



A New Record of *Helichrysum chionophilum* Boiss. & Bal. (Asteraceae) in Iraq

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Abstract

Helichrysum chionophilum Boiss. & Bal. is a new addition to the Asteraceae family in Iraq, from Qandil mountain (north-east of Erbil) within Rowanduz district (MRO). Identification and morphological study have been conducted, these clarified by graphs. In addition, some characters of the pollen grains have been studied such as shapes, colors, sizes, numbers and surface sculpture.

Key words: New record, *Helichrysum chionophilum*, Asteraceae, Rowanduz district, Iraq.

Introduction

Asteraceae is one of the plant families that found in Iraq, which included 22750 species throughout the world and distributed on 1528 genera [1]. In Iraq involves 382 species distributed on 49 genera [2]. In Turkey, [3] stated 16 species of the genus involving *H. chionophilum*. In Europe, [4] mentioned that 16 species of the genus *Helichrysum* present. [5] indicated that 20 species of the genus found in Iran. [6] in the Flora of low land Iraq stated 1 species. While [2 and 7] mentioned 5 species in Iraq. [8] mentioned 1 species in Pira magrun mountain. [9 and 10] indicated that 2 species of the genus present in Sinjar and Hawraman mountains respectively. [11] did not mention any species of the genus *Helichrysum* in Haibat Sultan mountain. In all the available references, the researcher did not find any species refer to *H. chionophilum*, therefore it will be regarded as a new record in Iraq.

Compared to the number of species included, the family is of lesser economic importance. Common valuable ornamentals include species of *Aster*, *Dahlia*, *Chrysanthemum*, *Gerbera*, *Helichrysum*, *Tagetes* and *Zinnia*. A few food plants include *Lactuca* (lettuce), *Cynara* (artichoke), *Helianthus* (sunflower oil), and *Cichorium* (chicory, added to coffee). Safflower a red dye is obtained from *Carthamus tinctorius*. Latter is now more commonly cultivated for its seeds yielding safflower oil, used in cooking. *Chrysanthemum cinerariifolium* is the source of natural insecticide *pyrethrum* [12].

The study assumes the presence of *H. chionophilum* in Iraq and to study the morphological characters with some pollen grains characters, to add some information to the Flora of Iraq.

Materials and Methods

Plant specimens have been collected within the field trips in the different regions of northern districts of Iraq in 2016, during spring and summer seasons. Identification of the specimens has been done by using of some keys especially in Flora of Turkey, the specimens were treated herbarially to become formal specimens, and placed in herbarium of Education College - University of Salahaddin, Erbil (ESUH). Kruss dissecting microscope has been used in the examining of the collected seven plant specimens that belong to *H. chionophilum*. The geographical distribution of the species was cleared with the fixation of some ecological notes, and a map (figure 1) was placed. For the pollen grains, anthers fixed in FAA (Formalin-glacial acetic acid-ethyl alcohol) solution, 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].

