.05.2002, *Ü. Budak* 708 (GAZI); Çatalarca, 04.05.2002, *Ü. Budak* 960, (GAZI); Nevşehir: Avanos, Paşalı village, 1200 m, 03.06.2004, *B. ahin* 2093 (GAZI).

**B6 Sivas:** 35 km W. of Gürün, 1700 m, 1960, *Stainton and Heanderson* 5694 (E photo); Gürün-Pınarbaşı, in gorge on E. side pass, 18.vi.1954, *Davis* 21987 (ANK); Gürün-Malatya, 68. km, 1669 m, 15.07.2002, N 38° 49' 54", E 37° 13' 12", *FAK* 3377 (GAZI); Maraş: Binboğa mountain N. of Göksun ravine above Yalak, 1500 m. *Davis* 19952, (ISTE); ibid. 24.07.1952, *Davis* 19935, *Dodds and Çetik* (E photo).

**Distribution:** Azerbaijan. Irano-Turanian element.

This species is given as endemic in the Flora of Turkey. Also, it is named as *Staurophragma natolicum* in the Flora of USSR. *S. natolicum* is placed that as synonym of *V. natolicum* in the Flora of Turkey. So it's not endemic.

Some of the specimens of this species collected from Yozgat (*FAK* 3164 and *H.Duman*) have 5 stamens, the 5 th stamens is a staminode.

2- *Verbascum spodiroticum* (Hub.-Mor.) Hub.-Mor., *Bauhinia* 5(1): 15 (1973).  
= *Celsia spodiroticha* Hub.-Mor., *Bauhinia* 1(1): 62, t. 19 (1955).

**Type:** C3 Antalya: Kalkfelsen am Strand in der Bucht von Çıralı, 26.05.1950, *Hub.-Mor.* 9581 (holo G: Hb. Hub.-Mor. photo!).

Perennial, 20-55 cm, woody at base, with long branched eglandular and shorter glandular hairs. Basal leaves 1-7×1-5 cm, oblong, ovate, entire, cordate, crenate-bicrenate, obtuse, upper surface dense grey, lower surface branched hairs, white pannose; with petiole 1-3 cm. Stem cylindrical, simple or sparingly branched. Lower cauline leaves 1-3.5×0.5-3 cm, oblong, ovate, entire-cordate, crenate, obtuse, with petiole 0.5-1.5 cm. Upper cauline leaves 5-7×1-3 mm, lanceolate, entire, acute; without petiole. Inflorescence raceme, panicle. Lower bracts 2-3×1-2 mm, lanceolate, entire, acute. Upper bracts 1-2×0.5-1 mm, linear-lanceolate, entire, acute. Pedicels 10-18 mm, ebracteolate. Calyx 3-4 mm, almost divided to the base, lobes lanceolate. Corolla 10-20 mm diam, yellow, with central violet patch, lobes 4-5 mm, glabrous outside, sometimes few glandular, tube 1 mm length. Stamens 4, 4-5 mm. Filaments 3-4 mm, purple-violet woolly, two anterior glabrous near apex. Anthers 1 mm, reniform. Ovary 0.5×1 mm, globose. Style 8 mm, filiform. Stigma 0.5-1 mm, capitate. Capsule 3-5×4-5 mm, globose, sometimes glabrous.

Fl: 5-6, Fr: 6-7

**Habitat:** Limestone rocky and ruins, under *P. brutia* forest, s.l.-400 m.

#### Examined specimens

**C3 antalya:** Tekirova, 27.08.1993, *H. Duman* 5391 (GAZI, E photo); ibid 31.05.1950, *M. Heilbronn and A. Attila* 2522 (ISTF); Kemer, Faselis bay, 0-150 m, 23.06.1978, *H. Pe'men* 3145 (GAZI); ibid. *H. Pe'men* 4020, *B. Yıldız and Ş. Kalın* (HUB); Kesmeboğaz, Tehneli, 400 m, 29.08.1980, , *H. Pe'men* 4906 (ANK, HUB, ISTE); c. 50 m, 9.vi.19777, *Y. Akman* 7186 (ANK); 50 m, 18.05.1999, N 36° 44' 22", E 30° 32' 29", *FAK* 2681 (GAZI, BRNO); ibid. 0-200 m, 05.07.2002, N 38° 56' 22", E 39° 45' 29" *FAK* 3318 (GAZI, ISTE, Hb. YIDIRIMLI); ibid. 19.07.2002, *FAK* 3390 (GAZI, EGE); Çıralı, 26.05.1950, *M. Heilbronn and A. Attila* 2433 (ISTF).

All collections are come from Antalya province. It has narrow distribution. But, the populations are good conditions in this area. It is closed to *V. arcturus*, separated from it with entire basal leaves (not lyrate) and two anthers reniform shape (not decurrent).

**Distribution:** Endemic, E. Mediterranean element.

3- *Verbascum orientale* (L.) All., *Fl. Pedem* 1: 106 (1785).

Annual, 15-130 cm, glandular-puberulent below, puberulent to glabrescent above. Basal leaves with 4-6 pairs, 2-6×1.5-2.5 cm, oblong-obovate, pinnatifid-pinnatisect, lobes 3-5, 1-2×0.5-0.9 cm, linear-oblong, entire, acute; with petiole 1.5-2.5 cm. Stem terete, slender, sometimes branched. Cauline leaves with 1-2 pairs, 1-4×1-2 cm, similar to basal leaves, pinnatisect, lobes 5-20×3-10 mm, linear-oblong, entire, acute. Inflorescence raceme, panicle. Lower bracts 5-20×3-10 mm, pinnatisect, linear-lanceolate, lobes 2-3×1-2 mm, linear, entire, acute. Upper bracts 5-7×2-3 mm, linear-lanceolate, entire, acute. Pedicels 1-23 mm, ebracteolate. Calyx 5-7 mm, almost divided to the base, lobes lanceolate-narrowly oblong, acute. Corolla 16-20 mm diam, golden yellow, lobes 7-10 mm, glabrous outside, with a few brownish spots, sometimes absent, tube 1 mm length. Stamens 4, 4-6 mm. Filaments 3-4 mm, with whitish-yellow woolly right up to anthers. Anthers 1-2 mm, reniform. Ovary 1-15×6-14 mm, ovoid. Style 3-4 mm, filiform. Stigma 1 mm, capitate. Capsule 4-8×3-6 mm, globose-ovoid, glabrous.

Fl: 4-6, Fr: 5-7

**Habitat:** Steppe, macchie, limestone stony slopes, oak forest, *Paliurus* sp. shrub, *Pinus* sp. forest., fallow fields, vineyards, s.l.- 1400 m.

1. Lower bracts pinnatisect, uppers entire, linear-lanceolate; pedicels 1-5 mm.....  
.....subsp. *orientale*

1. Lower and upper bracts linear-lanceolate; pedicels 8-23 mm.... subsp. *brachysepalum*

subsp. *orientale*

=*Celsia orientalis* L., Sp. Pl. 621 (1753).

=*Verbascum elegans* Salisb., Prodr. 105 (1796).

**Type:** Described from Cappadocia, *Tournefort*. (Hb. Linn. 774/1 photo!)

#### Examined specimens

**A2 Bursa:** Uludağ, İnkaya-Yığıtali, 14.05.1955, *M. Heilbronn* 2178 (ISTF); Emirsultan-Işıklar, 23.05.1954, *M. Heilbronn* 2180 (ISTF); Kocaeli: Gebze, Ballıkayalar, Tavşanlı, 90 m, 22.05.2004, *G. Akaydın* 8927 (GAZI).

**A3 Bilecik:** 2 km S. of Bilecik, 1966. *Davis* 42080 (E photo).

**A4 Ankara:** Keçiören-Hacıkadın, c. 900-950 m, 29.05.1956, *B. Tutel* and *B. Tozun* 56/153 (ISTF); ibid. *Atay* 170 (ISTF); Çubuk pass, 22.05.1950, *M. Heilbronn* and *Atilla* 2220 (ISTF); Incesu, 27.05.1933, *W. Kotte* 1077/1211 (ANK).

**A5 Amasya:** 100-600 m. *Bornm.* 1889:593, Boğazköy-Duruca, 523 m, 28.05.1993, *M. Vural* (GAZI); Boğazköy-Merkepcikışlacığı, 520 m, 25.07.1977, *K. Alpınar* 37010 (ISTE); Yeşilırmak-Tersakan, 390 m, 05.05.2002, *F. Celep* 1001 (GAZI).

**A7 Sivas:** 58. km of <sup>a</sup>ebinkarahisar 1936, *Wellman* and *Westover* 2488, Trabzon: 30.v.1933, *Balls* and *Gourlay* 320 (ANK).

**B4 Ankara:** Polatlı-Duatepe, 840 m, 23.05.2004, *S. Karaman* 1496 (GAZI).

**B5 Yozgat:** Şefaati, Karanlıkdere, Çatallar, 930 m, 18.05.2002, *Ü. Budak* 543. (GAZI); ibid. 05.05.2002, *Ü. Budak* 334, ibid., 14.06.2002, *Ü. Budak* 919 (GAZI).

**B6 Kahramanmaraş:** Süleymanlı-Berit mountain, 1500-2800 m, 20.05.1978, *B.Yıldız* 1958 (HUB).

**B7 Erzincan:** Kemaliye, Bağıştaş, Derindere, 500 m, 08.05.1951, *A. Atilla* (ISTF); Malatya: Pötürge, Çengelli village, c. 900 m, 29.v.1982, *Y. Altan* 2387 (GAZI).

**B8 Erzurum:** Oltu-Olur, Yeşilbağlar village, 1045 m, 11.07.2002, N 40° 45 38', E 42° 10 44', *FAK* 3360 (GAZI).

**B9 Van:** Özalp, Eğribelen-Oymaklı, Topatepe, 2100 m, 25.06.1996, *F* 1794 (VANF).

**C3 Antalya:** Antalya-Bucak 33 km, Yeşilbayır (Pınarbaşı), 350 m, 16.04.2002, N 37° 07 27', E 30° 34 37', *FAK* 3151 (GAZI, EGE, BRNO, ANK); Kırkgözler, 200 m, 17.04.2002, N 37° 06 76', E 30° 34 92', *FAK* 3155 (GAZI, Hb YILDIRIMLI); ibid. 23.05.2002, *FAK* 3197 (GAZI); Hafızpaşa-Bucak 5 km, 775 m, 23.05.2002, *FAK* 3201 (GAZI, ISTE, G), Burdur: Burdur-Antalya, Hafızpaşa, 22.05.1950, *M. Heilbronn* and *A. Atilla* 2215 (ISTF); Yeni yörük village, 06.06.1950, *A. Atilla* and *Hub-Mor.* 2190 (ISTF).

**C4 Konya:** Bucakkışla, Dedetepe, c. 56 m, 29.v.1979, *M. Vural* 1830 (ANK).

**C5 Mersin:** Tarsus-Namrun (Çamlıyayla) 35. km, 870 m, 21.05.2002, N 37° 05 95', E 34° 43 73', *FAK* 3184 (GAZI); Niğde: Ulukışla-Pozantı 5. km, 1300 m, 01.06.2002, N 37° 31 86', E 34° 33 18', *FAK* 3260 (GAZI); Ulukışla-Pozantı 30. km, 1300 m, 17.06.2003, *FAK* 3422 (GAZI).

**C6 Hatay:** Keldağ, 1185 m, 19.05.2002, *FAK* 3165 (GAZI); Antakya-Yayladağı, 3-5 km W of Kışlak, 890 m, 26.04.1986, *M. Nydegger* 41448 (ISTE); Iskenderun, Askarbeyli, c. 80 m, 30.04.1952, *H. Demiriz* 901 (ISTF); Iskenderun-Antakya, 150 m, 25.04.1957, *Davis* 27140 and *Hedge* (E photo); Samandağ, 100 m, 08.05.1965, *Coode* and *Jones* 636 B (E photo); Adana: Kozan-Feke 35. km, Akkaya village, 850 m, 20.05.2002, *FAK* 3175 (GAZI); Nurdag above Kizildere, 100 m, 17.iv.1957, *Davis* (26747) and *Hedge* (ANK); Karsantı, Akören, Değirmencik, c. 980 m, 25.v.1973, *E. Yurdakulol* 1320 (ANK, E photo).

**Distribution:** Balkans, Crimea, Syria, Lebanon, Palaestina, Iraq, Iran, E. Mediterranean element.  
subsp. *brachysepalum* (Fisch. and Trautv.) Karavel. and Aytaç comb. et. stat. nov.

=*Celsia brachysepala* Fisch. and Trautv., Ind. Sem. Horti Petrop. 4: 33 (1837) (G photo).

=*Verbascum brachysepalum* (Fisch. and Trautv.) Kuntze, Rev. Gen. Pl. 2: 469 (1891).

**Type:** Described from Anatolia (LE).

#### Examined specimens:

**B2 Denizli:** Çivril, Aktaş-Ahırlı valley, ca. 1150 m, 07.06.1983, *Y. Gemici* 2143 (EGE).

**C3 Konya:** Beyşehir-Üzümlü, Kurucuova, 1150-1200 m, 25.05.2001, *H Duman* 8558 (GAZI); Isparta: Sütçüler, Ayvalı-Darıbükü, 850-1100m, 06.06.1975, *H. Pe'men* 2131 and *A. Güner* (HUB).

