

TWO NEW SPECIES AND A NEW RECORD OF THE GENUS *COUSINIA* CASS., SECT. *CYNAROIDEAE* (ASTERACEAE) FROM WEST OF IRAN

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Cousinia dalahuensis and *C. mobayenii* are described as new species. These species closely related to the *Cousinia sardashtensis* and *C. kirrindica*. Also *Cousinia qandilica* is reported as a new record from Iran. Anatomical studies on the root, stem and leaf of *C. mobayenii* were carried out.

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Key words. *Cousinia*, *Asteraceae*, new species, Iran, anatomy.

دو گونه جدید و گزارش یک گونه جدید از جنس کوزینیا (بخش *Cynaroideae*) از غرب ایران

فریده عطار و احمد قهرمان

گونه‌های *Cousinia dalahuensis* و *C. mobayenii* از استان کرمانشاه شرح داده می‌شوند که به ترتیب نزدیک‌ترین وابستگان آنها گونه‌های *C. sardashtensis* و *C. kirrindica* می‌باشند. خصوصیات بافت شناختی گونه *C. mobayenii* بررسی می‌شود. همچنین گونه *Cousinia qandilica* که تاکنون فقط از عراق گزارش شده بود برای اولین بار از استان آذربایجان (بین سردشت و پیرانشهر) گزارش می‌گردد.

INTRODUCTION

In four years of taxonomic studies concerning genus *Cousinia* Cass. in Iran interesting samples have been collected in the oak forests of West of Iran (In Kermanshah province). Two species in the section *Cynaroideae* named *Cousinia dalahuensis* and *C. mobayenii* are described. *Cousinia qandilica* which was introduced by Rechinger as a new species in Iraq (from Arbil and Qandil mountains), has also been found in the Azarbaijan province in Iran (between Piranshahr and Sardasht).

NEW SPECIES

Cousinia mobayenii Ghahreman & Attar, **sp. nov.**; fig. 1, map 1.

Perennis, monocarpica. Radix fusiformis. Caulis ad 40 cm altus, a basi divaricate ramosus, arachnoideo-floccosus, dense foliatus, omnino alatus. Folia herbacea, utrinque manifeste reticulato-nervosa, persistenter tomentulosa, spinis lateralibus ad 8 mm longis, terminalibus ad 6 mm longis; folia basalia sessilia, 21x6 cm, lanceolata, pinnatilobata, lobis triangularibus; folia caulina oblonga, in alas spinulosas, ad 8 mm latas, decurrentia; folia summa gradatim decrescentia. Capitula singula, terminalia, spinis inclusis 6 cm

diametro, \pm 114-flora. Involucrum superne constrictum laxe araneosum; phylla \pm 165, appendiculata; phylla exteriora 2-4.5 mm longa; appendix 9-18 mm longa, basi 2-5 mm lata, triangularis, in spinam longam attenuata, utrinque spinis numerosis, reflexis vel recurvatis praedita; phylla intermedia 5-7 mm longa; appendix 18-22 mm longa, basi 3-6 mm lata, triangularis, utrinque spinis 2-3 praedita, gradatim in spinam longam rigidam attenuata, reflexa; phylla interiora 13 mm longa; appendices rhomboidea, acuminata, 10x4 mm; phylla intima exappendiculata, membranacea, erecta, acuminata, prominentia. Receptaculi setae scabridae, ad 18 mm longae. Corolla purpurea, 21 mm longa, tubo limbum subaequante, laciniis 3-6 mm longis; antherarum tubus purpureus, glaber; antherae basi 4 mm longae caudatae. Achaenia 5x2.5 mm., oblonga-obovata, scabra, costato-lineata, irregulariter atrius maculata, superne dentato-marginata; pappus 3-7 mm longus.