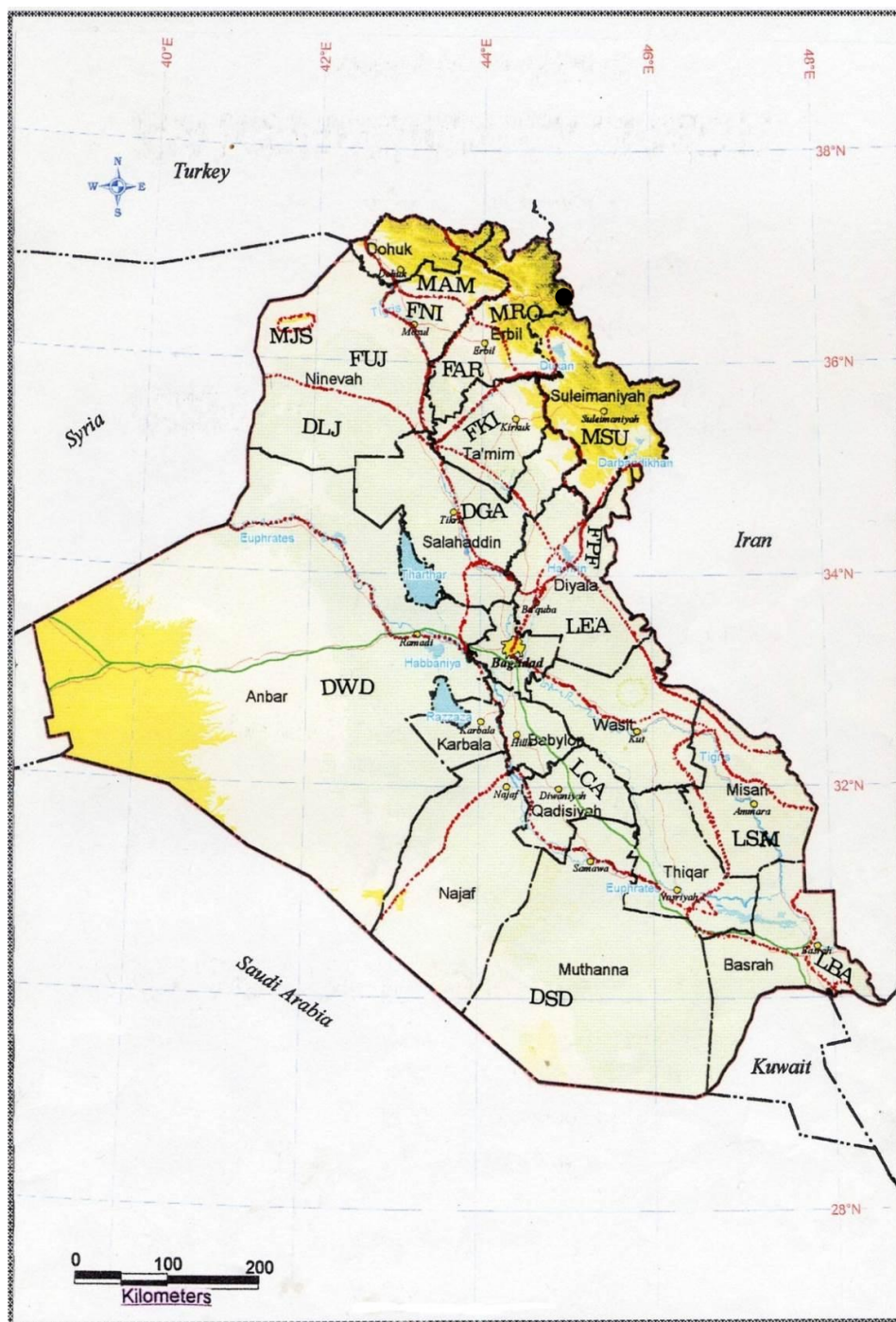


Fig (1): A map of Iraq shows the regions and districts depending on [13 and 14] • *H. chionophilum*

Results

Helichrysum chionophilum Boiss. & Bal. in Boiss., Diagn. ser. 2 (6): 103 (1859). Syn: *H. pallasii* (Sprengel) Ledeb. var. *chionophilum* (Boiss. & Bal.) Boiss., Fl. Or. 3: 230 (1875); Fl. Turkey, Davis and Kupicha, 5: 88 (1975).



Perennial, herbs, (5-21.5) cm, base forming hard mats, with densely white, lanate-felted hairs. Roots brown-dark, (9-16)x(0.1-0.35) cm. caudex branched. stem ascending, green-yellow, (20-40)x(0.8-0.9) mm. Leaves sessil, alternate-spiral, basal leaves oblanceolate-spathulate or narrowly oblanceolate, margin entire, apex acute, base attenuate or truncate, green or green-brown, (6-15)x(1-3.5) mm, lower cauline leaves linear or cultrate, margin entire, apex acute, base attenuate or truncate, green (11-15)x(1.2-1.7) mm, upper cauline leaves linear or cultrate, margin entire, apex acute, base attenuate or truncate, green (10-13)x(1.1-1.8) mm. Inflorescence a hemispherical or oblong-ovoid capitulum, (7-11)x(9-12) mm, flowering stems unbranched, ascending, costate, green-yellow, (7-10)x(0.6-0.8) mm, sterile shoots not swollen at base. Bracts linear or cultrate-linear, margin entire, apex acute, base truncate, green, (6-10)x(0.9-1.5) mm, phyllaries imbricate, broadly ovate, narrowly ovate, elliptic or elliptic-narrowly ovate, margin entire, apex acute, base