**C4 Konya:** 54. km from Bozkır to Hadım, 1200 m, 1948, *Hub-Mor.* 8033, 9580 (E photo); Karaman: Ayrancı,

Kayaönü village, 1600-1650 m, 01.06.2002, *FAK* 3258 (GAZI, HUB, ISTE, EGE); *ibid*, *FAK* 3424. (GAZI, ANK, G); Karapınar, Yağlıbayat village, Koçulutepe, 1400 m, 12.06.1982, *Hüseyin Dural*, 907 (KNYA), Karapınar, Göçü village, Hodulbaba, 1350 m, 26.06.1983, *Hüseyin Dural* 1470 (KNYA); Büyükçataltepe, 1650, 22.06.1981, *Hayrettin Ocakverdi* 1320 (KNYA).

**C5 İçel:** Tarsus-Namrun (Çamlıyayla) 35. km, 870 m, 21.05.2002, N 37° 05 95', E 34° 43 73', *FAK* 3185 (GAZI, BRNO, Hb. YILDIRIMLI); Fındıkpınarı, c. 1250 m, 28.05.1951, *H. Demiriz* 2449 (ISTF); Pozantı-Gülek pass, c. 1000-1300 m, 14.06.1991, *Y. Gemici* 6257 (EGE); Niğde: Niğde-Çamardı, Narpiz gorge, 1900 m, 15.06.1990, *M. Nydegger* 45732 (GAZI, HUB); Adana: Tekir-Gülek, 1340 m, 25.06.1993, *Z. Aytac* 5907 (GAZI).

**Distribution:** Endemic, E. Mediterranean element.

In Flora of Turkey, these two species were separated from each other as follows;

1. Pedicel thickness, equal or shorter than capsule ..... *V. orientale*
1. Pedicel weak, 2-3 times longer than capsule.....  
.....*V. brachysepalum*

Also, these two taxa have some differences in their description in the Flora of Turkey. These are, lower bract pinnatisect, upper bracts linear and corolla with brown spots inside in *V. orientale*. All bracts oblong-linear, linear; corolla without spots inside in *V. brachysepalum*.

As a result of the field studies and investigations on herbaria materials, it seen that, the using ‘‘corolla having brown spots inside’’ is not a good character. The specimen of *V. orientale* (*FAK* 3260) collected from Erzurum had no brown spots and the specimen of *V. brachysepalum*, collected from Mersin (*FAK* 3185) had a few obscure brown spots inside of corolla.

The pedicels are 1.5-5 mm long, and lower bracts are pinnatisect; in *V. orientale*, pedicels are 8-20 mm and all bracts oblong-linear to linear in *V. brachysepalum*. Only upper bracts are linear in *V. orientale*. They were evaluated as subspecies each other.

**4- *Verbascum cilicium* (Boiss. and Heldr.) Kuntze, Rev. Gen. Pl. 2: 469 (1891). =*Celsia cilicica* (Boiss. and Heldr.) Boiss., Diagn. Ser. 1(12): 30 (1853) (G-photo!). Type: C5 Niğde: in saxosis Tauri cilici ad radices montis Bulghurdagh (Bolkar Da.), prope Tchiftehan (Çiftehan), 27.09.1845, Heldr. 1260 (holo G photo!).**

Biennial, 40-110 cm, with numerous stalked glands throughout and less numerous longer articulate, eglandular hairs below. Basal leaves 2-17×6-8 cm, flabellate, semicircular, subcordate, crenate-dentate, acute-acuminate. Stem branched from base. Cauline leaves 2-3.5×1.5-1 mm, ovate-lanceolate, semiamplexicaul, dentate, acute. Inflorescence panicle. Lower bracts 1-3×1.5-2.5 cm, cordate-triangular, amplexicaul, dentate, acute. Upper bracts 5-7×5.5-6 mm, ovate, semiamplexicaul, entire-dentate, acute-acuminate. Pedicels 10-25 mm, ebracteolate. Calyx 2-3 mm, almost divided to the base, lobes ovate, ovate-lanceolate, entire, acute. Corolla 15-20 mm diam, yellow, lobes 5-7 mm, sparsely glandular outside, tube 1 mm length. Stamens 4, 6-9 mm. Filaments 5-7 mm, with whitish-yellow and purplish violet woolly, two anterior glabrous near apex. Anthers 1-2 mm, reniform. Ovary 1-2×0.5-1 mm. Style 7-8 mm, filiform. Stigma 0.5-1 mm, capitate. Capsule 3.5-5×3-4 mm, globose.

Fl: 5-9, Fr: 8-9

**Habitat:** Rocky places, limestone stony slopes, volcanic and serpentine rocks, 830-1550 m.

**Examined specimens:**

**C5 Niğde:** Ulukışla-Çiftehan, 1050 m, 25.08.1993, *M. Vural* 6221 (GAZI, ANK); Ulukışla, Bulgar mountain, Alihoca, c. 1200-1300 m, 03.09.1949, *Davis* 16525 (ANK); 5 km nördlich Çiftehan, 900-920, 29.05.1956, *Hub.-Mor.* 13487 (E photo); At the foot of Aladağ, *G.V.D. Findlay* 67 (E photo); Pozantı-Ulukışla 20. km, 1000 m, 24.06.1993, *Z. Aytac* 5865 (HUB); Ulukışla-Pozantı 19. km, 1070 m, 01.06.2002, N 37° 31 86', E 34° 33 18', *FAK* 3262 (GAZI, G, Hb. YILDIRIMLI); Pozantı-Ulukışla 10. km., 1000-1100 m, 17.06.2003, *FAK* 3420 (GAZI); 30. km, 1000-1100, 17.06.2003, *FAK* 3421 (GAZI); Pozantı-Gülek pass 25. km, 830 m, 01.06.2002, *FAK* 3263 (GAZI, ISTE, G); Pozantı, *Siehe* 1896:389, *ibid. T. Baytop* 25987 (ISTE); Konya: Ereğli, Aydos mountain, Delimahmutlu-Karsantı, 1550 m, 14.07.1977, *S. Erik* 2572a. (HUB).

**Distribution:** Endemic, Irano-Turanian element.

It is closed to *V. trapifolium*, but it can be separate from it by orbicular leaves with long petioles. Otherwise lower bracts cordate-triangular not lanceolate.

**5- *Verbascum trapifolium* (Stapf) Hub.-Mor., Bauhinia 5(1): 16 (1973).**

Perennial or biennial, 20-100 cm, with numerous glandular and few or numerous eglandular, papillose hairs. Basal leaves 1.5-16×1-6 cm, flabellate, semicircular,



subcordate, crenate-dentate, acute-acuminate. Stem cylindrical, sometimes branched at base. Cauline leaves 3-5×1-3 mm, lanceolate, entire, acute. Inflorescence raceme, panicle. Lower bracts 2-4×1-3 mm, lanceolate, entire, dentate, acute. Upper bracts 1-2×0.5-1 mm, lanceolate, entire, acute. Pedicels 20-35 mm, ebracteolate. Calyx 2-5 mm, almost divided to the base, lobes lanceolate, acute. Corolla 10-25 mm diam, yellow, sometimes with few brown spots in center, lobes 5-7 mm, sparsely glandular outside, tube 1 mm length. Stamens 4, 6-9 mm. Filaments 5-7 mm, white-lanate intermixed with purple-violet hair, two anterior glabrous near apex. Anthers 1-2 mm, reniform. Ovary 1-2×0.5-1 mm, ovoid. Style 7-9 mm, filiform. Stigma 0.5-1 mm, capitate. Capsule 6-7×2-3 mm, ovoid.

Fl: 5-7, Fr: 6-7

**Habitat:** Pebble places, sandy places, serpentine rocks, Oak scrub, *Pinus* sp. forest, 900-1500 m.

1. Plant long eglandular and papillose; corolla with few brown spots in cent.

.....var. *trapifolium*

1. Plant stalked glandular and eglandular; corolla without brown spots in cent

.....var. *flabellifolium*

var. *trapifolium* stat. nov.

=*Celsia trapifolia* Stapf in Denkschr. Akad. Wiss. Wien, Math.-Nat. Kl. 50(2): 88 (1885). (G photo!).

**Type:** C2 Muğla Caria: In monte Nif Dağı N. of Fethiye, 6.vi.1881, *Luschan* (holo WU).

**Examined specimens:**

**C2 Burdur:** Dirmil-Göhlhisar 3,5 km, 1250 m, 07.06.1996, *N. Özhatay et al.* 72241 (GAZI); Göhlhisar-Dirmil 10 km., 1070-1200 m, 12.07.1993, *H. Duman* 5091 (GAZI); 3 km, 1300 m, 08.07.1997, *L. Bekad* (EGE); Yeşilova, 1150 m, 06.07.1993 *L. Bekad* 3090, ibid. 01.07.1980, *E. Leblebici, L. Bekad* 3540 (EGE); Çavdır-Tefenni 21 km, 1100 m, 19.05.1999, N 37° 09 17', E 29° 41 13', *FAK* 2875 (GAZI); 18 km, 1100 m, 29.05.2002, N 37° 09 15', E 29° 41 11', *FAK* 3240, ibid. 05.07.2002, *FAK* 3321 (GAZI, ANK, HUB); Göhlhisar-Dirmil 4,5 km, 900-950 m, 30.05.2002, N 37° 05 95', E 29° 31 88', *FAK* 3241 (GAZI, G); Tefenni, 2-3 km nördlich Dirmil, 1200 m, 17.06.1948, *Hub.-Mor.* 8070 (E photo); Muğla: Köyceğiz, Sandras mountain, Beşparmak forest, c. 1400-1500 m, *K. Karamanoğlu-Davis* 13598 (ANK); Muğla: Sandras mountain above Ağla, 1400-1500 m. 25.07.1947, *Davis* 13598 (E photo); ibid. 30.05.2006, 2020 m, *FAK* 3512 (GAZI).

**Distribution:** Endemic, E. Mediterranean element.

var. *flabellifolium* (Hub.-Mor.) Karavel. and Aytaç, com. et stat. nov.

=*Celsia flabellifolia* Hub.-Mor., *Bauhinia* 2 (3): 303, t. 9 (1965).

=*Verbascum flabellifolium* (Hub.-Mor.) Hub.-Mor. *Bauhinia* 5(1): 12 (1973).

**Type:** C2 Burdur: d. Yeşilova, Eichenmacchie am Südufer des Salda Gölü, 1170 m, 30.06.1964. *Hub.-Mor.* 16920 (holo G: Hb. Hub.-Mor. photo!).

**Examined specimens:**

**C2 Burdur:** Dirmil-Fethiye, 18.06.1981, 1650 m, *M. Nydegger* (GAZI, HUB, E photo); ibid. 05.07.2002, *FAK* 3328 (GAZI); ibid. 1100 m, 05.07.2002, *FAK* 3330 (GAZI, ANK, HUB, EGE); Yeşilova, Salda Gölü, 900 m, 19.07.1994, *FAK* 2808 (GAZI); ibid. 1180 m, 01.07.1981, *E. Leblebici, L. Bekad* (EGE); ibid. 975 m, 29.05.2002, N 37° 30 80', E 29° 42 71', *FAK* 3238 (GAZI); ibid. 05.07.2002, *FAK* 3322 (GAZI, G).

**Distribution:** Endemic, E. Mediterranean element.

According to the Flora of Turkey, these two species are separated from each other as follows;

1. Basal leaves eglandular, densely papillose  
.....*V. trapifolium*

1. Basal leaves short glandular and long eglandular  
.....*V. flabellifolium*

Also, there are some differences in the description of the two species in the Flora of Turkey. These are: Biennial, basal leaves 4-5×5-7 cm, glandular and eglandular, calyx 5 mm in *V. flabellifolium*; perennial, basal leaves 1.5-3.5×2-5 cm, eglandular, densely papillose, calyx 2-3 mm in *V. trapifolium*.

It is observed, as a result of the field studies and investigated specimens that other differences were not stable characters. For instance, biennial specimens of *V. trapifolium* were observed during field studies. In the Flora of Turkey, the height of *V. flabellifolium* was reported as c. 1 m, but we did not find any specimen which has 1 m length during the field studies and among the investigated specimens. Specimens that were collected were about 70 cm tall at most. Some specimens of *V. trapifolium*, also 65 cm tall. When the basal leaves 4-7×1-6 cm in *V. flabellifolium*, 2-16×1-6 cm in *V. trapifolium*. It is natural that specimens collected during the field studies differ from the specimens stated in the Flora of Turkey. The description of *V. flabellifolium* is based on only from the specimen collected from type

locality. Also the description of *V. trapifolium* is based on three different localities now. These two taxa were obviously different from each other with hairs type. *V. flabellifolium* is glandular hairs *V. trapifolium* is eglandular and densely papillose. So they are considered as varieties each others.

