



A New Record of *Saxifraga afghanica* Aitch. & Hemsl. (Saxifragaceae) in Iraq

Abdullah Sh. Sardar

Department of Biology, College of Education, University of Salahaddin-Erbil, Erbil, Iraq

Abstract

Saxifraga afghanica Aitch. & Hemsl. is a new addition to the Saxifragaceae family in Iraq, from Qandil mountain (north-east of Erbil) within Rowanduz district (MRO). The collected specimens have different characteristics. *S. afghanica* is perennial, herb, with crowded shoots forming cushions, many branched. Leaves sessil, narrowly oblong, narrowly oblong-lanceolate, oblanceolate or sub-spatulate, glabrous, entire, ciliated at lower half, apex leaves aggregated into a rosette, chalk glands (pits at the leaves apex) 5. Bracts cultrate, linear or narrowly oblong, glandular-pubescent. Inflorescence corymbose cyme, flowers (3-5), white-pink, stamens 10, ovary semi-inferior, styles 2, divergent, recurved at the top. Capsule globose-semi globose. Identification, morphological study was conducted, these reinforced by graphs. In addition, some characters of the pollen grains have been studied such as shapes, colors, sizes, numbers and surface sculpture.

Keywords: *Saxifraga afghanica*, Saxifragaceae, Rowanduz district, Iraq.

تسجيل جديد للنوع *Saxifraga afghanica* Aitch. & Hemsl. (Saxifragaceae) في

العراق

عبدالله شكور سردار

قسم علوم الحياة، كلية التربية، جامعة صلاح الدين-اربيل، اربيل، العراق.

الخلاصة

Saxifraga afghanica Aitch. & Hemsl. هو اضافة جديدة الى العائلة Saxifragaceae في العراق من جبل قنديل (شمال شرق اربيل) ضمن مقاطعة رواندوز (MRO). العينات التي جمعت تمتلك صفات مميزة مختلفة، فهي اعشاب معمرة ذات اغصان مزدحمة مكونة شكلا وساديا متعددة الافرع. الاوراق جالسة، متطاولة ضيقة، متطاولة ضيقة-رمحية، رمحية مقلوبة او شبه ملعقية، ملطاء، كاملة الحافة، مهدبة في النصف العلوي، الاوراق القمية تتجمع على شكل وريدة، الغدد الطباشيرية (نقر في قمة الاوراق) عددها خمسة. القنابات شريطية او متطاولة ضيقة، ذات شعيرات غدية-ناعمة قصيرة. النورة مشطية محدودة، الازهار (3-5)، بيضاء-وردية. الاسدية عشرة. المبيض نصف منخفض، الاقلام اثنتان، متباعدة، منحنية للخلف عند القمة. العلبة كروية-شبه كروية. لقد تمت عملية التشخيص والدراسة المظهرية للنوع وعززت هذه بالصور.

اضافة الى ذلك، فقد تمت دراسة بعض صفات حبوب اللقاح مثل اشكالها والوانها واحجامها واعدادها ونقش اسطحها.

Introduction

From the families in the Flora of Iraq is Saxifragaceae that involves 660 species throughout the world which distributed on 35 genera [1]. In Iraq has 5 species within 3 genera: *Parnassia vanensis* Azm., *Saxifraga hederacea* L., *S. sibirica* L., *S. tridactylites* L. and *Vahlia viscosa* Roxb. (Weddenii Reichb) [2]. In the Flora of U.S.S.R., [3] stated 79 species of the genus *Saxifraga*. While in Turkey, [4] mentioned 20 species of the genus. In Iran, [5] indicated that 21 species of the genus present from which *S. afghanica*. Each of [2, 6, 7] mentioned 3 species in Iraq, where in [6, 7] the family involves only one genus which is *Saxifraga*. [8] indicated that 1 species found in Pira magrun mountain. [9-11] did not mention any species of the genus *Saxifraga* in Sinjar, Haibat Sultan and Hawraman mountains respectively. In Pakistan, [12] mentioned the distribution of 19 species involving *S. afghanica*.

This study aimed to confirm the presence of *S. afghanica* in Iraq and conduct a study for the morphological characters and the geographical distribution of the collected species, and to contribute in a small part of the Flora of Iraq.