Typus. Kermanshah: between Eslamabad-e Gharb and Kerend-e Gharb: 3 km after Firouzabad village, 1490 m, Ghahreman & Attar 20569 (holotypus TUH). -*Paratypus.* Kermanshah: between Eslamabad-e Gharb and Kermanshah, 1500 m, Ghahreman &

Aitar 22378 (TUH); 18 km North of Kerend-e Gharb, Lotfeh village, 1700 m, Hamz'ee & Hatami, 1425 (TARI); Kerend mountains, road of Dalahu, 1700-2000 m Assadi 60789 (TARI).

Monocarpic biennial. Root fusiform. Stem up to 40 cm high, divaricately branched from the base, arachnoid-floccose, densely leafy, totally winged. Leaves herbaceous, persistent-tomentellose on both surfaces; nervation pinnate-reticulate, prominent; lateral spines up to 8 mm long; terminal spine 6 mm long; basal leaves sessile, 21x6 cm, lanceolate, pinnatilobed; lobes triangular; stem leaves oblong, decurrent; stem wings dentate, spiny, up to 8 mm wide; uppermost leaves gradually reduced. Capitulum solitary, terminal, included spines 6 cm in diam., without spines 2.5 cm in diam., \pm 114-flowered; involucre constricted above, loosely arachnoid; bracts \pm 165, appendiculate; outer bracts 2-4.5 mm long; appendages 9-18 mm long, 2-5 mm wide at the base, triangular, attenuate into long spine, with numerous spines on each side, reflexed, or recurved; median bracts 5-7 mm long; appendages 18-22 mm long, 3-6 mm wide at the base, triangular, with 2-3 spines on each side, gradually

attenuate into rigid long spine, reflexed; inner bracts 13 mm long, appendages rhombic, 10x14 mm, acuminate; innermost bracts exappendiculate, membranous, erect, exerted, acuminate; seta of receptacle barbellate, up to 18 mm long. Corolla purple, 21 mm long; tubus nearly as long as limb; lacinia 3-6 mm long; anther tube purple, glabrous; anther 4 mm long caudate at the base. Achene 5x2.5 mm, scabrous, oblong-obovate, striate, irregularly black-maculate, dentate above; pappus 3-7 mm long.

The new species belongs to *Cousinia kirrindica* but differs from it by the following characters: flowers \pm 114 (not \pm 75), bracts \pm 165 (not \pm 70), seta scabrous (not smooth), plant \pm 40 cm high (not 25-30 cm).

ANATOMICAL STUDIES

Materials and Methods

The sample of plant examined was collected from West of Iran. Voucher specimen (Ghahreman & Attar 20569-TUH) is kept in Tehran University Herbarium (TUH). Specimens were stored for a month in Alcoholglycerin mixture. Before cutting the sections, they were kept for 15 minutes in temperature 70 to 80 centigrades. Sections were stained with