**6- *Verbascum pyroliforme* (Boiss. and Heldr.) Kuntze, Rev. Gen. Pl. 2: 469 (1891).**

Perennial. 10-80 cm, glabrous or sometimes sparsely strigose. Basal leaves 4-17×0.5-3 cm, oblong, oblong-linear, linear-spatulate, cuneate, entire, acute, glaucous, fleshy, or bright green not fleshy. Stem sometimes much branched from base, cylindrical sometimes angular. Cauline leaves 2.5-8×0.5-1 cm, lanceolate, cuneate, entire, acute. Inflorescence raceme, panicle, with 5-100 flowers. Lower bracts 3-6×2-3 mm, ovate, ovate-lanceolate, lanceolate, entire, acute-acuminate. Upper bracts 1-3×0.5-1.5 mm, lanceolate, entire, acute. Pedicels 10-20 mm, ebracteolate, glabrous, sometimes sparsely strigose. Calyx 2-3 mm, almost divided to the base, lobes ovate-lanceolate, lanceolate, acute. Corolla 10-20 mm diam, yellow, lobes 4-8 mm, gland-dotted outside, often with red spot in cent, tube 0.5 mm length. Stamens 4, 2-5 mm. Filaments 1-3 mm, whitish woolly up to anthers or two anterior glabrous near apex. Anthers 1-2 mm, reniform. Ovary 1-2×0.5-1 mm, ovoid. Style 3-4 mm, filiform. Stigma 1-2 mm, spatulate. Capsule 3-5×2-4 mm, ovoid.

Fl: 6-9, Fr: 7-9

**Habitat:** Salty marshes, wet places by lakes and streams, 950-1170 m.

1. Basal leaves glaucous; with 5-25 flowers; pedicels strigose .....subsp. *pyroliforme*
1. Basal leaves bright green; with 30-100 flowers; pedicels glabrous. subsp. *dudleyanum*

subsp. *pyroliforme* stat. nov.  
= *Celsia pyroliformis* (Boiss. and Heldr.) Boiss.,  
Diagn. Ser. 1(12): 28 (1853).

**Type:** C4 Konya: In salsis hyeme inundatis planitie  
Koniah ad radices montis Karadag 19.6.1845, *Heldreich*  
(holo G photo!).

**Examined specimens:**

**B4 Konya:** Konya-Kayaçık, 06.09.1947, *Davis* 13598, ibid.  
*Davis* 14726 (ISTE, E photo); 18 km S. of Konya, 1000 m,  
1965, *Ledigman, Ekim and Yurdakulol* 4357 (E photo);

Tuz Gölü, Amarat, 960 m, 28.v.1997, *M. Aydoğdu* 3850  
(ANK); Dondurma village, c. 900 m, 01.08.1952, *H. Birant*  
and *B. Kasaplıgil* 750 (ANK); Cihanbeyli, Bolluk Gölü,  
1010 m, 04.08.1860, *Khan, Prance and Ratiliffe* 443  
(ANK); ibid. 04.08.2003, *FAK* 3359 (GAZI); Ereğli,  
28.06.1968, *Y. Akman and T. Ekim* 7 (ANK); Niğde:  
Sultanhamı, Eşmekaya, 950 m, 22.09.1993, *M. Vural*  
(GAZI); ibid. 22.09.2003, *FAK* 3380 (GAZI, ANK, HUB);  
Aksaray: Gölyazı-Eskil, 900 m, 10.11.1993, *N. Adıgüzel*  
1412 and *H. Duman* (GAZI).

**Distribution:** Endemic, Irano-Turanian element.

subsp. *dudleyanum* (Hub.-Mor.) Karavel. and Aytaç  
com. et stat. nov.

= *Celsia dudleyana* Hub.-Mor., *Bauhinia* 2(2): 302  
(1965).

= *Verbascum dudleyanum* (Hub.-Mor.) Hub.-Mor.,  
*Bauhinia* 5(1): 12 (1973).

**Type:** C2 Burdur: S shore of Salda G., 1170 m, 30.06.1964,  
*Hub.-Mor.* 16919 (holo G: Hb. Hub.-Mor. photo!).

**Examined specimens:**

**C2 Burdur:** S. shore of Salda, 1150 m, 11.07.1993,  
*H. Duman* 5073 (GAZI, G, BRNO); ibid. 22.08.1993,  
*H. Duman* 5271 (GAZI); ibid. 18.07.1994, *FAK* 2027,  
ibid. 05.07.2002, *FAK* 3323 (GAZI, ANK, HUB, EGE);  
ibid. 29.06.2005, N 37° 30' 70" E 29° 41' 75", *MUÖ* 1900  
(GAZI).

**Distribution:** Endemic, Irano-Turanian element.

1. Plant halophytic; inflorescence with 5-25 flowers;  
corolla 10-12 mm diam.....  
.....*V. pyroliforme*
1. Plant hydrophytic; inflorescence with 30-100 flowers;  
corolla 15-18 mm diam.....  
.....*V. dudleyanum*

These 2 species are separated from each other as by  
given characters in the Flora of Turkey. But it is seen that,  
the characters given in the key are not enough to separate  
them.

Only growing habitats are different, when *V. dudleyanum*  
is grown in river banks, *V. pyroliforme* is  
growing salty meadow.

Specimens of *V. dudleyanum* collected from wet  
places of Salda lake and streams in Burdur, were 20-80 cm;  
corolla is 14-20 mm diam. The height of specimens of  
*V. pyroliforme* is 10-60 cm and corolla is 10-17 mm diam.

Although, not stated in the Flora of Turkey, the 2 species can be separated by their pedicel hairs. In addition to this difference, the features such as the leaves being dark green and succulent or not and the difference in the number of flowers, as in the Flora of Turkey, are used to distinguish the taxa each other.

- 7- *Verbascum coronopifolium* (Boiss. and Balansa) Kuntze, Rev. Gen. Pl. 2: 269 (1891).  
=*Celsia coronopifolia* Boiss. and Balansa, Boiss, Diagn. Ser. 2(6): 126 (1859).  
Lectotype: B2 Kütahya: Murat mountain, above Gediz, Kesik Söğüt, 1700-1900 m, 21.06.2002, FAK 3388 (GAZI)

Perennial, 30-55 cm, woody at base, with shortly stalked glands, glabrous below. Basal leaves 3-6×0.3-0.5 cm, spatulate-linear, cuneate, incised-dentate, acute. Stem cylindrical, fragile, branched at the base. Cauline leaves 3-5×1-2 mm, linear-lanceolate, entire, acute. Inflorescence raceme, panicle, with 20-50 flowers. Lower bracts 2-3×1-1.5 mm, linear-lanceolate, entire, acute. Upper bracts 1-2×0.5-1 mm, linear, entire, acute. Pedicels 10-23 mm, ebracteolate. Calyx 2-3 mm, almost divided to the base, lobes oblong, oblong-lanceolate, acute. Corolla 10-17 mm diam, yellow, lobes 5-7 mm, sparsely glandular or glabrous outside, tube 1 mm length. Stamens 4, 4-6 mm. Filaments 3-4 mm, with purple-violet, sometimes whitish yellow woolly up to anthers. Anthers 1-2 mm, reniform. Ovary 1-2×0.5-1 mm, ovoid. Style 5 mm, filiform. Stigma 1 mm, capitate. Capsule 5-7×3-4 mm, ovoid.

Fl: 6-7, Fr: 7

**Habitat:** *Juniperus* sp. scrub, rocky mountain slopes, 1380-2100 m.

**Examined specimens:**

**B2 Kütahya:** Murat mountain, above Gediz, Kesik Söğüt, 1700-1900 m, 21.06.1996, *M. Ekici* 1895 (GAZI); ibid. Oktay plateau, 1450, 17.05.1978, *A. Baytop* 39382 (ISTE); ibid. Belova-Yeşilsöğüt 5. km, 1835 m, 18.07.2002, N 39° 39' 15", E 30° 16' 22", FAK 3388 (GAZI, ANK, HUB, EGE, BRNO); Uşak: Murat mountain, Çamsu, 1380, 25.05.1992, *M. Nydegger* 46077 (GAZI).

The type specimen is not suitable for type, the leaves, flowers etc. out of specimen, so that new type is chosen.

**Distribution:** Endemic, Irano-Turanian element.

- 8- *Verbascum serratifolium* (Hub.-Mor.) Hub.-Mor., *Bauhinia* 5(1): 15 (1973).  
=*Celsia serratifolia* Hub.-Mor., *Bauhinia* 1 (1): 78, t. 34 (1955).  
Type: B3 Eskişehir: Eskişehir-Kütahya, Wegrund 25 km südwestlich Eskişehir 950 m, 13.06.1954, Hub.-Mor. 12297 (holo G! Hb. Hub.-Mor. iso ISTF!)

Perennial, 50-150 cm, densely pubescent, puberulent or glabrous below, with short stalked glands sometimes completely puberulent above. Basal leaves 6-20×0.2-2 cm, linear-lanceolate, spatulate-linear, cuneate, incised-dentate to irregularly serrate, acute. Stem sometimes much branched at the base. Cauline leaves 2-3×0.1-0.2 cm, linear-lanceolate, entire, acute. Inflorescence raceme, panicle. Lower bracts 4-5×0.5-1 mm, linear lanceolate, entire, acute. Upper bracts 2-3×0.5-1 mm, linear-lanceolate, entire, acute. Pedicels 15-30 mm, ebracteolate. Calyx 2-5 mm, divided to 4/3 into, lobes oblong spatulate, obtuse. Corolla 18-30 mm diam, yellow, lobes 3-7 mm, glabrous outside, tube 1 mm length. Stamens 4, 4-8 mm. Filaments 3-6 mm, hairy whitish-yellow below, purplish above, sometimes intermixed, two anterior glabrous near apex. Anthers 1-2 mm, reniform. Ovary 0.5-1 mm, broadly ovoid. Style 7-8 mm, filiform. Stigma 0.5 mm, capitate. Capsule 6-7×4-5 mm, ovoid.

Fl: 5-6, Fr: 6-7

**Habitat:** *Pinus* sp. forest, oak scrub, phrygana, road side, stream sandy place, serpentine rocks, 250-1000 m.

**Examined specimens:**

**B2 Bursa:** Harmancık-Orhaneli, W. of Harmancık, 650 m, 01.06.1989, *M. Nydegger* 44025 (HUB,GAZI); ibid. 792 m, 28.06.2006, FAK 3558 (GAZI).

**B3 Eskişehir:** Sarıcakaya, valley of Sakarya, Gökçekaya dam, 450-500 m, 08.05.1994, *T. Ekim* 9402 (GAZI); Sarıcakaya-Nallıhan, 250 m, 28.05.1999, *M. Vural* 8183 (GAZI); Porsuk dam, 35. km, 1000 m, 23.06.1993, *Z. Aytaç* 6206 (GAZI); Sündiken mountain, Ilıca, 06.06.1976, *T. Ekim* 2651 (ANK); Çanakkıran, 902 m, 18.07.2002, N 39° 44' 48", E 30° 26' 37", FAK 3383. (GAZI); ibid. 968 m, 18.07.2002, N 39° 39' 15", E 30° 16' 22", FAK 3384 (GAZI, BRNO, HUB); Kuluali stream, 350 m, 18.v.1971, *T. Ekim* 823 (ANK); Eskişehir-Kütahya 2. km, 850 m, 26.05.2001, FAK 3001, ibid. 18.07.2002, FAK 3382 (GAZI, HUB, EGE); 11. km, 850 m, 26.05.2001, FAK 3002 (GAZI, Hb. YILDIRIMLI).

**B4 Ankara:** Elmadağ, Hisarköy, *Kılınç* 153 (ANK); ibid. 01.06.2001, 897 m, N 39° 49 20', E 33° 18 06', *FAK* 3006 (GAZI); ibid. 10.07.2001, *FAK* 3111 (GAZI).

**Distribution:** Endemic, Irano-Turanian element.

**9- *Verbascum basivelatum* Hub.-Mor., *Bauhinia* 6(3): 371 (1979).**

**Type: B3 Eskişehir: Türkmen Dağı, Porsuk barajı, 900 m, T. Ekim 2071 (holo G: Hb. Hub.-Mor.! iso ANK!).**

Perennial, 100-150 cm, densely lanate below, glabrous or sparsely glandular above. Basal leaves 10-25×1.5-5 cm, many, congested at base, lanceolate, cuneate, crenate-denticulate. Stem cylindrical, robust, sometimes much branched at the base. Cauline leaves 5-6×2-3 mm, sparsely leafy, oblong-lanceolate, entire, acute. Inflorescence lax panicle, slender. Lower bracts 1-2×0.5-1 mm, ovate-lanceolate, entire, acute. Upper bracts 0.3-0.5×0.2-0.3 mm, ovate-lanceolate, entire, acute. Pedicels 4-6 mm, ebracteolate. Calyx 2-3 mm, almost divided to the base, lobes linear-lanceolate, acute. Corolla 7-10 mm diam, yellow, lobes 3-5 mm, densely pellucid-punctate outside, tube 1 mm length. Stamens 4, 3-5 mm. Filaments 2-3 mm, whitish, two anterior glabrous near apex. Anthers 1-2 mm, reniform. Ovary 0.5-1×0.4-0.7 mm, ovoid. Style 4-5 mm, filiform. Stigma 2 mm, spatulate. Capsule 2-3×1.5-2.5 mm, ovoid.

Fl: 6, Fr: 6-7

**Habitat:** Serpentine rocks, 500-1100 m.

**Examined specimens:**

**A2(A) Bursa:** Uludağ, Soğukpınar, 1100 m, 05.07.1993, *M. Nydegger* 15135 (GAZI, HUB); Bursa-Keles, 37 km W. of Keles, 500 m, 08.07.1982, *M. Nydegger* 17028 (GAZI, HUB); 792 m, 28.06.2006, *FAK* 3557 (GAZI).

