

# Morphological Study of the *Centaurium pulchellum* and *C.erythraea* (Gentianaceae) in Kurdistan region of Iraq

Jawhar Fatah Saeed



Salahaddin University-College of Basic Education.

## ARTICLE INFO

Received: 27 / 9 /2012  
Accepted: 24 / 2 /2013  
Available online: 30/11/2013  
DOI: [10.37652/juaps.2013.83089](https://doi.org/10.37652/juaps.2013.83089)

### Keywords:

Survey,  
Kurdistan,  
Iraq,  
*Centaurium*,  
Gentianaceae.

## ABSTRACT

In this study a survey for the species of *Centaurium* Hill (Gentianaceae) in Kurdistan of Iraq was presented along with survey and identification of samples preserved in some Iraqi herbaria. Several scientific excursions were made to different regions in Kurdistan, and a comparative study was conducted on the vegetative and reproductive parts. These have been reinforced by graphs and figures. The present study dealt with the ecology and geographical distribution, and a map was designed for this purpose. The present study specified the real number of the *Centaurium* Hill species within the studied area by two species as follow: *Centaurium erythraea* Rafn (which was found as *C. erythraea* subsp. *turcicum* (Velen.) Meldris & *C. pulchellum* (Swartz) Druce.

## Introduction

One of the families that was not come in the Flora of Iraq is **Gentianaceae** family which involves 800 species through out the world that are distributed on 70 genera (1), while in Iraq involves 11 species distributed on 5 genera (2). (3) stated 2 species of the genus. (4) indicated only 1 species in Iraq, while (5) mentioned 2 species in Iraq, and (6) pointed out to the presence of 4 species of the genus in Iraq, as well as (7) also stated that 3 species was found in low lands of Iraq. In Europe, (8) stated that 8 species of the genus were found involving *C. erythraea* & *C. pulchellum*. In Turkey, (9) also mentioned that 5 species of the genus were found involving the species under study. In Saudi Arabia, (10) indicated only 1 species. In Iraq, (2) mentioned the distribution of 5 species of the genus, and (11) stated that 4 species of the genus were found indicating the districts in which the species are distributed, while (12) pointed out to the presence of one species in Pira Magrun mountain which is *C.*

*pulchellum*. (13) mentioned 3 species of the genus in Pakistan involving *C. pulchellum*.

The present study aimed to specify *Centaurium* species in Kurdistan of Iraq and to study the morphological characters and the geographical distribution of the species, as well as fixation some ecological notes and study of plant specimens found in some Iraqi herbaria to add a small part to the Flora of Iraq.

## Materials and Methods

Several scientific excursions (about 40 excursion) were made to different districts of Iraqi Kurdistan (MAM, MRO, MSU, FAR and FPF) during Summer season of year 2011 for plant specimens collection, some Iraqi herbarial specimens were used such as National Herbarium of Iraq, Salahaddin University Herbarium/Science college and Education College Herbarium-Scientific departments/ University of Salahaddin, these specimens were identified by helping of some keys especially in Flora of Turkey, the specimens were made herbarially to become formal specimens, and deposited in herbarium of

\* Corresponding author at: Salahaddin University-College of Basic Education;  
E-mail address:

Education College- Scientific departments .Species geographical distribution were cleared with fixation of some ecological notes, and map (figure 1) was deposited.

## Results

1. *Centaureum Hill*, Fl. lo .La. Iraq, Rechinger, 476 (1964), Syn :*Erythraea* Borkh.; Fl. Europaea, 3, 56 (1972); Fl. Turkey, Jakobsen, 6: 178 (1978).

Annual or biennial herbs with opposite, sessile leaves. Basal leaves usually tufted. Stem strictly erect. Inflorescence cymose, rarely a spike-like cyme. Flowers 4-5 merous. Calyx narrow, with linear, frequently scarious-margined lobes. Corolla hypocrateriform, pink, purple or yellow, rarely white. Anthers twisting spirally after dehiscence. Style bifid at apex, stigmas capitate. Capsule oblong to fusiform. Seeds minute, reticulate (9).