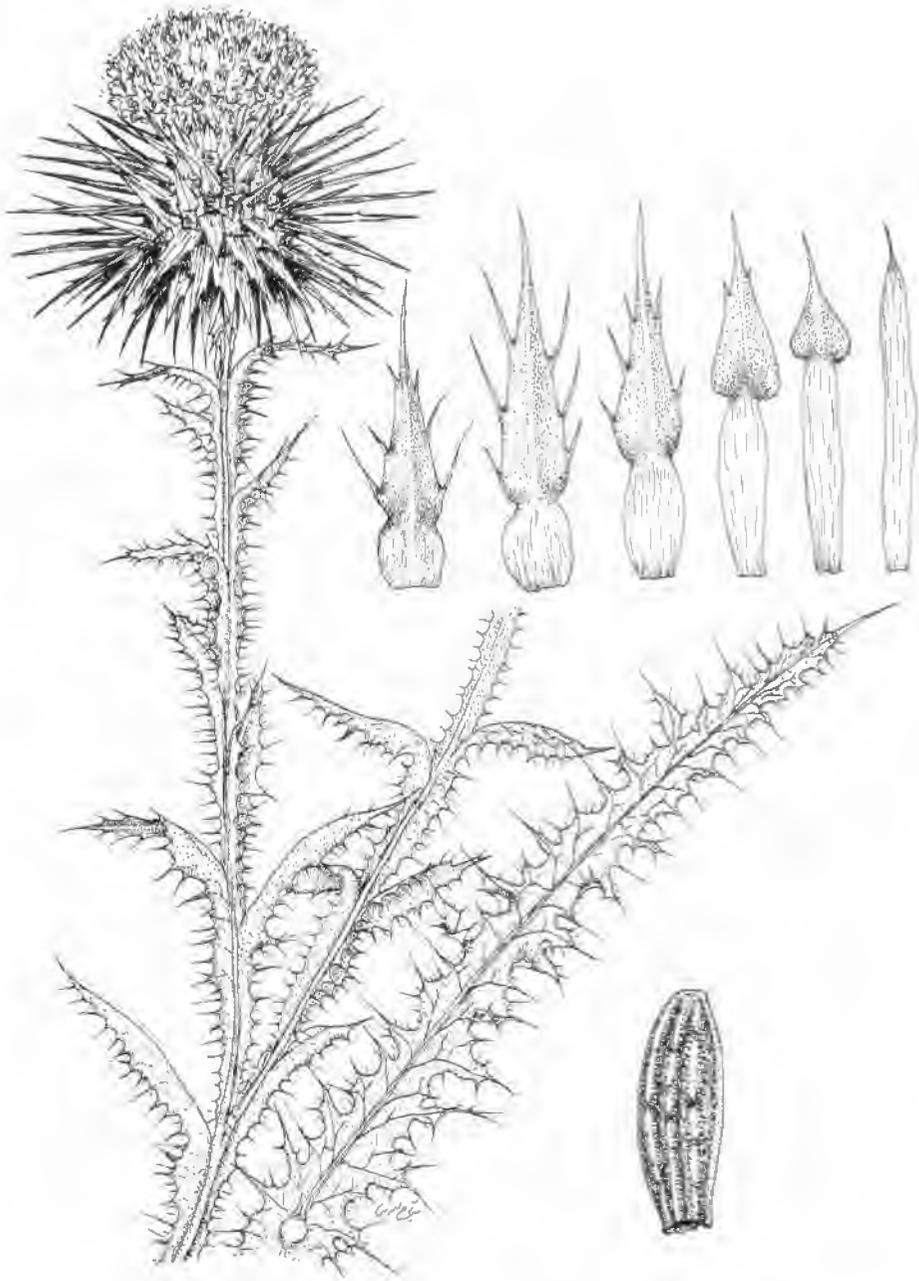


Fig. 1. *Cousinia mobajenii* (x 0.68); bracts (x 2.1); achene (x 6.1)

Methyl Green (to give a green color to the woody tissues) and Brown Bismark (to give a brown color to the cellulose tissues). Then by means of Optical Microscope (OPM) and stereoscopic Microscope (SM) the sections were photographed and studied.

Observations

Root. The transverse section is circular and shows secondary growth. The outer layers of the root is suberized tissue. The cortex contains schizogenic cavities appearing as numerous enlarged cavities. Between these cavities and the parenchyma cells are filled by fibrous tissues. The inner layer is endodermis. The pericycle consists a more or less complete ring of fibres which are sometimes interrupted by groups of thin walled parenchyma cells. Secondary phloem formation (due to cambium activity) occurs above the cambium facing outward. Between the phloem lies fiber elements. Cambium is made of few layers of thin walled rectangular cells. The xylem contains a continuous ring of lignified tissue which is composed of vesseles, xylem fibres, xylem parenchyma cells and medullary rays. Presence of three or four rings of phloem and xylem is indicative of the perennial plant. In medullary rays lies

schizogenic cavities. The pith region contains xylem tissues. (Fig. 2. A, B, C).