obtuse, glabrous, yellow, (3-12)x(1.7-3) mm, row numbers 4-5, inner row oblanceolate or oblanceolate-linear, margin entire, apex acute, base truncate, glabrous, yellow, (5-8)x(0.6-1) mm, receptacle flat and naked. Flowers numerous, discoid, hermaphrodite, (5.5-6.5) mm, Calyx pappus of about 25 hair like structures, white-yellow, (4-6)x(0.04-0.05) mm, Corolla tubular, of tube and limb, yellow, tube swollen at base (3.5-4.5)x(0.25-0.35) mm, limb of 5 lobes, triangular, margin entire, apex acute, (0.25-0.5)x(0.35-0.5) mm, Stamens 5, epipetalous, syngenesious, filaments filiform, inserted on the middle of corolla tube, yellow, (0.8-1)x(0.03-0.04) mm, anthers linear, yellow, basifixed attachment with the filaments, (1.6-2.3)x(0.04-0.05) mm. Pollens yellow, single, tricolporate, spheroid in equatorial view, triangular-spheroid in polar view, small according to [15], equatorial axis (10-15) μ m, polar axis (11.25-17.5) μ m, numerous, surface sculpture echinate. Ovary inferior, cultrate-narrowly oblanceolate or cultrate-very narrowly elliptic, yellow, (1.3-1.7)x(0.4-0.5) mm, style 1, filiform, swollen at base as corolla tube, bi-branched at apex, yellow, (3.3-3.8)x(0.04-0.05) mm, stigma 2, (0.7-0.8)x(0.03-0.05) mm. Fruit simple, dry, achenial, cypsela, narrowly oblong or narrowly oblong-narrowly oblanceolate, brown, (1.6-1.8)x(0.5-0.6) mm, persistent style (2-3.5)x(0.25-0.35) mm. Seed one, don't separate from pericarp. (plates 1-5).