**B2 Bursa:** Harmancık-Orhaneli, 4. km, 770 m, 05.08.1993, *M. Nydegger* 18639 (GAZI, HUB).

**B3 Eskişehir:** Porsuk dam, Türkmen Dağı, 930 m, 23.07.1993, *Z. Aytaç* 6620 (GAZI, HUB); ibid. c. 850 m, 17.06.1979, *T. Ekim* 2071 (ANK), Çanakıran, 18.07.2002, 902 m, N 39° 44 48', E 30° 26 37', *FAK* 3385 (GAZI, G, BRNO, ANK, EGE).

**Distribution:** Endemic, Irano-Turanian element.

**10- *Verbascum bourgeauanum* Hub.-Mor., *Bauhinia* 5(1): 11 (1973).**

=*Celsia lycia* Boiss., *Fl. Or.* 4:357 (1879) (G photo!).

=*Verbascum lycium* (Boiss.) Kuntze, *Rev. Gen. Pl.* 2: 469 (1891), non Stapf (1885).

**Lectotype: (ined. Karavel.) C2 Antalya: Elmalı, Akdağ, Kızlarsivrisi, 2000-2300 m, 02.08.2002, FAK 3438.**

Perennial, 15-20 cm, with pellucid, shortly stalked glands and branched hairs. Basal leaves 2-5×0.3-0.9 cm, oblong-linear, cuneate, irregularly crenate, obtuse. Stem cylindrical, fragile, branched at the base. Cauline leaves 1-2×0.5-1 mm, lanceolate, cuneate, entire, acute. Inflorescence raceme, panicle, with 6-12 flowers. Lower bracts 1-1.5×0.4-0.9 mm, oblong-linear, slightly cuneate, entire, acute. Upper bracts 0.5-1×0.3-0.7 mm, lanceolate, slightly cuneate, entire, acute. Pedicels 2-13 mm, ebracteolate. Calyx 2-3 mm, almost divided to the base, lobes oblong-spatulate, acute. Corolla 10-15 mm diam, yellow, lobes 4-7 mm, glandular outside, tube 1 mm length. Stamens 4, 4-8 mm. Filaments 3-6 mm, whitish-yellow up to anthers. Anthers 1-2 mm, reniform. Ovary 1-2×0.5-1 mm, ovoid. Style 6-7 mm, filiform. Stigma 1 mm, capitate. Capsule 3-5×2-3 mm, ovoid.

Fl: 7, Fr: 7-8

**Habitat:** Steppe, limestone rocks, 2000-2800 m.

**Examined specimens:**

**C2 Antalya:** Elmalı, Akdağ, Kızlarsivrisi, 2000-2300 m, 02.08.1995, *H. Duman* 5984 (GAZI); ibid. 2000-2500 m, 19.7.2003, *FAK* 3429, ibid. 20.08.2003, *FAK* 3438 (GAZI, G, ANK); Beydağı, 2400-2800 m, 11.07.1992, *Y. Gemici and G. Görk* 7150 (EGE).

**Distribution:** Endemic, E. Mediterranean element.

It is related to *V. coronopifolium* and *V. serratifolium*, but it is distinguished from them with entire cauline leaves and bracts, not crenate, dentate or serrate. Also these species are growing Central Anatolia (Kütahya and Eskişehir provinces) *V. bourgeauanum* is growing south part of Anatolia (Antalya province).

The type specimen of this species is not ideal, the leaves, bracts etc. not suitable, so new type has been chosen.

**11- *Verbascum serpenticola* Hub.-Mor., *Bauhinia* 5(1): 15 (1973).**

=*Celsia serpentinica* Hub.-Mor., *Candollea* 12: 216, f. 14 (1949). (G photo!), non *V. serpenticum* Rech. fil. (1957).

**Type: C2 Burdur: Serpentschutt auf dem Pass 6 km südlich ob Altinyayla, 1600 m, 28.06.1948, Renz and Hub.-Mor. 8249 (holo G: Hb. Hub.-Mor. photo!, iso Hb. Basler Bot. Ges.).**

Perennial, 15-45 cm, with pellucid glands, shorter and longer glandular. Basal leaves 2-12×1-3 cm, flabellate, semicircular, subcordate, irregularly crenate-dentate. Stem cylindrical, sometimes branched at base. Cauline leaves 1-7×0.5-2 mm, ovate-lanceolate, crenate, acute. Inflorescence raceme, panicle, with 20-50 flowers. Lower bracts 2-10×0.6-1.5 mm, lanceolate, entire, slightly crenate, acute-acuminate. Upper bracts 1-4×0.5-1 mm, lanceolate, entire, acute. Pedicels 10-23 mm, ebracteolate. Calyx 2-5 mm, almost divided to the base, lobes lanceolate, acute. Corolla 10-17 mm diam, yellow, lobes 5-8 mm, sparsely glandular outside, tube 1 mm length. Stamens 4, 6-8 mm. Filaments 5-6 mm, lower part whitish-yellow, upper part purple-violet, woolly up to anthers. Anthers 1-2 mm, reniform. Ovary 1-2×0.5-1 mm, ovoid. Style 7-9 mm, filiform. Stigma 1-2 mm, capitate. Capsule 5-9×2-4 mm, ovoid.

Fl: 5-6, Fr: 6-7

**Habitat:** Serpentine rocks, 1450-1650 m.

**Examined specimens:**

**C2 Burdur:** Dirmil, Dirmil passage, 1450-1650 m, 12.07.1993, *H. Duman* 5102, ibid. 03.06.1997, *FAK* 2461, ibid. 30.05.2002, *FAK* 3247, ibid. 05.07.2002, *FAK* 3320 (GAZI, ANK, HUB, ISTE, G, BRNO, EGE).

**Distribution:** Endemic, East Mediterranean element.

It is closed to *V. bourgeauamum*, but, filaments with whitish-yellow and violet woolly up to anthers not completely whitish-yellow hairs up to anthers. *V. bourgeauamum* is growing about 2300 m altitude, *V. serpenticola* is growing 1600 m altitude. Otherwise it is closeted to *V. sorgerae* but, basal leaves flabellate to subcordate not ovate, cordate.

**12- *Verbascum sorgerae* (Hub.-Mor.) Hub.-Mor., Bauhinia 5(1): 12 (1973).**

=*Celsia sorgerae* Hub.-Mor., *Bauhinia* 3(2): 324 (1967) (G photo!).

**Type: C3 Isparta: d. ³arkikaraağaç, Çiçekdağı (Anamas) Bergsteppe, 1700 m, 17.06.1966, Sorger 66-50-26 (holo Hb. Sorger, Wien, G photo!).**

Biennial, 30-50 cm, with pellucid glands, shorter and longer glandular. Basal leaves 1.5-8×1-4 cm, oblong-broadly ovate, cuneate-semicordate, irregular crenate-dentate; with petiole 1-5 cm. Stem cylindrical, sometimes branched at base. Cauline leaves 2-7.5×1-3 cm, oblong-lanceolate, slightly cuneate-semicordate, crenate-dentate, acute; with petiole 1-2 cm. Inflorescence raceme, panicle. Lower bracts 5-8×3-6 mm, cordate to ovate, dentate, acute. Upper bracts 2-5×1-2 mm, lanceolate-linear, denticulate or entire, acute. Pedicels 10-20 mm, ebracteolate. Calyx 3-6 mm, divided  $\frac{3}{4}$  into oblong-lanceolate, acute lobes. Corolla 10-17 mm diam, yellow, lobes 5-6 mm, sparsely glandular outside, tube 1 mm length. Stamens 4, 4-6 mm. Filaments 3-4 mm, with whitish-yellow and violet woolly, two anterior glabrous near apex. Anthers 1-2 mm, reniform. Ovary 1-2×0.5-0.7 mm, ovoid. Style 9-12 mm, filiform. Stigma 2 mm, spatulate. Capsule 4-7×3-6 mm, ovoid.

Fl: 5-6, Fr: 6-7

**Habitat:** Rocky place, *Juniperus* sp. and *Cedrus* sp. forest, 1350-1800 m.

**Examined specimens:**

**C3 Isparta:** Çiçekdağı, Gedikli village, Sindeli, 31.05.2002, 1350 m, N 37° 52' 90", E 31° 17' 69" *FAK* 3253, ibid. 04.07.2002, *FAK* 3316 (GAZI, ANK, HUB, EGE, G, BRNO, ISTE, Hb. YILDIRIMLI).

It is related to *V. serpenticola*, but distinguished from it by ovate oblong-broadly ovate leaves. It is one of the narrowly endemic species. It is not collected different another locality yet.

**Distribution:** Endemic, E. Mediterranean element.

**13- *Verbascum nudicaule* (Wydler) Takht., Fl. Erevana ed. 2, 234 (1972).**

=*Scrophularia nudicaulis* Wydler, *Mém. Soc. Phys. Hist Nat. Genève* 4: 68 (1828).

=*Celsia nudicaulis* (Wydler) B.Fedtsch., *Fl. URSS* 22: 172 (1955).

=*Celsia persica* C.A.Mey., *Verz. Pfl. Cauc.* 111 (1831).

=*Verbascum persicum* (C.A.Mey.) Kuntze, *Rev. Gen. Pl.* 2: 466 (1891) non *Bornm.* (1907).

=*Verbascum brevicaulis* Freyn, *Bull. Herb. Boiss.* 2 (1): 276 (1901).

**Type: Iran, in monte Elwind (Alvand) Asiae minoris, 1822, Olivier (holo G: DC photo!).**

Perennial or biennial, 15-70 cm, puberulent below, shortly glandular and eglandular above. Basal leaves with 3-4 pairs, 1-11×2-5 cm, lanceolate-oblong, pinnatifid-pinnatisect, cuneate, lobes 1-1.5×0.5-0.8 cm, lanceolate, entire, acute. Stem cylindrical, sometimes branched at the base. Cauline leaves with 1-2 pairs, 0.6-2×0.2-1 cm, lower cauline leaves similar to basal leaves, upper lanceolate, cuneate, serrate-entire, acute. Inflorescence raceme, panicle, with 30-50 flowers. Lower bracts 6-20×1-2 mm, pinnatifid-lanceolate, lobes 2-3×1-2 mm, linear, entire, acute. Upper bracts 3-7×1-2 mm, linear-lanceolate, entire, acute. Pedicels 10-26 mm, ebracteolate. Calyx 2.5-5 mm, almost divided to the base, lobes lanceolate-narrowly oblong, acute. Corolla 15-20 mm diam, yellow, lobes 7-10 mm, glabrous outside, tube 2 mm length. Stamens 4, rarely with an anther 5th staminode, 4-7 mm. Filaments 3-5 mm, with whitish-yellow and violet woolly, two anterior glabrous near apex. Anthers 1-2 mm, reniform. Ovary 1-2×0.5-1 mm, pyriform-ovoid. Style 7-10 mm, filiform. Stigma 1-2 mm, capitate. Capsule 4-7×3-5 mm, pyriform-ovoid, sparsely glandular or glabrous.

Fl: 6-7, Fr: 7

**Habitat:** Steppe, serpentine rocks, dry slopes, 1650-2400 m.

#### Examined specimens

**B9-B10 Van:** Erek mountain, Gemi° Gölü, 2200 m, 20.09.1974, *A. and T. Baytop* 31038 (ISTE); Toprakkale, 1700-1800 m, 08.06.2001, *FAK* 3046 (GAZI, HUB, ANK, EGE, ISTE); Van: 12. km from Özalp to Van, 2130 m, 05.06.1966 *Davis* 44349 (E photo); Hoşap-Gürpınar, 2000 m, 06.06.2001, N 38° 20' 87", E 43° 41' 46", *FAK* 3035 (GAZI); Güzelsu-Ba°kale, 82. km, 2150 m, 12.06.2002, N 38° 15' 98", E 43° 52' 11", *FAK* 3405 (GAZI); Özalp, Damlacık village, Ziyarettepe, 2300 m, *Davis* 44376 (ANK); ibid. 14.06.1996, *F562* (VANF); Van-Özalp 46. km, 1950-2000 m, 17.07.2001, *FAK* 3128, ibid. 13.07.2002, N 38° 39' 46", E 43° 51' 15", *FAK* 3372 (GAZI, G, BRNO, Hb. YILDIRMLI).

Closed to *V. suworowianum*, but differs from it by pinnatifid basal leaves and ovoid to obovoid capsule.

**Distribution:** Iran, Irano-Turanian element

**14- *Verbascum suworowianum* (K. Koch) Kuntze., Rev. Gen. Pl. 2: 469 (1891).**

Biennial, 25-75 cm, glandular pubescent above, eglandular, papillose below. Basal leaves 2-13×1-3 cm, lanceolate-obovate, cuneate, dentate or pinnatisect, acute.