Stem. A transverse section reveals a polygonal shape which indicates furrows on the stem. The first layer is the epidermis. There is undereneath at the corner angular or lamellar collenchyma. This formation is sometimes continuous. The inner layer is endodermic. Within the collenchyma and the parenchyma tissues lies scattered small schizogenic cavities. Vascular bundles with primary structure are surrounded by fiber elements. On the cortex periferal vascular bundles are seen. The position of the phloem in the peripheral bundles is the reverse of the position it has in the central bundles. The pith region contains parenchymatous cells. Fig. 2: D; Fig. 3: A, B.

Leaf. Transverse section of lamina is dorsiventral and exhibits the following characters:

mesophyll. The upper and lower epidermises have a single layer of cells with smooth cuticle. Trichomes abundant, multlicellular (biseriate) with terminal conical cell and glandular hairs (biseriate) with swelling terminal cell. Stomata are ranunculaceous type and abundant in the upper and lower epidermises. There are

underneath of the upper epidermis two layers of palisade parenchyma and the same layers are also present irregularly under the lower epidermis. Meager amount of spongy tissue indicate the degree of its xerophyte characteristic. (Fig. 3: D, E).

Midrib. The upper and lower epidermises sometimes show irregular furrows. The palisade of the mesophyll becomes discontinuous over the midrib. There is a prominent zone of angular or lamellar collenchymatous cells attached to lower and upper epidermises. The midrib contains numerous vascular bundles and are surrounded by fiber cells. Fig. 3, C.

Cousinia dalahuensis Attar & Ghahreman, **sp. nov.**; fig. 4, map 1.

Perennis monocarpica. Caulis 35 cm altus. Folia supra laxe arachnoideo-tomentosa, subtus dense albo-araneoso-tomentosa, pennato-reticulata, nervosa, denticulata et spinuloso-ciliata, spinis usque 4 mm longis; folia basalia ignota; folia caulina inferiora oblonga; folia caulina oblonga, decurrentia, in alas usque 20 mm latas traseuntia; folia summa decrescentia, a capitulis remota. Capitula 2 cm diametro, ± 65 -flora; involucrem ovato-oblongum; phylla ± 67 , appendiculata, extus papillosa; phylla exteriora 3-3.5 mm longa, appendices

triangulares, 7 mm longae, basi 5.5 mm latae, sensim attenuatae, squarroso-imbricatae, margine utrinque 1-3 spinulosae; phylla intermedia 3.5-4 mm longa; appendices triangulares, 6.5 mm longae, basi 7.5 mm latae, sensim attenuatae, margine utrinque 1-spinulosae, squarroso-imbricatae; phylla interiora 7 mm longa; appendices rhombiformes, acutae, 5 mm longae, 6 mm latae; phylla intima usque 18 mm longa, exappendiculata, acuta, exserta, membranacea; receptaculi setae scabridae, usque 17 mm longae; corolla ± 20 mm longa, purpurea; tubus limbum aequans, laciniae 5-7 mm longae; filamenta 4 mm longa; antherarum tubus glaber, purpureus; antherae basi 2 mm longae caudatae. Achaenia 4.5 mm longa, 2.5 mm lata, obovata, basin versus attenuata, atrata vel brunnescentia scabrida, longitudinaliter striata, superne truncata, marginato-denticulata; pappus caducus, 4-8 mm longus.

Typus. Kermanshah: Gahvareh: Tang-e Khamoush, 1500 m, Attar & Mirtajodini, 19918 (holotypus TUH). -*Paratypus.* Kermanshah: Mihidasht region, Bujan pass, 1300 m, Attar & Mirtajodini, 19929 (TUH).