1- plant biennial, with a distinct basal leaf rosette ; flowers sessile or sub sessile; calyx 1/2-3/4 x corolla tube 1- *erythraea* subsp. *turcicum* 1- plant annual, without a distinct basal leaf rosette ; flowers pedicellate; calyx nearly equalling corolla tube 2- *pulchellum*

1- *C.erythraea* subsp. *turcicum* (Velen) Meldris in J. Linn.Soc. (Bot.) 65:232 (1972). Syn: *Erythraea centaurium* sensu Boiss., Fl. Or. 4:68 (1875); *E. turcica* Velen., Fl. Bulg. 384 (1891); *Centaureum minus* subsp. *turcicum* (Velen.) Soo in Soo & Javorka, Magyar Nov. Kez. 1: 480 (1951); Fl. Turkey, Jakobsen, 6: 179 (1978).

Biennial herbs, (22-60) cm, stem erect, winged (usually tetra-winged), green, green-yellow .Basal leaves narrowly oblanceolate, narrowly elliptic, narrowly oblanceolate-very narrowly elliptic, margin entire with glandular hairs, apex acute or obtuse, base truncate, (2.5-4.5)x(0.8-1.1) cm. Lower cauline leaves

oblanceolate, very narrowly elliptic, margin also entire with glandular hairs, apex acute or obtuse, (2.3-3.3)x(0.5-0.8) cm, Upper cauline leaves cultrate, narrowly lanceolate-cultrate, margin such as others, apex acuminate or acute-acuminate, base truncate, (1.2-2.2)x(0.2-0.4) cm. Inflorescence cymose dichasial, peduncle teret, winged, green, (1.1-5.0)x(0.06-0.13) cm, bracts linear, cultrate or cultrate-linear, margin entire with glandular hairs, apex acuminate, base truncate, (2.5-6.0) x (0.5-0.6) mm. Flowers hermaphrodite, sessile or sub sessile. Calyx narrow, (3.7-4.6) mm, 1/2-3/4 x corolla tube, with glandular hairs, calyx tube tubular-cup shape, green, (0.9-1.3)x(1.0-1.2) mm, calyx limb with 5 linear, unequal, scarious-margined lobes, apex acuminate, green, (2.8-3.3)x(1.3-1.5) mm. Corolla hypocrateriform, corolla tube very narrowly lanceolate, yellow, (6.5-7.0)x(0.9-1.2) mm, corolla lobes narrowly lanceolate-very narrowly lanceolate, apex obtuse-acute, pink, (4.1-4.5)x(3.7-4.0) mm. Stamens 5, epipetalous and antipetalous, at the apex of the tube, filaments filiform, light yellow, (1.9-2.3) x (0.15-0.20) mm, anthers narrowly oblong , yellow, basifixed with the filaments, (2.3-2.7)x(0.6-0.7) mm. Pistil 1, ovary superior, uni-locular, multi-ovules, cultrate, yellow ,(6.4-7)x(0.7-1.0) mm, style teret, terminal attachment with the ovary, bifid at apex, yellow, (1.2-1.6)x(0.15-0.20) mm, fid (0.3-0.5)x(0.2-0.25) mm, stigma 2, capitate, yellow, (0.9-1.0)x(1-1.1) mm. Fruit a follicle, dehiscent, cultrate, dark yellow, (9.5-10.0)x (1.4-1.8) mm, persistent style (1.2-1.5)x(0.12-0.15) mm, persistent style fid (0.35-0.50)x(0.2-0.22) mm, persistent stigma (0.8-1.0)x(1.1-1.3) mm. Seeds minutes, numerous, orbicular or very broadly ovate, reticulate, dark yellow-brown, (0.25-0.45)x(0.22-0.35) mm (figure 2-B, plate 1).

Type: Described from Bulgaria, nr. Varna.

### Selected samples from the studied specimens

MAM: ESUH/ Gara mountain, 1500 m, 29.4.2011, J. Saeed, A. Sardar & Z. Sadiq, 6867; MRO: Binkalat village, Hassar-i Rost mountain, 1100 m, 27.5.2011, Al-Khayat, J. Saeed & A. Sardar, 6877; MSU: Sirwan river ridge-on border line between Iraq and Iran, 850 m, 13.5.2011, A. Sardar & Z. Sadiq, 6878.