Type: [Turkey B5 Kayseri] in regione alpina superiori montis Aslan dach Antitauri in Cappadocia, viii 1855, *Balansa* (K!).

Studied samples

MRO: ESUH/ Qandil mountain (north-east of Erbil), 2800-2850 m, 25.8.2016, A. Sardar, S. Al-Dabagh & K. Rasul, 7452.

Environment notes

The plant was found as individuals within the area, in the rocky soils; altitude: 2800-2850 m; flowering: July-September. Present in Qandil mountain within Rowanduz district (MRO). (figure 1).



Plate (1): Field photograph of *H. chionophilum*



Plate (2): *H. chionophilum* with root



Basal leaves



Lower cauline leaves



Upper cauline leaves



Bracts

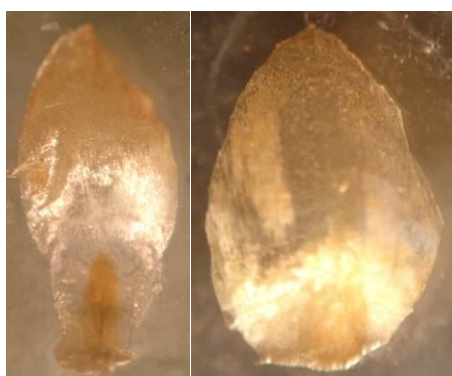


Lanate (felted) hairs



Phyllaries

2 mm



Outer phyllaries



Inner phyllary

1.5 mm

Plate (3): Different parts of *Helichrysum chionophilum*



Capitulum



1.1 mm

Flower



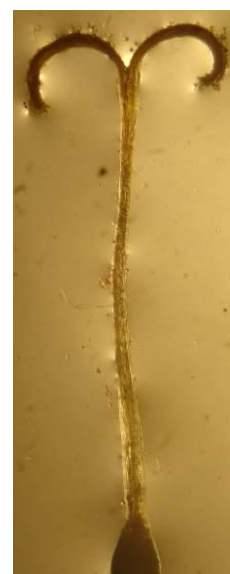
0.6 mm

Corolla



0.4 mm

Stamen



0.5 mm

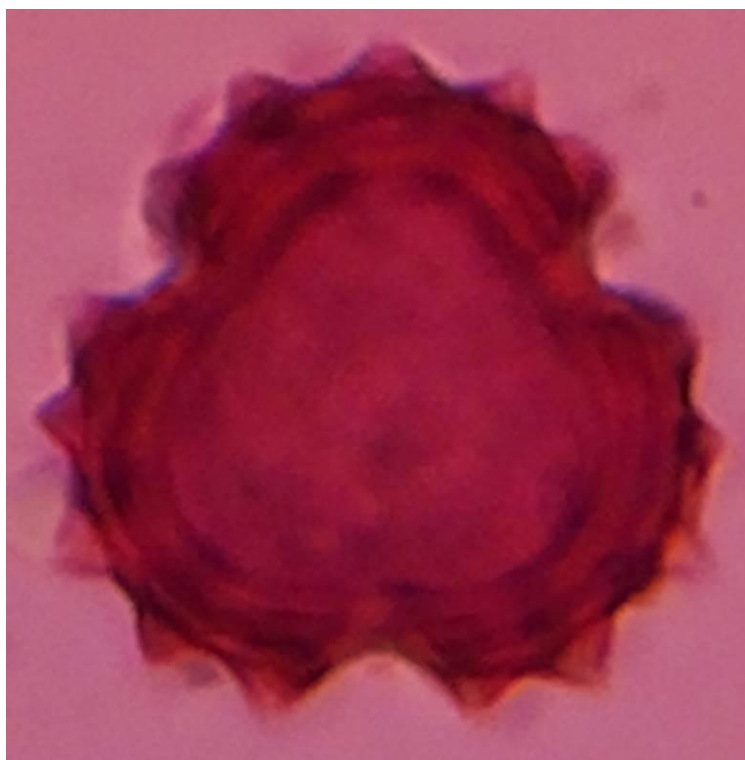
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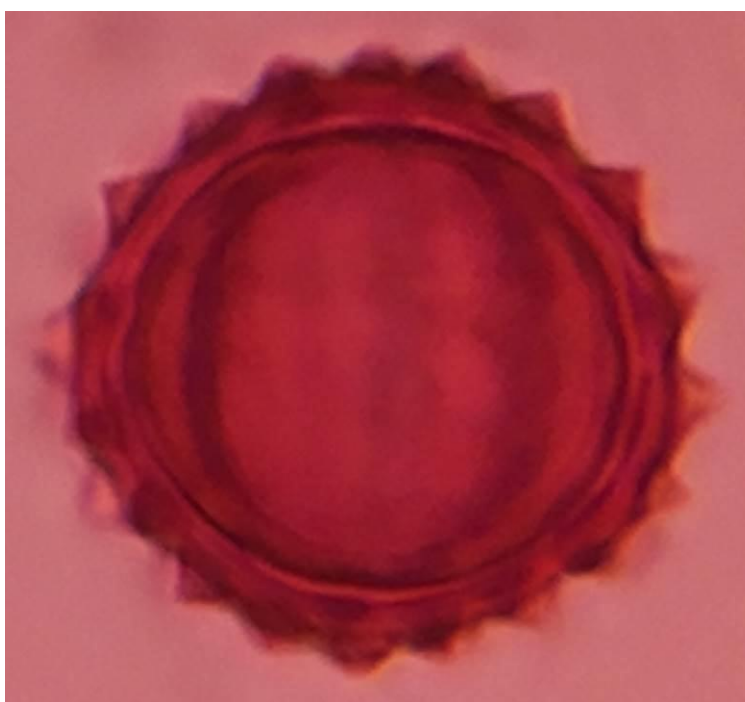
2 mm

Cypsela

Plate (4): Reproductive parts of *H. chionophilum*



Polar view



Equatorial view

Plate (5): Pollen grains of *H. chionophilum* X100

Discussion

This study dealt with a new record of *Helichrysum* which is *H. chionophilum* from Asteraceae family in Iraq, as well as, the study included limited aspects, such as the morphological characters and the environment with the distribution in the studied region. Within literature review connected to the genus *Helichrysum*, including the specimens of National Herbarium of Iraq (BAG), College of Science Herbarium, University of Salahaddin -



Erbil, Iraq (ARB) and College of Education Herbarium, University of Salahaddin - Erbil, Iraq (ESUH), the researcher did not find any species refer to *H. chionophilum*, therefore it will be regarded as a new record in Iraq from Qandil mountain.

H. chionophilum has some characters differ from the close species which is *H. pallasii* (Sprengel) Ledeb. that present in Iraq, and these characters involve that the plant base forming hard mats, with densely white, lanate-felted hairs, caudex branched, basal leaves oblanceolate-spathulate, flowering stems unbranched, ascending sterile shoots not swollen at base. Inflorescence a hemispherical or oblong-ovoid capitulum, inner row of phyllaries oblanceolate or oblanceolate-linear. Identification, morphological study was conducted, these clarified by graphs. In addition, pollen grains were yellow, single, tricolporate, spheroid in equatorial view, triangular-spheroid in polar view, small, numerous and surface sculpture echinate. According to [16] the pollen grains of the species *H. pallasii* had tricolporate and tetracolporate apertures, oblate-spheroidal shape, medium size, as well as echinate surface sculpture.

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