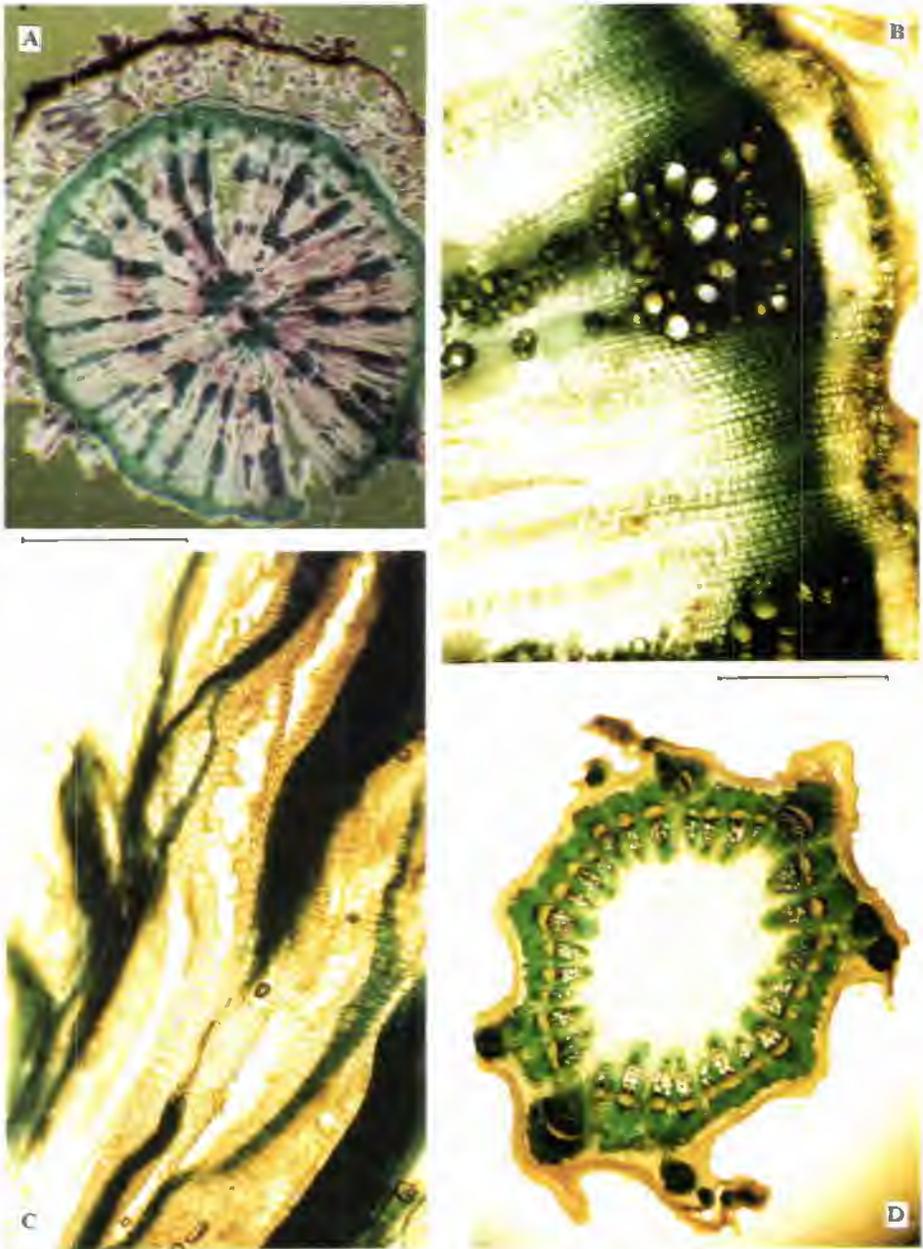


Fig. 2. *Cousinia mobayenii*. A, B, root in TS, bar in A 2 mm, in B 400 μ m. C, root in LS (shows schizogenic cavities), bar=400 μ m; D, stem in TS, bar=1000 μ m.