Stem cylindrical, sometimes branched at base. Cauline leaves 3-7×1-1.5 cm, lanceolate, cuneate, dentate, acute. Inflorescence raceme, panicle. Lower bracts 15-20×5-7 mm, ovate-lanceolate, semicordate, dentate, acute. Upper bracts 0.5-1×0.2-0.5 mm, ovate-lanceolate, lanceolate, semicordate, dentate, acute. Pedicels 15-20 mm, ebracteolate. Calyx 2.5-5 mm, almost divided to the base, lobes oblong-spatulate, acute. Corolla 16-20 mm diam, yellow, lobes 3-5 mm, glabrous or sometimes sparsely glandular outside, tube 1 mm length. Stamens 4, 4-6 mm. Filaments 3-4 mm, with whitish-yellow and violet woolly, two anterior glabrous near apex. Anthers 1-2 mm, reniform. Ovary 2-3×1.5-2 mm, globose. Style 6-7 mm, filiform. Stigma 1 mm, capitate. Capsule 5-6×4.5-5.5 mm, globose, sparsely glandular or glabrous.

1. Basal leaves dentate lobed to pinnatisect ..... var. *suworowianum*
1. Basal leaves undivided, dentate..... var. *papillosum*

Fl: 5-7, Fr: 7-8

**Habitat:** Steppe, pebbly place, volcanic tuff, 820-2000 m.

var. *suworowianum*

=*Celsia suworowiana* K.Koch, Linnaea 17: 284 (1845).

=*Celsia collina* Benth, DC, Prodr. 10: 247 (1846).

=*Celsia suworowiana* K.Koch var. *typica* Murb., Monogr. Celsia 119 (1925).

Type: A9/10 Kars: in Kars, *K.Koch* (holo B, iso G photo!).

#### Examined specimens

**A9 Kars:** Kağızman-Iğdır, 26 km W. of Tuzluca, 1080 m, 03.07.1992. *M. Nydegger* 46579 (GAZI); Kilise, 1300 m, 30.07.1980, *A. Güner* 1270 (HUB); Tuzluca-Kağızman, 15. km, 1000 m, 10.06.2001, N 40° 06' 62", E 43° 34' 96", *FAK* 3070 (GAZI, G, BRNO, HUB); Kağızman-Erzurum, 14. km, 1300 m, 10.06.2001, *FAK* 3075 (GAZI); ibid. 16. km, 12.06.2002, *FAK* 3274 (GAZI, ANK, EGE); ibid. 12.07.2002, N 40° 06' 01", E 42° 58' 48", *FAK* 3362 (GAZI, Hb. YILDIRMLI, ISTE).

**B9 Kars:** Iğdır-Doğubeyazıt, 8 km S. of Iğdır, 950 m, 07.07.88, *M. Nydegger* 43610 (GAZI); Van: Muradiye, Pirre°it mountain, 2000 m, 30.06.1998, *MÜ* 3363 (VANF); Bitlis: Tatvan-Bitlis, 2 km N. of Bitlis, 1540 m, 18.07.1983, *Nydegger* 18306 (GAZI).

**Distribution:** Iran, Irano-Turanian element.

var. *papillosum* (Murb.) Hub.-Mor., Rev. Gen. Pl. 2: 469 (1891).

=*Celsia suworowiana* K.Koch var. *papillosea* Murb., Monogr. Celsia 120 (1925).

Type: Transcaucasica, prope Karakala, 24.07.1919, *Grossheim* (holo LD, G- photo!).

**Examined specimens**

**B10 Ağrı:** d. Doğubeyazıt, Topçatan village, 09.06.2001, 1550 m, N 39° 35' 35", E 44° 10' 91", *FAK* 3058 (GAZI, G, BRNO, HUB); *ibid.* 19.07.2001, *FAK* 3132 (GAZI, ANK, EGE); *ibid.* 12.07.2002, N 39° 35' 10", E 44° 10' 53", *FAK* 3368 (GAZI, Hb. YILDIRIMLI, ISTE); *ibid.* 02.08.2002, *FAK* 3392 (GAZI).

These two varieties are growing same area, the basal leaves very important for separation. Otherwise stem hairiness is not good characters, to given in Flora of Turkey, because two of them have glandular and aglandular hairs.

Two varieties (var. *acuminatum* and var. *pseudopersicum*) belonging to this taxon which spread out Iran could not been found. For not being a mistake after investigate all varieties there may be change at taxonomic status of this species

*V. suworowianum* is related to *V. nudicaule*, it can be separate from it by subglobose capsule (not ovoid or obovoid) and undivided to dentate basal leaves.

**Distribution:** Iran, Irano-Turanian element.

**15- *Verbascum luciliae* (Boiss.) Kuntze, Rev. Gen. Pl. 2: 469 (1891).**

=*Celsia luciliae* Boiss., *Diagn. Ser.* 1(4): 65 (1844).

**Type: C2 Denizli: in fissuris rupium ad colles circa Geyre, cariae, Aprodissiae veterum 6.1842, Boiss. (holo G photo!).**

Perennial, 20-60 cm, numerous eglandular below, puberulent and sparsely glandular hairs above. Basal leaves with 2-5 pairs, 6-8×2-3 cm, oblong-lanceolate, lyrate-pinnatifid, lobes 1.5-2×0.6-0.7 cm, oblong-lanceolate, cuneate, acute; with petiole 1-1.5 cm. Stem cylindrical, sometimes branched at base. Cauline leaves with 2-3 pairs, 4-6×1.5-2 cm, oblong-lanceolate, lyrate, pinnatifid, lobes 1-1.5×0.5-0.6 cm, oblong-lanceolate, lanceolate, cuneate, acute. Inflorescence raceme, panicle. Lower bracts 3-5×1-1.5 mm, lanceolate-linear, entire, acute. Upper bracts 1-2×0.5-1 mm, linear, entire, acute. Pedicels 7-15 mm, ebracteolate. Calyx 2.5-3.5 mm, almost divided to the base, lobes oblong-lanceolate, acute. Corolla 13-20 mm

diam, yellow, lobes 5-7 mm, sparsely glandular outside, tube 1 mm length. Stamens 4, 7-9 mm. Filaments 6-7 mm, whitish yellow woolly, two anterior glabrous near apex. Anthers 1-2 mm, reniform. Ovary 1-2×0.5-1 mm, globose. Style 4-5 mm, filiform. Stigma 1 mm, capitate. Capsule 3.5-4×2.5-3.5 mm, globose.

Fl: 6-7, Fr: 7-9

**Habitat:** Rock crevices, volcanic slopes, 250-1050 m.

**Examined specimens**

**B2 Manisa:** 26 km N. of Salihli to Borlu, 250 m, 23.07.1954, *Hub.-Mor.* 12296 (E photo); 250 m, *H. Demiriz* 2041 (ISTF); Kiçir to Hisarköy 900 m, 1965, *Coode* and *Jones* 2743 (E photo); Kütahya: Simav, Akdağ, 03.08.1993, *Gemici et al.* (8179) (EGE); U<sup>ak</sup>: E<sup>me</sup>, Gümü<sup>kol</sup>, Edertepe, 900-1050 m, 20.07.2002, N 38° 27' 52", E 29° 10' 56", *H. Duman* 7178 (GAZI, G, ANK, HUB, ISTE, BRNO).

**C2 Muğla:** Kavaklıdere, Çamlıyurt village, 715 m, 14.10.2000, *Ö.Varol* 3543 (GAZI).

**Distribution:** Endemic, E. Mediterranean element.

It is known by two locations (Manisa and Kütahya) before. Also new collection comes from Muğla province, where too distant for this species, now it has wide distribution.

The habitus shape is similar to *V. rupicola*, but filaments with whitish yellow wool, not purple-violet wool. When the basal leaves 2-5 pairs of oblong lateral lobes in *V. luciliae*, 1-2 pairs of ovate lateral lobes in *V. rupicola*.

**16- *Verbascum rupicola* (Hayek and Siehe) Hub.-Mor., Bauhinia 5(1): 14 (1974).**

=*Celsia rupicola* Hayek and Siehe, *Ann. Naturh. Mus. Wien* 28: 175, t. 14 f. 1 (1914).

**Type: C4 Konya: An Felsen im Lycaonischen Taurus (steile Felsen bei Kora°, 2000 m, 06.1912, Siehe 547 (holo GB!, iso W).**

Perennial, 15-35 cm, with articulate eglandular and less numerous shorter glandular hairs throughout. Basal leaves with 1-2 pairs, 3-8×2-2.5 cm, ovate, lobes much small, ovate, slightly crenate, acute terminal lobe longer than others, 1-3×0.7-2.5 cm, oblong-ovate, ovate, crenate, semicordate, acute. Stem cylindrical, sometimes branched at base. Cauline leaves 1-1.5×0.5-1 cm, lanceolate, crenate, cuneate, acute; sometimes with petiole 1-3 cm. Inflorescence raceme, panicle, with 20-50 flowers. Lower bracts 1-2×0.5-1.5 mm, ovate, entire or dentate, acute.

Upper bracts 3-5×2-3 mm, ovate-lanceolate, entire, acute. Pedicels 10-15 mm, ebracteolate. Calyx 2-3 mm, almost divided to the base, lobes ovate-oblong. Corolla 12-16 mm diam, yellow, lobes 5-6 mm, glabrous or sometimes sparsely glandular outside, tube 1 mm length. Stamens 4, 4-6 mm. Filaments 3-4 mm, whitish yellow and purplish-violet woolly, two anterior glabrous near apex. Anthers 1-2 mm, reniform. Ovary 1-2×0.5-1 mm, globose. Style 7 mm, filiform. Stigma 1 mm, spatulate. Capsule 3-4×3-3.5 mm, globose.

Fl: 4-5, Fr: 6-7

**Habitat:** Rocks, 100-2000 m.

**Examined specimens:**

**C1 Izmir:** Gümüldür, 100-200 m, 26.06.2003, S. *enol* 3025 (EGE, GAZI).

**Distribution:** Endemic, E. Mediterranean element.

*Verbascum rupicola* it is known only type gathering and never collected again some area, so placed in "Data Deficient-DD" in the Red Data Book (Ekim *et al.* 2000). As a result of the investigation of a doubtfully collected specimen of *Verbascum*, is collected by *Serdar enol* (Ege University) from Izmir, Gümüldür, 100-200 m, is considered to be *V. rupicola* when compared with the type specimens of *V. rupicola*. It's really strange that the species known from 2000 m. according to Flora of Turkey new records was collected from 100-200 m. altitude. In fact that, there is no locality with 2000 m. high in that region mentioned in Flora of Turkey, we believe that the places that *Siehe* visited might be a label mistake. It is classified as "Critically Endangered-CR" at the IUCN list.

**17- *Verbascum agrimoniifolium* (K.Koch) Hub.-Mor. in Bauhinia 5:151 (1975)**

**subsp. *agrimoniifolium***

=*Celsia agrimoniifolia* K.Koch, *Linnaea* 22: 732 (1843).

=*Celsia heterophylla* Desf., *Pers. Syn. Pl.* 2: 161 (1807).

=*Verbascum heterophyllum* (Desf.) Kuntze, *Rev. Gen. Pl.* 2: 469 (1891), non Miller (1760), nec Moretti (1822), nec Velen. (1888), nec Griseb. (1841).

**Type:** Erzurum: *Tournefort* (holo P, iso P-Tourn. 760, photo!).

Biennial, 30-140 cm, pellucid, stalk glandular-pubescent below, glabrous above. Basal leaves with 4-10 pairs, 5-35 cm, oblong lanceolate, terminal lobe longer

than others, pinnatisect, lobes 2-10×1-4 cm, lanceolate, serrate-dentate, cuneate, acute. Stem cylindrical, branched at base. Cauline leaves with 3-4 pairs, 2-20 cm, oblong, pinnatisect, lobes 1-8×0.5-4 cm, lanceolate, serrate, dentate or entire, acute. Inflorescence raceme, panicle. Lower bracts 10-15×3-8 mm, cordate, crenate or entire, acuminate. Upper bracts 6-8×2-5 mm, triangular ovate, auriculate, entire, acuminate. Pedicels 10-20 mm, ebracteolate. Calyx 2.5-3.5 mm, almost divided to the base, lobes oblong-lanceolate, acute. Corolla 10-15 mm diam, yellow, lobes 3-5 mm, glabrous outside, tube 1 mm length. Stamen 4, 5-7 mm. Filaments 4-5 mm, whitish-yellow, two anterior glabrous near apex. Anthers 1-2 mm, reniform. Ovary 0.5-1×0.5-1 mm, globose. Style 7 mm, filiform. Stigma 2 mm, spatulate. Capsule 3-6×2.5-5.5 mm, globose.

Fl: 6-7, Fr: 7-8

**Habitat:** Riversides, wet places, gravel terrace, 500-1710 m.

**Examined specimens**

**B6 Malatya:** Malatya-Pütürge 17. km, 990 m, 03.06.2001, N 38° 18 49', E 38° 29 67', *FAK* 3012 (GAZI, HUB, ANK); ibid. 12.07.2001, *FAK* 3115 (GAZI, G, ISTE).

**B7 Elazığ:** Elazığ-Pertek, Murat bridge, 500 m, 21.07.1973, *P. Hanel and T. Kesercioğlu* (EGE).

**B8 Erzurum:** Hınıs, Çatak village, 1640 m, 04.08.1996, *A. Dönmez* 3150 (GAZI).

**B9 Bitlis:** Tatvan-Bitlis, 2 km N. of Bitlis, 1540 m, 18.07.1983. *M. Nydegger* 14725 (GAZI, E photo).

**C7 Diyarbakır:** Diyarbakır-Urfa 39. km, c. 1125 m, 20.06.1984, *T.Ekim* 4850 (ANK); Antep: Antep-Kilis 10. km, 850 m, 23.05.1999, *H. Akan* 2755 (GAZI); Adıyaman: Besni-Adıyaman 20. km, 30.05.1978, *A. Baytop and E. Tuzlacı* 40411 (ISTE).