### Ecology & Geographical Distribution

Found as separated individual within the area, in wet places, stream sides, clay soils; altitude: 540-1600 m; flowering: May-July.

Started in distribution from Amadyia district (MAM) in Matin mountain (Sulav), Gara mountain, Ashawa, Baadri and Gali Zanta, then reach Rowanduz district (MRO) in Mirgaour, Shirwan Mazin road, Binkalat village (Hassar-i Rost mountain), Sakran mountain, Rayat (on Haji Omran road), Bikhma, between Sisawa and Harir and in Qandil mountain and elongated to Sulaimanyia district (MSU) in Sarkand village (near Halabja) and Sirwan river edge (on border line between Iraq and Iran). (figure 1).

2- *C.pulchellum* (Swartz) Druce, Fl. Berks. 342 (1898). Syn: *Gentiana pulchella* Swartz in Kungl. Svenska Vet.-Acad. Nya Handl. 4:85 (1783); *Erythraea ramosissima* (Vill) Pers., Syn. Pl. 1:283 (1805); Fl. Turkey, Jakobsen, 6: 180 (1978).

Annual herbs, glabrous, (11-30) cm, stem erect, winged (usually tetra-winged), green. Basal leaves oblanceolate, ovate or ovate-broadly elliptic, margin entire, apex acute or obtuse, base obtuse, (0.6-0.9)x(0.35-0.6) cm. Lower cauline leaves narrowly obovate or narrowly obovate-narrowly elliptic, margin also entire, apex acute, (0.55-1.2)x(0.26-0.47) cm, Upper cauline leaves lanceolate or lanceolate-

narrowly oblong, margin such as others, apex acuminate or acute, base truncate, (0.65-0.82)x(0.21-0.32) cm. Inflorescence cymose dichasial, peduncle teret, winged, green, (1.6-4.0)x(0.05-0.11) cm, bracts narrowly lanceolate or cultrate, margin entire, apex acuminate or acute-acuminate, base truncate or obtuse, (3.5-15)x(0.6-1.6) mm. Flowers hermaphrodite, pedicelate, (3.5-6.5)x(0.2-0.5) mm. Calyx narrow, (5.5-11.0) mm, nearly equaling corolla tube, calyx tube tubular, green, (1.5-3.5)x(0.9-1.7) mm, calyx limb with 5 linear, unequal, scarious-margined lobes, apex acuminate, green, (4.0-7.5)x(1.7-2.0) mm. Corolla hypocrateriform, corolla tube very narrowly lanceolate-cultrate, yellow, (5.5-11.0)x(1.0-1.6) mm, corolla lobes narrowly lanceolate-very narrowly lanceolate or narrowly lanceolate-narrowly elliptic, apex obtuse, pink, (2.8-4.0)x(2.4-3.2) mm. Stamens 5, epipetalous and antipetalous, at the apex of the tube, filaments filiform, light yellow, (1.1-2.2)x(0.05-0.10) mm, anthers narrowly oblong, yellow, basifixed with the filaments, (1.0-1.3)x(0.3-0.4) mm. Pistils 1, ovary superior, uni-locular, multi-ovules, cultrate-linear, yellow, (5.3-8.5)x(0.6-1.0) mm, style teret, terminal attachment with the ovary, bifid at apex, yellow, (1.0-3.3)x(0.15-0.20) mm, fid (0.4-1.1)x(0.15-0.4) mm, stigma 2, capitate, yellow, (0.6-1.4)x(0.4-0.7) mm. Fruit a follicle, dehiscent, linear, linear-cultrate or cultrate, dark yellow, (8.0-12.0)x(0.9-1.4) mm, persistent style (1.1-3.5)x(0.12-0.15) mm, persistent style fid (0.5-1.0)x(0.2-0.22) mm, persistent stigma (0.5-1.3)x(0.25-0.6) mm. Seeds minutes, numerous, orbicular or very broadly ovate, reticulate, dark yellow-brown, (0.15-0.35)x(0.15-0.30) mm (figure 2-A, plate 1).