Materials and Methods

Scientific trips were made to the northern districts of Iraq: Amadiya District (MAM), Rowanduz District (MRO), Sulaimaniya District (MSU), Kirkuk District (FKI) and Arbil District (FAR). Plant specimens collection have been done during Spring and Summer season of the year 2016, the identification process conducted by using some keys in Flora of Iraq, Flora of Turkey, Flora Iranica and Flora of Pakistan, the specimens were treated herbarially to be formal herbarial specimens, and preserved in Education college herbarium (ESUH) as a one collection of replicated specimens under the number 7450. The geographical distribution of the species was mentioned and some ecological notes, a map Figure-1 has been clarified. For the pollen grains, anthers fixed in FAA, then a single anther removed and placed in a drop of water or 50% glycerol (the latter to prevent the material from drying out), and dissected with a scalpel to extrude the pollen grains; the anther wall material removed and a cover slip applied. Then, the pollens stained with safranin [1].

Results

Saxifraga afghanica Aitch. & Hemsl. in J.Linn.Soc.Bot. 18:56. 1880. 19:162; Kitam. in Kihara, Fl.Afghan.171.1960; Stewart in Biologia (Lahore), 13,2:74.1967; Sch.-Tem., l.c.13; Stewart, Ann.Cat.Vasc.Pl. W.Pak. & Kashm.341.1972.

Perennial, herbs, (9-22) cm; roots dark brown, (6-14)x(0.2-0.35) cm, with crowded shoots forming cushions, many branched; stem erect-ascending, glandular, green-yellow, (3-8)x(0.1-0.12) cm; Leaves alternate, narrowly oblong, narrowly oblong-lanceolate, oblanceolate or sub-spatulate, margin entire, ciliated at lower half, apex obtuse-acute, base obtuse, glabrous, one-veined, basal leaves black or dark brown, (4-8)x(1-2.2) mm, lower cauline leaves yellow-light yellow, (5-9)x(1.5-2.5) mm, upper cauline leaves green, (4.5-5.5)x(1.5-2) mm, apex leaves aggregated into a rosette, its diameter (10-12) mm, chalk glands (pits at the leaves apex) 5; Inflorescence a corymbose cyme, peduncle costate, densely glandular, green-yellow, (15-25)x(0.5-0.8) mm; Bracts cultrate, linear, spatulate or narrowly oblong, margin entire, apex acute or obtuse, base truncate, glandular-pubescent, green-yellow, (2-3.3)x(0.3-0.6) mm; Flowers 3-5 (converted to fruits), (6.2-10) mm; pedicel (7-9)x(0.2-0.3) mm, perigynous, hypanthium globoid-semigloboid, (1.2-2)x(2-3.3) mm; Calyx of 5 sepals, persistent, triangular, margin entire, apex acute, base truncate, glandular, yellow-brown, (1.3-1.7)x(1-1.5) mm; Corolla of 5 petals, persistent, oblanceolate, margin entire, apex obtuse, base truncate, glabrous, white-pink, (5-8)x(2-3) mm; Stamens 10, obdiplostemonous, persistent, filaments filiform, yellow, (5-7)x(0.1-0.15) mm, anthers semi-globoid, yellow, versatile attachment with the filaments, (0.35-0.45)x(0.4-0.5) mm; Pollens yellow, single, tricolporate, oblate in equatorial view, spheroid in polar view, small {depending on [13]}, equatorial axis (10-13.5) μ m, polar axis (9-12) μ m, few-many, surface sculpture striate; Pistil single; ovary semi-inferior, styles 2, divergent, recurved at the top; Fruit simple, dry, dehiscent, capsule, globose-semi globose, yellow-brown, (1.2-3.5)x(2-4) mm, persistent style (2-3.5)x(0.25-0.35) mm; Seed numerous, narrowly oblong or oblanceolate-narrowly oblong, brown-black, (0.4-0.75)x(0.12-0.2) mm. (Plates 1-4).

Type: Pakistan: Kurram: Ad rupes faucis Shend Toi, 2270-3330 m, AITCH. 383.

Selected samples from the studied specimens

MRO: ESUH/ Qandil mountain (north-east of Erbil), 2140-2350 m, 25.8.2016, A. Sardar, S. Al-Dabagh and K. Rasul, 7450.

Environment & Geographical Distribution

Found as individuals within the area, in wet places on the rocks; altitude: 2140-2350 m; flowering: June-August. Found in Qandil mountain within Rowanduz district (MRO). Figure-1.