**C9 Hakkari:** Hakkari-Ba<sup>q</sup>kale 28. km, 1300 m, 11.08.2005, *FAK* 3477 (GAZI); Şırnak: Şenoba-Hakkari, 72. km, 1100 m, 15.07.2001, N 37° 20 72', E 43° 14 52', *FAK* 3126 (GAZI); Uludere-Hakkari 7. km, 2000 m, 20.08.1983, *M. Nydegger* 74618 (ISTE); Zap george beneath Çukurca, 700-750 m, *Davis* 44826 (E photo).

**C10 Hakkari:** Bacırge 1966, *Davis* 45258 (E photo); Cilo mountain, Diz stream, 1710 m, 06.08.1954, *Davis and O. Polumin* 23929 (ANK); Çukurca, 1400 m, 05.06.2001, *FAK* 3031 (GAZI, BRNO, Hb.YILDIRIMLI).

**Distribution:** Afghanistan, Iran, Iraq, Irano-Turanian element.



*V. agrimonniifolium* subsp. *agrimoniifolium* is similar *V. coromandelianum* (Vahl) Hub.-Mor. which is common Asia (Afghanistan, India, Burma, China) in Flora of Turkey. *V. agrimonniifolium* subsp. *agrimoniifolium* has a morphologically similar to *V. luciliae* and *V. levanticum*.

**18- *Verbascum levanticum* I.K.Ferguson, Bot. J. Linn. Soc. 64(2): 230 (1971).**

=*Celsia horizontalis* auct. non Moench (1794).

=*Celsia glandulosa* Bouché, Verh. Ges. Nat. Fr. Berlin 1: 395 (1829).

=*Verbascum glandulosum* (Bouché) Kuntze, Rev. Gen. Pl. 2: 469 (1891). non Delile (1849).

**Type:** Cyprus: in rupibus montis Pentadactylos, 5.1880, Sintenis. and Rigo 144 (holo K., G- photo!).

Annual, biennial or perennial. 20-180 cm long, articulate eglandular below, short stalk glands above. Basal leaves with 2-4 pairs, 8-25×5-12 cm, oblong, lyrat-pinnatifid-pinnatisect, with large terminal lobe, 5-12×2-10 cm, lanceolate-ovate, cordate, crenate-bicrenate-serrate, acute. Laterale lobes 0.5-8×0.5-5 cm, lanceolate-ovate, serrate, acute; with petiole 1.5-7 cm. Stem cylindrical, simple or branched at base. Cauline leaves with 1-2 pairs, 3.5-10×1.5-6 cm, lanceolate-ovate, pinnatifid-pinnatisect, lobes 0.5-2×0.3-1 cm, lanceolate-ovate, crenate-bicrenate-serrate, acute; without petiole. Inflorescence raceme, panicle. Lower bracts 4-6×4-6 cm, pinnatifid-pinnatisect, lobes ovate, cordate, serrate, acute-acuminate. Upper bracts 0.5-1×0.4-1 cm, triangular-ovate, serrate, acuminate-cuspidat. Pedicels 15-40 mm, ebracteolate. Calyx 3-5 mm, almost divided to the base, lobes lanceolate-oblong-spatulate, entire, acute. Corolla 10-35 mm diam, golden yellow, lobes 0.7-1 cm, glandular outside, tube 1 mm length. Stamens 4, 8-10 mm. Filaments 2-6 mm, whitish-yellow and purple-violet. Anthers 2-4 mm, reniform, two anterior anthers decurrent on to filament. Ovary 2-3×3-4 mm, ovoid. Style 8-9 mm, filiform. Stigma 1 mm, capitate. Capsule 5-7×5-6 mm, glabose-ovoid, glabrous or sometimes glandular.

Fl: 2-6, Fr: 6-8

**Habitat:** Stony slope, rocky place, macchie, riversides, ruins, *P. brutia*-*C. libani* forest, road side, sl- 1300 m.

**Examined specimens:**

**C2 Antalya:** Konyaalti, 3-4 km W. of Antalya, sl. 1956, *Hub.-Mor.* 13485, 10 m, 17.04.2002, *FAK* 3158 (GAZI); Muğla: Köyceğiz, Beyobası village, 80 m, 21.04.1991, *A. Güner* 9005 (GAZI, HUB); Finike-Elmalı, Arif village,

Aykırı çayı, Aykırıcahve, 650-670 m, 24.05.2002, *FAK* 3206 (GAZI, ISTE); Finike-Kalkan, 15. km, 20 m, 24.05.2002, *FAK* 3207 (GAZI, ANK).

**C3 Antalya:** Akseki-Fersin village, Manıyat, 600 m, 29.03.1996, *A. Duran* 3353 (GAZI); Çakırlar, Hisarçandır, Karlık hill, 800-1300 m, 11.05.1978, *H. Peşmen* 3831 (HUB); Kepez, 200-250 m, 17.04.2002, N 36° 57' 43", E 30° 38' 31", *FAK* 3154 (GAZI); ibid. 23.05.2002, *FAK* 3195 (GAZI, BRNO, G).

**C4 Antalya:** Alanya, Derince stream, 800 m, 31.08.1993, *H. Duman* 5467 (GAZI); Alanya-Hacımehmetli village, 300 m, 10.02.1987, *H. Duman* 2420 (GAZI); Alanya, *Davis* 14489 (ANK); Kale, 300 m, 10.05.2003, *FAK* 3407 (GAZI); Demre, 20 m, 14.08.1993, *H. Duman* 5151 (GAZI).

**Distribution:** Cyprus, Lebanon, Palaestine, Portugal, Crete, E. Mediterranean element.

It is known from Antalya province, but it is common in others Mediterranean countries mentioned above.

It is similar to *V. arcturus* which is growing in Girit.

**19- *Verbascum bugulifolium* Lam., Encycl. 4: 226 (1797).**

=*Janthe bugulifolia* (Lam.) Griseb., Spic 2: 40 (1844).

=*Celsia bugulifolia* (Lam.) Jaub. and Spach, III Pl. Or. 5: 7, t. 407 (1853).

**Type:** A2 (A) Istanbul: nr. Riva, *Tournefort*. (holo P-Tourn. 756, photo!).

Perennial or biennial, 15-85 cm, with short glandular and eglandular hairs, soon glabrescent. Basal leaves 2.5-13×2-6 cm, oblong-ovate, ovate, triangular-ovate, cuneate-semicordate, entire-crenate, obtuse. Stem cylindrical, sometimes angular, sometimes branched at base. Cauline leaves 2-3×0.5-0.7 cm, lanceolate-linear, lanceolate, entire, acute. Inflorescence raceme. Lower bracts 14-30×1-3 mm, lanceolate-linear, lanceolate, slightly cuneate, entire, acute-acuminate. Upper bracts 7-20×0.5-0.7 mm, lanceolate-linear, slightly cuneate, entire, acute. Pedicels 2-4 mm, ebracteolate. Calyx 4-8 mm, almost divided to the base, with unequal lobes, acute. Corolla 20-35 mm diam, yellowish, bluish-green or brownish-purple, lobes 3-5 mm, upper with purplish lines, glandular outside, tube 2 mm length. Stamens 4, 6-12 mm. Filaments 4, 5-7 mm, with whitish yellow and purplish violet woolly. Anthers 1-5 mm, reniform, two anterior anthers decurrent on to filament. Ovary 1-2×0.5-1 mm, ellipsoid. Style 5-8 mm, filiform. Stigma 1-2 mm, capitate. Capsule 5-8×3-6 mm, elliptic.

Fl: 4-6, Fr: 5-6

**Habitat:** Longoz and Oak forest, macchie, meadows, bushy and waste places, 1-450 m.

**Examined specimens**

**A1 (E) Kırklareli:** Demirköy-İğneada, Avcılar, 20 m, 13.06.2003, N 41° 51' 99", E 27° 56' 33", *FAK* 3416 (GAZI); Demirköy-İğneada, Hamam Gölü, 40-50 m, 12.06.2003, N 41° 49' 54", E 27° 57' 52", *FAK* 3413 (GAZI, ANK, HUB, ISTE); Mert Gölü -Saka Gölü, 20-25 m, 11.06.2003, N 41° 50' 59", E 27° 58' 64", *FAK* 3411 (GAZI, BRNO, G); Tekirdağ: Çorlu-Çerkezköy 7. km, 21.05.1978, *N. and E. Özhatay* 39470 (ISTE).

**A2 (E) İstanbul:** Çatalca-Sarayolu, Gökçeali, 08.05.1975, *N. and E. Özhatay* 31640 (ISTE); Belgrad Forest, 07.05.1975, *N. and E. Özhatay* 31549 (ISTE); ibid. May.1981, *O. Polunin* 15900 (E photo); ibid. 20.05.1961, *F. Yaltırık* (E photo).

**A2(A) İstanbul:** Penpa<sup>a</sup>köy, Ömerli dam, 250-300 m, 15.04.2001, *G. Ertürk* (GAZI); Boğaziçi, *H. Dingler* (ANK), Beykoz, 19.05.1942, *A. Mete* (ISTF); Beykoz, Anadoluhisarı, *A. Heilbronn and M. Ba<sup>a</sup>aran* 1937 (ISTF); Üsküdar, Anadoluhisarı-Ümraniye 2. km, 07.05.1967, *H. Demiriz* (ISTF); Halkalı, c. 20 m, 09.05.1962, *B. Tutel* 62/47 (ISTF); Küçük Bakkalköy-Kayışdağ, Kuraktepe, 12.05.1963, *B. Tutel* 63/37 (ISTF); Kartal cevizi, 28.04.1968, *A. Çırpıcı* (ISTF); Eyup, Sultançiftlik-Habibler 2. km, Mahmutbey, 30.04.1970, *H. Demiriz, A. Çırpıcı and E. Özhatay* (ISTF); Ta<sup>a</sup>delen forest, c. 300 m, 05.05.1962, *B. Tutel* 62/28 (ISTF); Bakırköy, Halkalı, 20 m, 22.05.1969, *B. Tutel* 69/25 (ISTF); Pendik, Kurtköy, Çataldağ, 30.04.1995, *A.J. Bayfield* 2146 (ISTE) Bursa: Armutlu-Kaplıca, 25.04.1964, *Betül Tutel* 64/30 (ISTF); Kocaeli: Gebze, Ballıkayalar, Arendere, 80 m, 24.04.2004, *G. Akaydin* 8450 (GAZI).

**A3 Adapazarı:** Hendek-Paşa village, 50 m, 19.vi.1981, *M. Aydoğdu* 702 (ANK).

**Distribution:** Bulgaria, Euro-Siberian element

It was collected by Tournefort in Riva from İstanbul in 1701 and described as a new species by Lamarck in 1797.

It was indicated that, no close any taxon in Flora of Turkey. But as a result of a field studies understand that, it is closed to *V. bornmuellerianum* and *V. ponticum* with decurrent anterior anthers.

**20- *Verbascum ponticum* (Boiss.) Kuntze, Rev. Gen. Pl. 2: 469 (1891). =*Celsia pontica* Boiss., Tchihat., Asie Min. Bot. 3(2): 11 (1860).**

**Type: A6 Samsun: Ponto, inter pagos Sarnytch et Thelu (ad S.S.E. urbis Samsun) montosis, plerumque silvat., 900-1000 m. 1858, Tchihatcheff 819 (holo G photo!).**

Biennial or perennial. 30-200 cm, with densely viscoso-villous articulate, mostly glandular throughout. Basal leaves 10-30×5-13 cm, broadly ovate, cordate, crenate, acute; with petiole 3-7.5 cm. Stem cylindrical, simple. Cauline leaves 4-21×0.5-6.5 cm, lanceolate, cordate-auriculate, crenate-serrate or entire, acute-acuminate; with petiole 0.5-3 cm, upper cauline leaves sessile, lower petiolate or all sessile. Inflorescence raceme, panicle. Lower bracts 1.5-3.5×0.5-1.5 cm, ovate-lanceolate, lanceolate, cordate, serrate or entire, acuminate. Upper bracts 0.9-1×0.3-0.5 cm, ovate-lanceolate, cordate, crenate or entire, acuminate. Pedicels 1-4 mm, ebracteolate. Calyx 6-10 mm, almost divided to the base, with unequal lobes, lobes ovate-lanceolate, lanceolate, acute. Corolla 26-33 mm diam, yellow, with purplish lines, lobes 5-7 mm, glabrous outside, tube 3 mm length. Stamens 4, 5-10 mm. Filaments 3-5 mm, with whitish-yellow and purplish-violet woolly, two anterior glabrous near apex. Anthers 2-5 mm, reniform, two anterior anthers decurrent on to filament. Ovary 2-2.5 mm, globose. Style 6-8 cm, filiform. Stigma 1 mm, capitate. Capsule 7-10×6-7 mm, ±globose.