Type: Described from Sweden

### Selected samples from the studied specimens

MAM: ESUH/ Gali Balinda, 750 m, 7.6. 2011, A. Sardar & Z. Sadiq, 6882; MRO: Safin mountain, 850 m, 19.4.2011, Al-Khayat, J.Saeed & A.Sardar, 6883; MSU: Biara,1300 m,15.5.2011, J. Saeed, A. sardar & Z. Sadiq, 6884.

### Environment & Geographical Distribution

Find as separated individual within the area, in plains, stream sides, clay soils; altitude: 390-1300 m; flowering: April-June.

Started in distribution from Amadyia district (MAM) in Gali Balinda, and reach Rowanduz district (MRO) in Mirgasour, Barzan, Rowanduz, Bikhhal road, Bikhma, Safin mountain, Aquban, then elongated to Sulaimanyia district (MSU) and found in Biara and Takia (on Sulaimanyia road), as well as its distribution between Arbil and Daratu involving Arbil district (FAR).(figuer 1).

### Discussion

This study dealt with the species of *Centaurium Hill (Gentianaceae)* from limited aspects including the study of morphological characters as well as the study of environment and their distribution in the studied districts.

According to the plant lists which have been done in Iraq, the presence of the species *C.turcicum* has been mentioned, while the present study proved that this species is a subspecies belongs to the species *C. erythraea* which did not mention in Iraq before.

One of *Centaurium* characters which has a taxonomical importance is the habit which is biennial and has basal leaf rosette in *C. erythraea subsp. turcicum*, and annual without basal leaf rosette in *C.pulchellum*. The calyx in *C. erythraea subsp. turcicum* is 1/2-3/4 x corolla tube, while in *C.pulchellum* is nearly equaling corolla tube. It seems

that the flowers is sessile or subsessile in *C. erythraea subsp. turcicum*, while in *C. pulchellum* it is pedicellate. An other character which has an important role is the glandular hairs which is present at the margins of the bracts and calyces in *C. erythraea subsp. turcicum*, and not present in *C. pulchellum*. The other characters did not show any taxonomical importance or have limited taxonomical importance. During the scientific excursions to the different districts, the specimens of each species were collected. The flowering period extended from the beginning of April to the end of July, and one of the species were biennial and the other were annual. The research was some what capable to cover the geographical distribution and the ecology of the two species.

### References

1. Core, E. L. Plant Taxonomy. Englewood Cliffs, N. J. Prentice-Hall, INC.: 394. (1955).
2. Al-Rawi, A. Wild plants of Iraq with their distribution. Ministry of Agriculture & Irrigation, State board for agricultural & water resources research, National Herbarium of Iraq, Baghdad: 132. (1964).
3. Handel-Mazzetti, H. F. Pteridophyta und Anthophyta aus Mesopotamien und Kurdistan Sowie Syrien und Prinpiko. I I, Wissenschaftliche Ergebnisse der Expedition nach Mesopotamien : 424. (1910).
4. Guest, E. Notes on plants and plant products with their colloquial names in Iraq. Bull. No. 27. Government press: 21. (1933).
5. Blakelock, R. A. The Rustam Herbarium, Iraq. Systematic List. Part 3. Kew Bull. 3: 521. (1949)
6. Zohary, M. The Flora of Iraq and its phytogeographical subdivision. Iraq, Dep. Agri. Bull. No. 31: 116. (1964).

7. Rechinger, K. H. Flora of low land Iraq. Weinheim verlag von. J. Cramer, wein: 477. (1964).
8. Melderis, A. In Flora Europaea.Vol.1. Cambridge Univ.Press: 57. (1972).
9. Jakobsen, K. In Flora of Turkey. Vol.4. Edinburgh at the University press: 176. (1978).
10. Migahid, A. M. and Hammouda, M. A. Flora of Saudi Arabia.Vol.1, Riyadh Univ. publ.: 394. (1978).
11. Ridda, T. J. and Daood, W. H. Geographical distribution of wild vascular plants of Iraq. National Herbarium of Iraq, Unpubl.: 57. (1982).
12. Faris, Y. S. The Vascular Plants of Pira Magrun mountain. M.Sc. thesis, Salahaddin University. Unpubl. :53. (1983).
13. Omer, S. in Flora of Pakistan. University of Karachi-Karachi and Missouri Botanical Garden- St. Louis, Misouri, U.S.A. (2002).