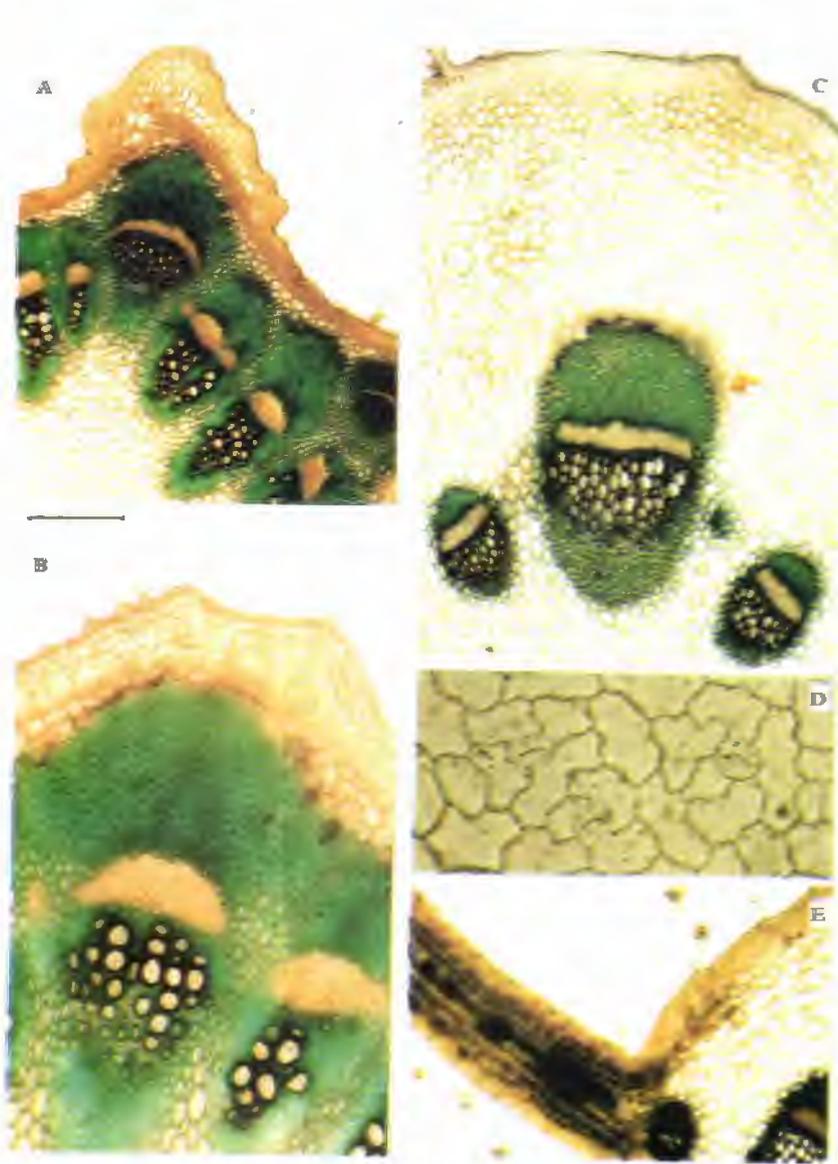


Fig. 3. *Cousinia mobayenii*. A, B, leaf in TS, in A bar=400 μ m, in B bar=100 μ m. C, A part of midrib showing three vascular bundles, bar=100 μ m. D, epidermal cells of leaf showing anomocytic stomata. E, A part of leaf shows lamina and midrib with multicellular glandular trichomes, bar=100 μ m.