Plate 1- Field photograph of *S. afghanica*



Part of plant



Pressed part of plant



Aggregation of basal leaves



Aggregation of lower cauline leaves



Aggregation of upper cauline leaves

Plate 2- Vegetative parts of *S. afghanica*

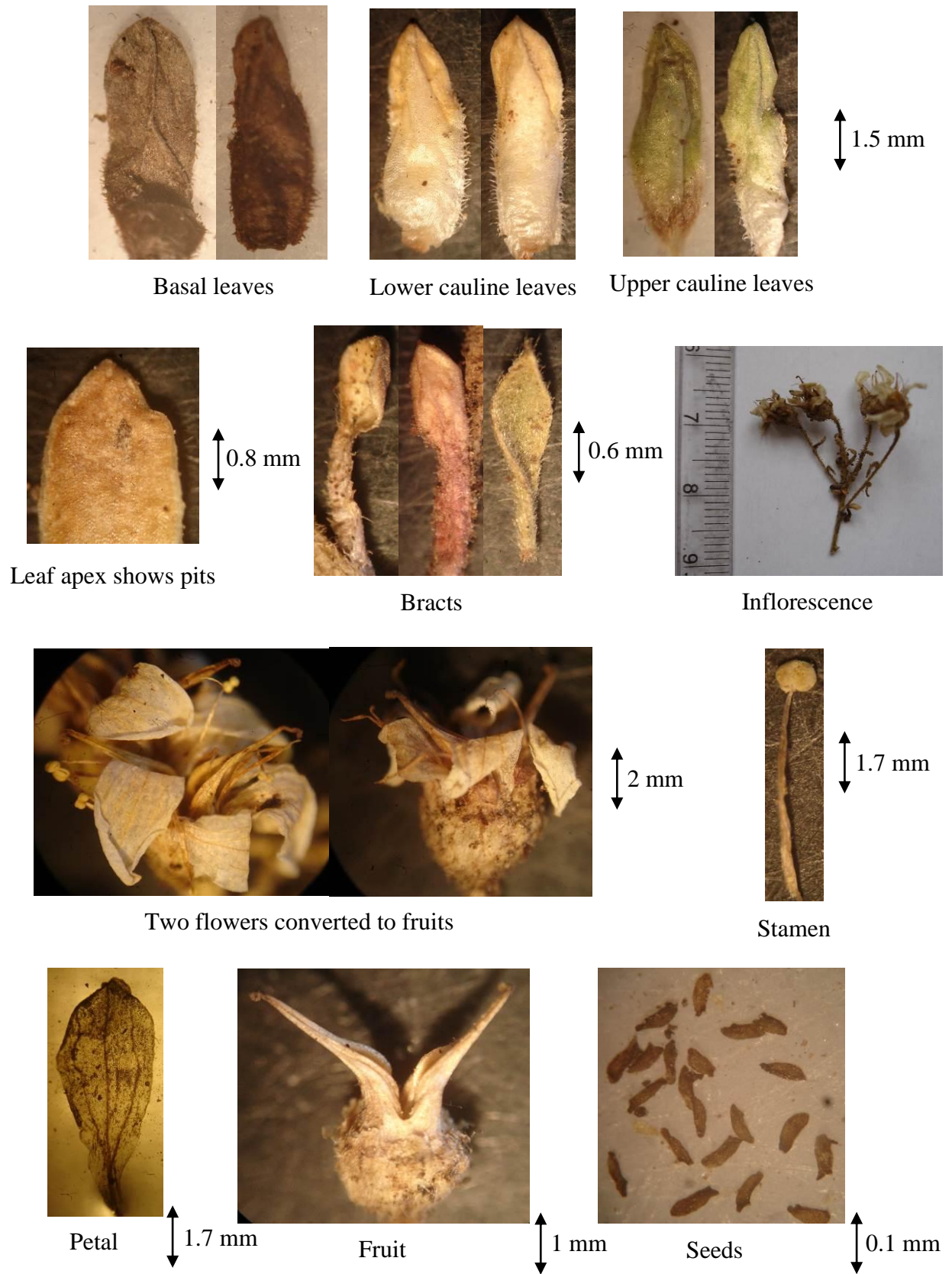
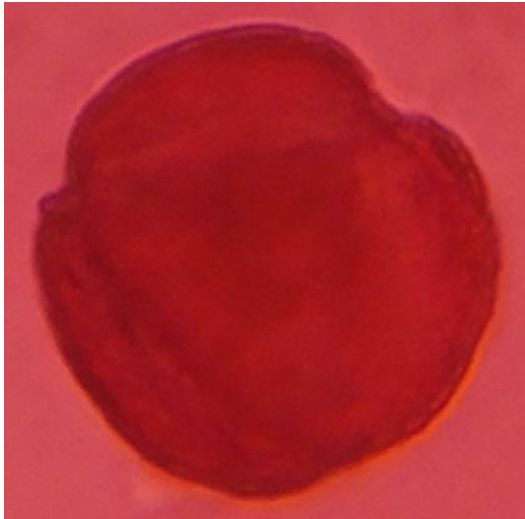
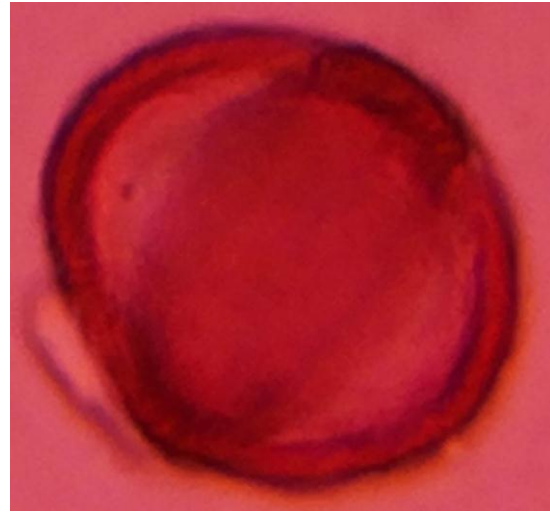