Fl: 6-8, Fr: 7-8

**Habitat:** Forest, Oak scrub, damp banks by stream, serpentine rocks, meadows, road side, riversides, 400-1580 m.

**Examined specimens**

**A4 Kastamonu:** İnebolu to Küre, 900 m, *Davis* 21653 (E photo).

**A5 Kastamonu:** Ilgaz mountain, 1000 m, 19.06.1989, *T. Ekim* (GAZI); Kastamonu-Araç, 1150 m, 22.06.1981, *M. Demirörs* 781 (ANK); c. 900 m, 08.06.1954, *Davis* 21653 (ANK); Tosya, Kilkuyular village, c. 1500 m, 02.07.1976, *M. Kılınç* 6616 (ANK); 1580 m, 23.06.2001, *FAK* 3110 (GAZI, HUB, ANK, G); Azdavay, Kayabaşı village, Nalbantoğlu, Çatak canyon, 600-700 m, 25.08.2002, *FAK* 3402 (GAZI, EGE, ISTE, BRNO).

**B7 Erzincan:** Erzincan-Refahiye, 1900 m, 05.07.2003, *H. Duman* 8949 (GAZI).

**Distribution:** Endemic, Euro-Siberian element

According Flora of Turkey, *V. ponticum* is "usually biennial", but observations and field work show as, some specimens of this species are "perennial" form.

Now a days, it is known from Samsun and Kastamonu, but it collected from Erzincan (Duman 8949) where very distant to two cities.

**21- *Verbascum bornmuellerianum* Hub.-Mor., *Bauhinia* 5(1): 10 (1973).**

=*Celsia bornmuelleri* Murb., *Monog. Celsia* 182, t. 13 (1925), non *V. bornmuelleri* Velen. (1890).

**Type:** W. Iran Schahu nördlich von Kermanschah, 25.05.1905, *Strauss*.

**(Isolectotype LD, Lectotype JE photo!).**

Biennial. 70-135 cm, with densely viscoso-villous, hairs long articulate, mostly glandular throughout. Basal leaves 10-14.5×3-4 cm, broadly ovate, cordate, irregular dentate, acute; with petiole 8-11 cm. Stem cylindrical, sometimes branched at base. Cauline leaves 9-11×1.5-2.5 cm, ovate, cordate-auriculate to semiamplexicaule, crenate-dentate, acute; with petiole 0.5-3 cm. Inflorescence raceme, panicle. Lower bracts 4-5 cm, cordate-ovate, cordate, crenulate, acute. Upper bracts 1.5-2.5 cm, ovate-lanceolate, round, entire, acuminate. Pedicels 1-2 mm, ebracteolate. Calyx 7-9 mm, almost divided to the base, lobes ovate-lanceolate, acute. Corolla 28-40 mm diam, yellow, with purplish lines, lobes 5-7 mm, glandular and articulate eglandular outside, tube 5 mm length. Stamens 4, 6-10 mm. Filaments 4-5 mm, purple-violet right up to anthers. Anthers 2-5 mm, reniform, two anterior anthers decurrent on to filament. Ovary 1×0.5 mm, ovoid. Style 6-9 mm, filiform. Stigma 1 mm, spatulate. Capsule 5-10×4-7 mm, ovoid.

Fl: 5-6, Fr: 7

**Habitat:** Limestone slope, *Quercus* sp. shrub 1200-1500 m.

**Examined specimens**

**C9 Şırnak:** Şırnak, 1450 m, 1966, *Davis* 42638 (E photo); Çakırsöğüt, 05.06.2001, 1400-1500 m, limestone slope, *FAK* 3025, *ibid.* 15.07.2001, N 37° 20' 10", E 43° 18' 79", *FAK* 3123 (GAZI); Hakkari: Çukurca, 1200 m, *Davis* 44748 (E photo).

**Distribution:** N. Iraq, W. Iran, Irano-Turanian element *V. bornmuellerianum* was collected only from Şırnak while this study since 1966 up to now.

**22- *Verbascum oreophilum* K. Koch in *Linnaea* 22: 726 (1849)**

Perennial, 60-180 cm, with densely stellate, short stalked glands throughout. Basal leaves 10-45×3-25 cm, lanceolate-oblong, ovate-elliptic, truncate-semicordate, crenate, bicrenate, dentate, acute; with petiole 3-15 cm.

Stem cylindrical, angular, branched at base. Cauline leaves 3-15×1-8 cm, lanceolate-oblong, truncate-semicordate, crenate-bicrenate-dentate, acute. Inflorescence panicle. Lower bracts 3-4×2-3 cm, ovate-lanceolate, semicordate-entire, entire-crenate, acute-acuminate. Upper bracts 1-3×0.5-2 cm, linear-lanceolate, entire, dentate, acute, rarely with 2 flowers. Pedicels 4-8 mm, ebracteolate. Calyx 3-6 mm, almost divided to the base, lobes oblong, acute. Corolla 15-30 mm diam, yellow, lobes 5-10 mm, with or without pellucid glands, stellate outside, tube 3 mm length. Stamens 4-5 (-7), 7-9 mm. Filaments 6-7 mm, with whitish-yellow and purplish-violet woolly, two anterior filaments woolly to anthers or glabrous near apex. Anthers 1-2 mm, reniform. Ovary 1-2×0.5-1 mm, ovoid-ellipsoid. Style 6-7 mm, filiform. Stigma 2 mm, spatulate. Capsule 4-6×2-5 mm, ovoid-ellipsoid.

1. Filaments with purplish-violet hairy; inflorescence stellate-short stalked glandular hairy.....  
.....var. *oreophilum*
1. Filaments with whitish-yellow hairy; inflorescence stellate-eglandular hairy .....  
.....var. *joannis*

Fl: 6-8, Fr: 8-10

**Habitat:** Steppe, meadows, Oak scrub, pastures, 600-2900 m.

var. *oreophilum*

=*Celsia aurea* K.Koch, *Linnaea* 22: 731 (1849).

=*Verbascum aurea* (K.Koch) Kuntze, *Rev. Gen. Pl.* 2: 469 (1891).

=*Verbascum aurea* (K.Koch) Kuntze var. *genuinum* Murb., *Bot. Not.* 1940: 5 (1940).

**Type:** A9 Çoruh: Im Gaue Ardanuç auf sekundärem Kalk und Mergel, 900-1200 m, 30.08.1843, *K. Koch* (holo B).

**Examined specimens**

**A4 Kastamonu:** Küre mountain, Pınarbaşı, 650 m, 23.08.2002, N 41° 36' 15", E 33° 07' 11", *FAK* 3397 (GAZI); Azdavay, Kayabaşı village, Nalbantoğlu, Çatak canyon, 600-700 m, 25.08.2002, *FAK* 3403 (GAZI, G, EGE); Tosya-Gökçeviz village 5. km, 1000-1300 m, 25.06.2003, *FAK* 3426 (GAZI).

**A9 Kars:** Akçay to Cumaçay E. of Kağızman, 2200 m, 17.07.1966, *Davis* 46735 (E photo); 10 km S. of Akçay, 1760 m, 29.07.1984, *M. Nydegger* 18490 (GAZI); Artvin: Ardanuç, Kutul, 14.07.1947, *M. Heilbronn and M. Ba'aran* (ISTF); Ardanuç, Kurdevan mountain, 1900-2900 m, 29.07.1982, *N. Demirku* 1646 (HUB).

**B6 Yozgat:** Akdağmadeni, Ortaköy, c. 1300 m, 07.07.1979, *T. Ekim and A. Düzenli* 4261 (ANK).

**B8 Erzurum:** 29. km from Erzurum to Pasinler 1800 m, 12.07.1966, *Davis* 46421 (E photo); Palandöken mountain, Terman, 2050 m, 11.07.2002, N 39° 41' 32", E 41° 23' 42", *FAK* 3350 (GAZI, ANK, ISTE, Hb. YILDIRIMLI); Karaköse 54. km. c. 2300 m, 20.07.1956, *H. Birand* 574 (ANK); Bingöl: Karlıova-Çat, 2250 m, 27.07.1970, *T. Baytop* 18281 (ISTE).

**B9 Van:** d. Çatak, Kavuoahap mountain, 2700 m, *Davis* 23067 (E photo); Bahçesaray-Uçum 4. km, 1560 m, 07.06.2001, N 38° 05' 64", E 42° 48' 12", *FAK* 3044 (GAZI); Bitlis: Bitlis-Tatvan, 1730 m, 30.06.1954, *Davis* 22340 (E photo), *ibid.* 1730 m, 30.06.1954, *Davis and O. Polunin* 22340 (ANK); *ibid.* Tepe, 1600-1700 m, 14.09.1995, *Y. Gemici* 16713 (EGE); Kotum, KarzDag above Kamer, 2300 m, 24.08.1954, *Davis and O. Polunin* 24597 (ANK); Tuğ, 1780 m, 26.07.19566, *H. Demiriz* 3520 (ISTF); Geva°-Tatvan, 2023 m, 13.07.2002, N 33° 22' 51", E 42° 46' 27", *FAK* 3373 (GAZI); Ağrı: Karaköse-Tutak, Murat river, Batmış-Aşağıtarabalı, 1500 m, 24.07.1956, *H. Demiriz* 3471 (ISTF); Karaköse-Tutak, Hamur, 1650 m, 24.07.1956, *H. Demiriz* 3457 (ISTF).

**B10 Van:** Özalp, Yukarı Balçıklı village, Beştepe, 2311 m, 18.10.1997, *F* 5561 (VANF).

**C10 Hakkari:** Van-Hakkari 113. km, c. 2400 m, 19.07.1956, alpine *H. Birand and K. Karamanoğlu* 471 (ANK).

**Distribution:** Caucasus, Irano-Turanian element.

This variety is endemic according Flora of Turkey, but after investigations literature, understand that, it is also distributed in Caucasus (Fedchenko, 1955).

var. *joannis* (Bordz.) Hub.-Mor., Denkschr. Schweiz. Nat. Ges. 87: 136 (1971).

=*Celsia joannis* Bordz., Monit. Jard. Bot. Tiflis. N.S. 5: 49 (1931).

=*Verbascum joannis* Bordz. ex Murb., op. cit. 542 (1933).

=*Celsia aureiformis* Murb., Monog. Celsia 83, f. 11 (1925).

=*Verbascum aureiforme* (Murb.) Murb., Monog. Verbascum 541 (1933).

=*Verbascum aureum* (K.Koch) Kuntze var. *joannis* (Bordz.) Murb., Bot. Not. 1940:6 (1940).

**Type:** Sovyet, d. Leninakan, in vicinias pagi Chorom, inter lapides in monte Kizly-Dagh, 26.7.1928, *Bordzilowski* (holo KW).

#### Examined specimens

**A9 Kars:** Kağızman, Paslı-Çilehane, 1600 m, 13.07.1981, *O. Güne* 2009 (HUB); 10 km S. of Sarıkamış, 21.07.2001, N 40° 15' 46", E 42° 38' 14", *FAK* 3140 (GAZI).

**B7 Erzincan:** Ke°i° mountain above Cimin, 2500-2600 m, 26.07.1957, *Davis and Hedge* 31664 (ANK, E photo); Spikordağı, Kırklar-Sipikor, 2225 m, 10.07.2001, N 39° 50' 51", E 39° 32' 17", *FAK* 3326 (GAZI, HUB, ANK, EGE).

**B8 Bingöl:** Bingöl-Karlıova, 12 km S. of Karlıova, 1700 m, 19.07.1982, *M. Nydegger* 17251 (GAZI); Solhan-Mu°, 23.08.1969, *T. Gözler* 15837 (ISTE); Mu°: Cingilli, 15.07.1956, *H. Birant* 343/328 (ANK); Solhan-Muş 12. km, Buğlan, Gediklitepe, 13.07.2001. 1640 m, *FAK* 3119 (GAZI, G, BRNO, Hb. YILDIRIMLI); Erzurum: Palandöken Dağı, Terman road, 2050 m, 11.07.2002, N 39° 41' 32", E 41° 23' 42", *FAK* 3351 (GAZI).

**B9 Erzurum:** 5 km W. of Karayazı, *Jelink* 2401 (E photo); Van: Muradiye waterfall, 1900 m, 17.07.2001. *FAK* 3129 (GAZI, ISTE); Muradiye, Adaklı village-Süphan, 2500 m, 14.07.1997, *MÜ* 1538 (VANF); Muradiye, Köseveli mountain, 2300 m, 17.07.1997, *MÜ* 695 (VANF); Ağrı: Taşlıçay, Balıklı Gölü, 2350-2400 m, 18.07.2001, *FAK* 3131 (GAZI).

**C9 Van:** Çatak, Dalbastı villag-Belbuka mountain pasture, 1800 m, 28.07.2003, *B. Bani* 2435.

**B10 Iğdır:** Suveren-Çili village, 1750 m, 19.07.2001, *FAK* 3135 (GAZI).

**C4 Konya:** Seydişehir-Şahinkayaı, 1700, 21.06.1980, *H. Ocakverdi* 1107 (KNYA).

**C6 Adana:** Karsantı-Hızır (Pos forest), c. 1180, 28.06.1973, *E. Yurdakulol* 22 (ANK).

**C10 Hakkari:** aat mountain above Veregöz, 1800-2000 m, *Davis* 45561 (E photo); Yüksekova-Esendere, 28. km, Altınbaşak village, 1180 m, 06.06.200, N 37° 42' 41", E 44° 31' 60", *FAK* 3036 (GAZI); *ibid.* 18. km, 2140 m, 23.07.1983, *M. Nydegger* 18421 (GAZI, E photo).