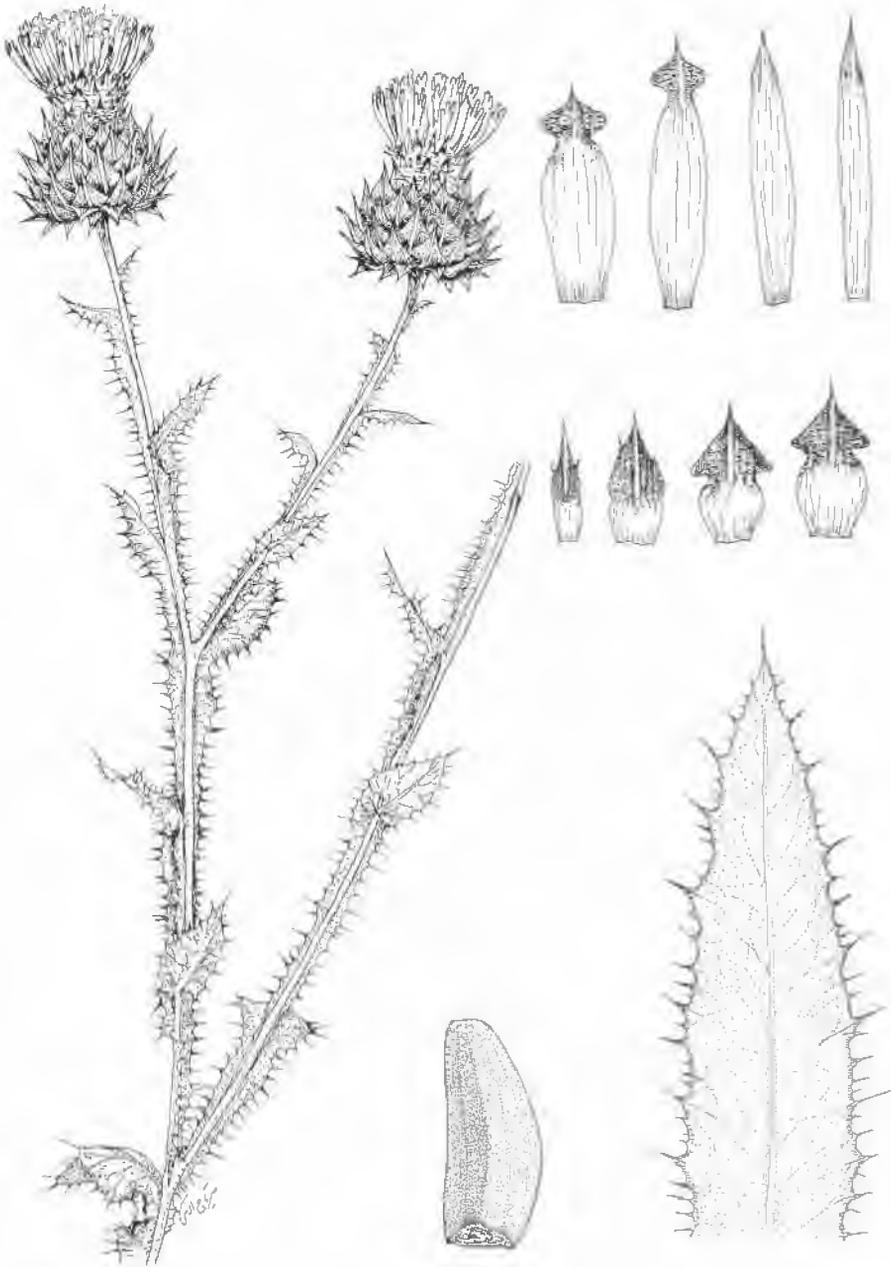


Fig. 4. *Cousinia dalahuensis* (x1); stem leaf (x1); bracts (x2); Achene (x6.3).

Habitat: Forests of *Quercus brantii*.