Plate 3-Vegetative and reproductive parts of *S. afghanica*



Polar view



Equatorial view

Plate 4- pollen grain of *S. afghanica* x100

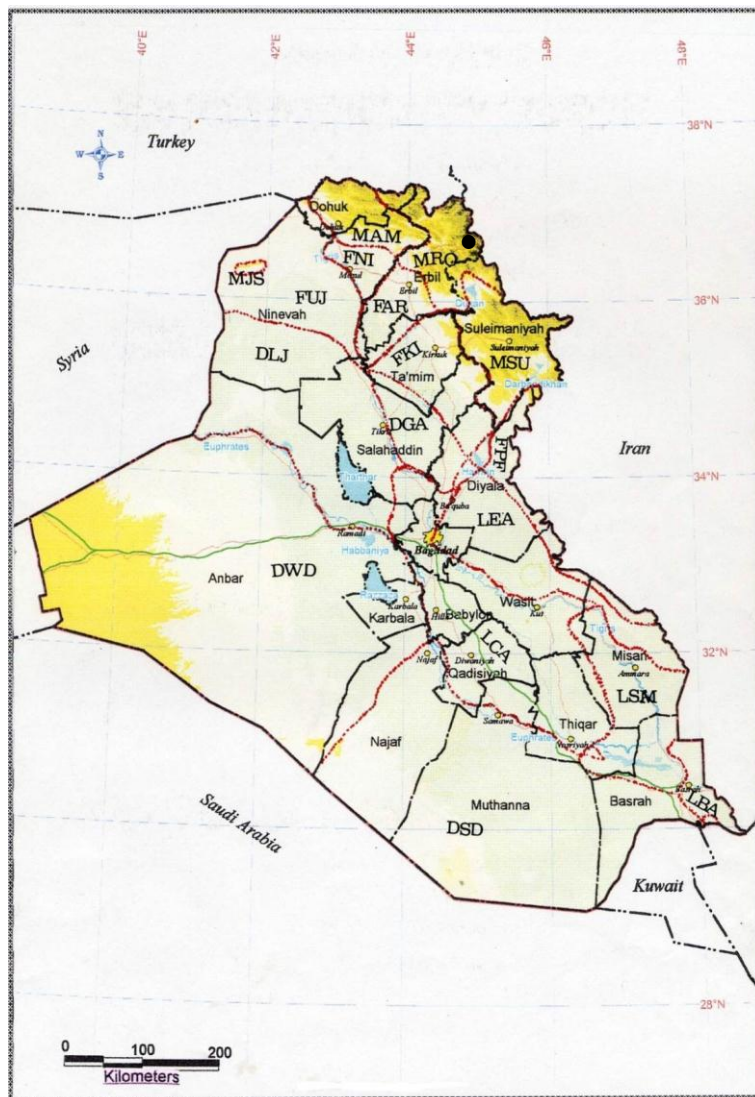


Figure 1- A map of Iraq shows the regions and districts according to [14, 15] • *S. afghanica*

Discussion

In the present study, *S. afghanica* has been dealt as a new record plant which is from Saxifragaceae family in Iraq, the study involved limited sides, such as the morphological characters and the environment in the studied area, as well as, some characters of the pollen grains. Within literature review related to the genus *Saxifraga*, from which the specimens of National Herbarium of Iraq, the researcher did not find any species belongs to *S. afghanica*, therefore it will be regarded as a new record in Iraq from Qandil mountain.