**Distribution:** Caucacus, Iran, Iraq, Lebanon, Irano-Turanian element.

While field studies at East and South-East of Anatolia, some of *V oreophilum* var. *joannis* specimens were collected, had 7 and some specimens had 3 stamens, but the specimens has 3 stamens are sterile..

**23- *Verbascum sinuatum* L. subsp. *gaillardotii* (Boiss.) Bornm., in Beih Bot. Cent. 31(2): 244 (1914). =*Verbascum gaillardotii* Boiss., Diag. Ser. 2(6): 128 (1859). =*Verbascum saltense* Post, Bull. Herb. Boiss. 1: 27 (1893). Type: W. Syria inter Dimar et Djedaide Antilabani, 06.1855, Gaill. (holo G photo!).**

Biennial, 30-110 cm, with grey or yellowish stellate-tomentose, eglandular throughout. Basal leaves 15-35×5-13 cm, oblong-oblong lanceolate, cuneate, sometimes undulate, sinuate, crenate-dentate, acute-acuminate, lower surface whitish, upper surface greenish; sessile to with petiole 1-6 cm. Stem cylindrical, angular, branched at base. Cauline leaves 3-7×1-4 cm, ovate-lanceolate, linear-lanceolate, entire, crenate-entire, acute-acuminate. Inflorescence panicle, flowers in distant clusters of 2-6. Lower bracts 1.5-2×1-1.5 cm, ovate-lanceolate, linear-lanceolate, cordate, crenate-entire, acute-acuminate. Upper bracts 1-1.5×0.5-1 cm, ovate-lanceolate, linear-lanceolate, cordate, entire, acute-acuminate. Pedicels 1-5 mm. Bracteoles 2-3, 5-7×4-6 mm, ovate-lanceolate, cordate, entire, acute-acuminate. Calyx 2-5 mm, almost divided to the base, lobes ovate-lanceolate, acute. Corolla 12-23 mm diam, yellow, lobes 3-8 mm, with pellucid glands, stellate outside, tube 1 mm length. Stamens 4-5, 4-6 mm. Filaments 3-4 mm, with purple-violet, two anterior glabrous near apex. Anthers 1-2 mm, reniform. Ovary 1-2×0.5-1.5 mm, ovoid. Style 4-6 mm, filiform. Stigma 1.5 mm, spatulate. Capsule 2.5-5×2-4 mm, ovoid.

Fl: 5-8, Fr: 8-10

**Habitat:** Limestone slopes, sl.-1300 m.

**Examined specimens**

**C6 Hatay:** Harbiye S.W. of Antakya, 03.07.2001, *A. Duran* 5738 (GAZI), *ibid.* 14.08.2001, *FAK* 3145, *FAK* 3146 (GAZI, HUB, ANK, EGE, G, BRNO, ISTE, Hb. YILDIRIMLI).

**Distribution:** Suriye, Lebanon, Palestine, E. Mediterranean element

*V. gaillardotii* has 4 stamens according Flora of Turkey, Vol. 6. p. 490, but some specimens with 5 stamens of this species collected and all of them are fertile from Hatay (*FAK* 3146)

*V. gaillardotii* was reduced to subspecies of *V. sinuatum* in 1914 by Bornmueller, because of similarity of stamens numbers.

Except changing of stamens numbers, other characters are similar with *V. sinuatum*. The compression of these two species are given in Table 2.

Table 2: The compression of *V. gaillardotii* and *V. sinuatum*

	<i>V. gaillardotii</i>	<i>V. sinuatum</i>
Inflorescens	2-6 flowers	1-7 flowers
Bracts	Ovate-lanceolate to lanceolate-linear, caudate	cordate-triangular, mucronate
Bracteol	Lanceolate	Ovate
Corolla	12-20 mm	15-30 mm
Stamens	4 (-5)	5 (-4)

At the end of our study, we understand that these two species are very closed to each other and subspecies of one other, mentioned as Bornmuller (1914). These two taxa can be distinguished each other by key which given at below

1. Bracts ovate-lanceolate to lanceolate-linear, caudate; bracteol lanceolate ..... ssp. *gaillardotii*
1. Bracts cordate-triangular, mucronate; bracteol ovate..... ssp. *sinuatum*
  2. Cauline leaves distinctly decurrent; calyx lobes eglandular..... var. *sinuatum*
  2. Cauline leaves not decurrent; calyx lobes glandular..... var. *adenosepalum*

**24- *Verbascum freynii* (Sint.) Murb., Monogr. Verbascum 380 (1933). =*Celsia freynii* Sint., Öst. Bot. Zeitschr. 44: 297 (1894).**

**Type:** A5 Kastamonu: Paphlagoniae ad Tossia (Tosya), in silvaticis subalpinis Giaurdag (Gavurdağı) 10.07.1892 (Gavur Dağı NW von Tosya), *Sint.* 4210 (holo LD, iso B photo!).

Biennial. 50-135 cm, with long articulate, stalked glandular, stellate throughout. Basal leaves 6-12×2.5-5 cm, oblong, oblong-lanceolate, obovate, cuneate, crenate, acute; with petiole 1-3 cm. Stem cylindrical, sometimes branched at the base. Cauline leaves 3.5-10×1.5-2 cm, oblong, oblong-lanceolate, lanceolate, cordate, crenate, acute-acuminate; without petiole. Inflorescence raceme, panicle, flowers in congested clusters of 1-7. Lower bracts 2-3×1-2 cm, triangular-ovate, cordate, entire, acuminate. Upper bracts 5-7×3-4 mm, linear-lanceolate, entire, acute. Pedicels 2-10 mm. Bracteoles 2.5-10×2-5 mm, ovate, linear-lanceolate, lanceolate, entire, acute-acuminate. Calyx 5-10 mm, almost divided to the base, lobes oblong-linear, acute-mucronate. Corolla 20-25 mm diam, yellow, lobes 6-8 mm, without pellucid glands, stalked gland and stellate hairs outside, tube 4 mm length. Stamens 4, 7-9 mm. Filaments 6-7 mm, with whitish-yellow and purplish-violet woolly, two anterior glabrous near apex. Anthers 1-2 mm, reniform. Ovary 1-2×0.5-1 mm, ovoid. Style 13 mm, filiform. Stigma 1.5 mm, capitate. Capsule 5-8×4-5 mm, ovoid.

Fl: 6, Fr: 6-7

**Habitat:** *Pinus nigra* forest, scrub, waste places, 1200-1800 m.

#### Examined specimens

**A5 Kastamonu:** Tosya, Y. Dikmen, Kilkuyu village, c. 1400-1600 m, 12.06.1975, *M. Kılınç* 3477 (ANK); Gavur mountain, 1600-1800 m, 25.06.2003, *FAK* 3426 (GAZI, EGE, ANK, ISTE); Tosya-Gökceviz village 5. km, 1000-1300 m, 25.06.2003, *FAK* 3427 (GAZI, Hb. YILDIRIMLI); Ilgaz, Hacıhasan village, 1000-1400 m, 25.06.2003, *FAK* 3425 (GAZI, G, BRNO, HUB); ibid. Akçe°me, c. 1200 m, 15.06.1982, *Y. Akman, E. Yurdakulol and M. Demirörs* 12542 (ANK).

**Distribution:** Endemic, Euro-Siberian element *V. freynii* is similar to *V. hajastanicum*, *V. pallidiflorum* and *V. trichostylum*. Although there was no clear difference between them, it was evaluated in group H.

#### 25- *Verbascum transcaucasicum* E.Wulf in Bull. Mus. Cauc. Tiflis 11: 69, t. 7 (1917).

**Type:** A9 Kars: Kağızman, Jelnezhaja Vorota, 02.06.1913, *Woronow* 13148 (holo LE).

Biennial, 85-110 cm, densely stellate, stalked glandular, glabrescent above. Basal leaves 20-30×2-6.5 cm, lanceolate, oblong-lanceolate, cuneate, crenate-serrate, acute-acuminate; with petiole 2-4 cm. Stem cylindrical, angular, solitary. Cauline leaves 5.5-15×0.5-2.5 cm, lanceolate, cuneate, crenate-serrate, acute-acuminate; without petiole. Inflorescence raceme, panicle, in distant clusters of 1-4 and upper bracts with one flower. Lower bracts 5-25×2-10 mm, lanceolate, entire, acuminate. Upper bracts 2-16×1-3 mm, lanceolate-linear, entire, acuminate. Pedicels 2-5 mm. Bracteoles 2, 3-10×1-4 mm, sometimes absent, linear-lanceolate, entire, acuminate. Calyx 4-7 mm, almost divided to base, lobes lanceolate, acute. Corolla 25-30 mm diam, yellow, lobes 6-9 mm, without pellucid glands, stellate outside, tube 2 mm length. Stamens 4-5, 5-9 mm. Filaments 4-7 mm, with purple-violet hairs, two anterior glabrous near apex. Anthers 1-2 mm, reniform. Ovary 2-3×1-2 mm, oblong-ovoid. Style 8-10 mm, filiform. Stigma 1-4 mm, capitate. Capsule 6-13×3-4 mm, oblong-ovoid.

Fl: 6, Fr: 7

**Habitat:** Rocky damp places, 1200-1950 m.

#### Examined specimens

**A9 Kars:** Akçay-Cumaçay, 14 km, 20.07.2001, 1950 m, N 40° 03 03', E 43° 17 07', *FAK* 3137 *et al.*, ibid. 12.07.2002, *FAK* 3363 *et al.* (GAZI, EGE, HUB, ANK, G).

#### Distribution:

 Caucasus, Euro-Siberian element

During field studies, some members of this species were collected, have five stamens.

According to Flora of Turkey, it is endemic, but it is also growing in Transcaucasian region (Fedchenko, 1955).

*V. transcaucasicum* is classified as "Data Deficient-DD" in the Red Data Book. This plant was collected from Kars-Kağızman, type locality second times. During the field observations, the population of the species weak, so it is classified as "Critically Endangered-CR" at the IUCN list.

### CONCLUSION

The taxonomic results and conclusions about each species are given at the end of the taxa.

The genus *Verbascum* "Group A" is represented by 30 taxa in the Flora of Turkey, 14 members of them are Irano-Turanian, 12 are Mediterranean and 4 of them are Euro-Siberian element.

Although, the species *V. orientale* and *V. brachysepalum*, *V. pyroliforme* and *V. dudleyanum*; *V. flabellifolium* and *V. trapifolium*, *V. gaillardotii* and *V. sinuatum* are morphologically very close to each other, they are evaluated different species in Flora of Turkey.

The taxonomically of the *V. flabellifolium* is reduced to the variety of *V. trapifolium*. *V. brachysepalum*, *V. dudleyanum* and *V. gaillardotii* are reduced to the subspecies *V. orientale*, *V. pyroliforme* and *V. sinuatum* in this study.

According to Flora of Turkey, 20 taxa are endemic. But, as a result of this working understand that, *V. natolicum*, *V. oreophilum* var. *oreophilum* and *V. transcaucasicum* are growing in Russia. So the number of the endemic taxa are decreased to 17.

Threatened categories of species *V. rupicola* and *V. transcaucasicum* were changed DD to CR.

The genus *Verbascum* is divided 13 groups in flora of Turkey, because of having many species. None of them are valid taxonomic category. Studying is shown us, some species has 4 stamens, while others have 5-7 stamens in group A. But, we understand that, stamen number is not good characters, because some species as *V. natolicum* (*FAK* 3164 and *H. Duman*), *V. nudicaule* (*FAK* 3372), *V. gaillardotii* (*FAK* 3145) and *V. transcaucasicum* (*FAK* 3137). have 5 stamens and *V. oreophilum* var. *joannis* has

7 stamens, where indicated with 4 stamens in group Contrary some species has 4 stamens placed in different groups.

End of the study, some information are added for taxa which is not mentioned in Flora of Turkey. For example, the capsule structure is 3-5×2-3 mm, ovate, sparsely glandular in *V. bourgeauanum*; capsule 5-10×4-7 mm, ovate, sparsely articulate hairy in *V. bornmuellerianum*; capsule 6-13×3-4 mm, ovate-oblong, stellate hairy in *V. transcaucasicum*.

Also another taxonomic characters as "the pedicels are sparsely hairy" which is not mentioned in Flora of Turkey for *V. prolifforme* subsp. *pyrolifforme* (FAK 3431).

In some specimens of *V. coronopifolium* (FAK 3388) and *V. rupicola* (S. "enol 3025) have glandular outside of corollas not only glabrous.

Some members of *V. ponticum* (FAK 3402) and *V. trapifolium* var. *flabellifolium* (FAK 3322) are perennial not only biennial.

Although filament hairs purplish in *V. freynii*, some specimens have purplish and white hairy (FAK 3425).

The basal leaves measurement are change 2-4.5×2.5-7 cm (in Flora of Turkey) to 2-17×6-8 cm in *V. cilicium* (FAK 3421), other change is done 1.5-3.5×2-5 cm (in Flora of Turkey) to 1.5-16×1-6 cm for *V. trapifolium* var. *flabellifolium*.

Any hybrid taxa are not observed during the fielding study.

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#### Abbreviations:

Fl. : Flowering period  
Fr. : Fruiting period  
ibid : In the same place  
E. : East  
N. : North  
W. : West  
S. : South

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