Monocarpic perennial. Stem 35 cm high. Leaves loosely arachnoid-tomentose above, white-arachnoid-tomentose below; nervation pinnate-reticulate; margin denticulate, spinulose-ciliate; spines up to 4 mm long; basal leaves unknown; lower stem leaves oblong; median leaves oblong, decurrent; wings up to 20 mm wide; uppermost leaves reduced. Capitulum 2 cm in diam., \pm 65-flowered; involucre ovate-oblong; bracts \pm 67, appendiculate, papillose outside; outer bracts 3-3.5 mm long; appendages triangular, 7 mm long, 5.5 mm wide at the base, gradually attenuate into spine, imbricate, with 1-3 spinule on each side; median bracts 3.4-5 mm long; appendages triangular, 6.5 mm long, 7.5 mm wide at the base, gradually attenuate, with 1 spine on each side, imbricate; inner bracts 7 mm long; appendages rhombic, acute, 5 mm long, 6 mm wide; innermost bracts up to 18 mm long, exappendiculate, acute, exerted, membranous; bristle of receptacle barbellate, up to 17 mm long; corolla \pm 20 mm long, purple; tube as long as limb; lobes 5-7 mm long; filaments 4 mm long; anther tube glabrous, purple; anther 2 mm long caudate at the base. Achene 4.5 mm long, 2 mm wide, obovate, attenuate at the base, brownish-black, scabrous,

longitudinally striate, truncate-denticulate above; pappus caducous, 4-8 mm long.

The closest species to the new species is *C. sardashtensis* but differs in: flowers \pm 65 (not 140-150), bracts \pm 67 (not \pm 96), corolla \pm 20 mm long and purple (not 23-24 mm and yellow), anther tube purple (not yellow), lacinia 5-7 mm long (not 3-5 mm), seta up to 17 mm long (not 20 mm), margin of bract appendage with 1-3 spines (not 1-5).

NEW RECORD

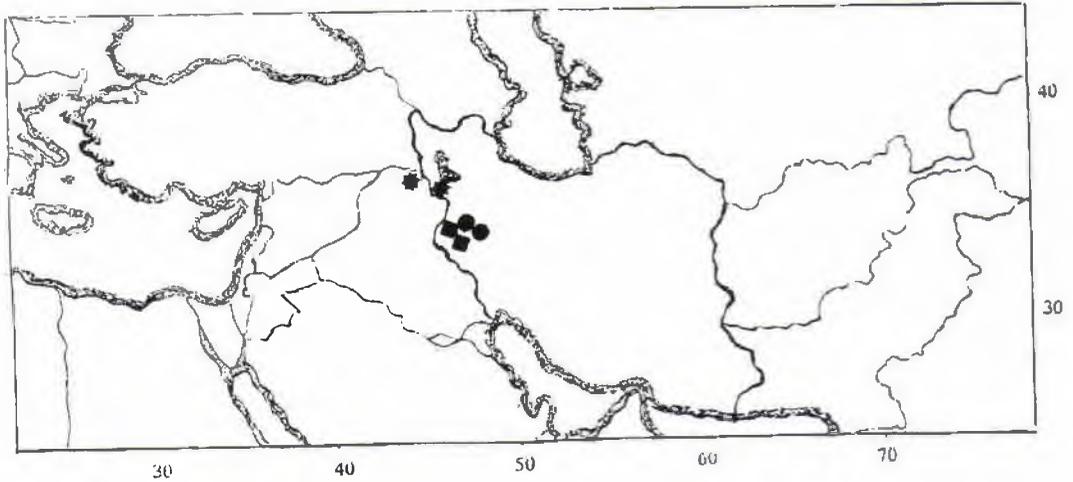
Cousinia qandilica Rech. f.; map 1.

Azarbaijan: between Piranshahr and Sardasht, 1300 m, Ghahreman & Attar, 22009-TUH.

It was described from Arbil and Qandil mountains of Iraq as an endemic species, but now its distribution extends to West of Iran. (Rechinger 1972).

This is a very distinctive species belongs to group of species having erect and imbricate bracts with numerous spines in the margin. Of this group only *Cousinia keredjensis* Bornm. & Gauba (NW Tehran) and *C. canescens* DC. (Azarbaijan) are growing in Iran.

C. qandilica is a rare species and scattered within the oak forest.



Map 1. Distribution of *Cousinia* species. *C. mobayenii* ■; *C. dalahuensis* ●; *C. qandilica* * .

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