S. afghanica has some characters differ from the perennial species which is *S. sibirica* that found in Iraq, and these characters include that the plant with crowded shoots forming cushions, many branched, leaves sessile, narrowly oblong, narrowly oblong-lanceolate, oblanceolate or sub-spatulate, glabrous, entire, ciliated at lower half; apex leaves aggregated into a rosette, chalk glands (pits at the leaves apex) 5, inflorescence corymbose cyme, ovary semi-inferior, capsule globose-semi globose. In addition, pollen grains were yellow, single, tricolporate, oblate in equatorial view, spheroid in polar view, small, few-many and surface sculpture striate. According to [16], six main trichome types were identified in 213 species of *Saxifraga*: multiseriate-glandular, uniseriate-glandular, sessile multicellular-glandular, multiseriate-eglandular, uniseriate-eglandular and unicellular-eglandular; where the different types were distributed on the flowers pedicels. About the leaf venation, [17] indicated that Saxifragaceae members have one-veined, pinnately veined or palmately veined.

References

1. Simpson, M. G. 2006. *Plant Systematics*. Elsevier Academic Press, USA, pp: 252- 453.
2. Al-Rawi, A. 1964. Wild plants of Iraq with their distribution. Ministry of Agriculture & Irrigation, State board for agricultural & water resources research, National Herbarium of Iraq, Baghdad, pp: 87.
3. Komarov, V. L. 1939. *Flora of the U.S.S.R.*, Vol.9. Izdatelstro Akademii Nauk SSSR, Moskva- Leningrad, pp: 109-154.
4. Matthews, V. A. 1972. *In: Flora of Turkey*. Vol. 4. Edinburgh at the University press, pp: 249 – 259.
5. Schonbeck, E. 1967. *In: Flora Iranica*. No.42/15.3., Akademische Druck -u. Verlagsanstalt, Graz-Austria, p: 1
6. Ridda, T. J. and Daood, W. H. 1982. Geographical distribution of wild vascular plants of Iraq. National Herbarium of Iraq, Un publ., p: 61.
7. Townswnd, C.C. 2013. *In: Flora of Iraq*. Vol.5, P.2. Ministry of Agriculture, Iraq, by Royal Botanic Gardens, Kew, pp: 101-104.
8. Faris, Y. S. 1983. The Vascular Plants of Pira Magrun mountain. M. Sc. Thesis, College of Science University of Salahaddin, Erbil, Iraq.
9. Khalaf, M. K. 1980. The Vascular Plants of Jabal Sinjar. M. Sc. Thesis, College of Science, University of Baghdad, Baghdad, Iraq
10. Fatah. H. U. 2003. The Vascular Plants of Haibat Sultan mountain and the Adjacent Areas. M. Sc. Thesis, College of Science, University of Sulaimani, Sulaimaniya, Iraq.
11. Ahmad, S. A. 2013. Vascular Plants of Hawraman Region in Kurdistan Iraq. Ph.D. Dissertation, Faculty of Agricultural Sciences, Sulaimani University, Iraq.
12. Shahina, G. Saxifragaceae *In: Flora of Pakistan*. Vol.3, Missouri Botanical Press, Missouri Botanical: 8 Garden, USA. www.eFloras.org
13. Erdtman, G. 1971. *Pollen Morphology and Plant Taxonomy, Angiosperms*. Hafner publishing company, New York, p.18.
14. Guest, E. 1966. *Flora of Iraq*. Vol. 1, Ministry of Agriculture of Iraq, pp: 213.
15. FAO. 2002. Yearly report of Food and Agriculture Organization of the United Nations. Agricultural production department, Erbil-Iraq.

16. Gornall, R. G. **1986**. Trichome anatomy and taxonomy of *Saxifraga* (Saxifragaceae). *Nord. J. Bot.*, (3), pp: 257-275.
17. Watson, L. and Dallwitz, M .J. (1992). The families of flowering plants.
<http://delta-intkey.com/angio/www/saxifrag.htm>