Figure (1) Distribution of the tow species

● *C. erythraea subsp. turicum* ○ *C. pulchellum*

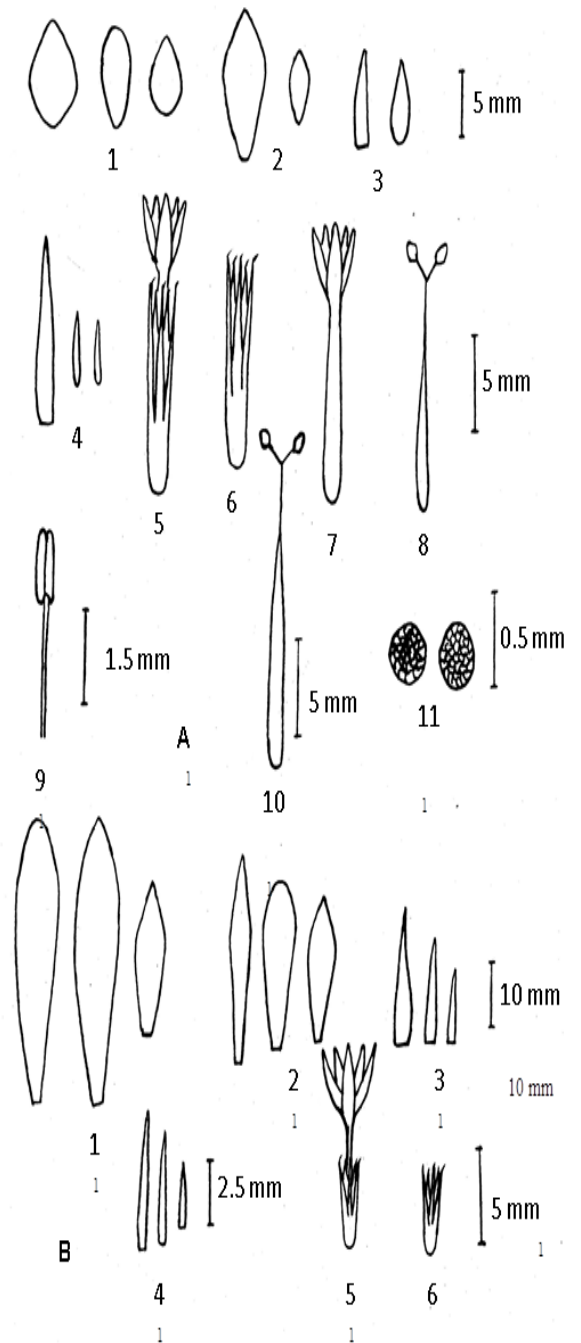


Figure (2): A- *C. pulchellum*; B- *C. erythraea subsp. turicum*: 1. Basal leaves; 2. Lower cauline leaves; 3. Upper cauline leaves



*C. erythraea* subsp. *turcicum*



*C. pulchellum*

Plate (1): Field specimens photographs of *Centaurium* species

## دراسة مظهرية للنوعين *Centaurium pulchellum* و *C.erythraea* من العائلة Gentianaceae في منطقة كردستان العراق

جوهر فتاح سعيد

### الخلاصة

تناولت الدراسة الحالية مسحا حقليا لأنواع الجنس *Centaurium Hill* من العائلة Gentianaceae في كردستان العراق ، كما تم مسح و تشخيص العينات المحفوظة في بعض المعاشب العراقية. أجريت العديد من السفرات الحقلية الى مناطق مختلفة من كردستان العراق ، وذلك لجمع العينات النباتية العائدة للجنس. تمت مقارنة انواع الجنس مظهريا من خلال صفات الأجزاء الخضرية والتكاثرية ، و أعدت الرسومات التوضيحية للأجزاء المختلفة بالتفصيل . وتمت دراسة البيئة والتوزيع الجغرافي ، وعملت خريطة لهذا الغرض، حدد البحث انواع الجنس في منطقة الدراسة بنوعين فقط وهما *C. erythraea Rafn* الذي ينتشر كنوع وهو *C. erythraea subsp. turcicum (Velen.) Meldris* و *C. pulchellum (Swartz) Druce* .