

Helianthemum sicanorum (Cistaceae), a new species from Sicily

by

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Abstract

Helianthemum sicanorum, an endemic species occurring on calcareous marls near Gela (S Sicily), is described and illustrated. Due to its habit and flower morphology, *H. sicanorum* shows close relationships with *H. kahiricum* Del., circumscribed to the semi-arid habitats of northern Africa and the Middle East. *H. sicanorum* is quite rare and localized on steep slopes facing the sea, where it is a member of thermophilous garigues of the Cisto-Micromerietea class.

Keywords: Cistaceae, endemism, *Helianthemum*, phytosociology, Sicily, taxonomy.

Resumen

Se describe e ilustra la nueva especie *Helianthemum sicanorum*, que crece sobre margas calizas cerca de Gela, en el sur de Sicilia. Por su hábito y morfología floral, *H. sicanorum* está relacionado con *H. kahiricum* Del., especie propia de ambientes subdesérticos del norte de África y Asia Menor. *H. sicanorum* es muy raro, y está limitado a laderas abruptas que miran al mar, donde crece en garrigas termófilas de la clase Cisto-Micromerietea.

Palabras clave: Cistaceae, endemismo, fitosociología, *Helianthemum*, Sicilia, taxonomía.

Introduction

The coastal belt of southern Sicily represents a very important area from the phytogeographical point of view. In fact, this part of the island is characterized by the occurrence of several endemic or rare species, mostly circumscribed to this territory (Giusso del Galdo & Sciandrello, 2003). During floristic investigations along the rocky coast of "Torre Manfria" (Gela), a small population of a really peculiar and hitherto uncollected *Helianthemum* was found (Proctor & Heywood, 1968; Pignatti, 1982). Based on investigations carried out on herbarium material (CAT, FI, RO) and literature data, this plant is closely related to *H. kahiricum* Delile, a xerophyte distributed in arid and semi-arid habitats of N Africa and the Middle East, but not recorded for any European country. However, the Sicilian population, differing from the typical of *H. kahiricum* in many morphological features chiefly concerning the leaves, inflorescence, flowers and fruits, is here described as a species new to science.

Materials and methods

The morphological study of *H. sicanorum*, was based on living plants coming from the type locality, while *H. kahiricum* was examined using herbarium specimens (CAT, FI) and the measurements of the flowers were taken on dry hydrated specimens.

Helianthemum sicanorum Brullo, Giusso & Sciandrello, **sp. nov.** (Figs. 1, 2)

Ab Helianthemum kahiricum differt caulibus adpresse lanuginosis pilisque simplicibus 0,1-0,3(0,4) mm longis, foliis etiam ita indutis atque linearibus aut lineari-oblongeolatis, petiolis 0,3-0,8 mm longis, inflorescentia maxime 10-flora, bracteis 1,5-2 mm longis, pedicellis 5-7 mm longis, calyce albo-sericeo pilis simplicibus adpressisque atque 0,1-0,2 mm longis, sepalis exterioribus subulatis apiceque rotundatis atque 0,1-0,2 mm longis, sepalis interioribus 3-nerviis apiceque obtusiusculis atque 4-5,5 mm longis, corolla calycem excedenti vel aequanti, petalis 4-5 × 2-2,5 mm longis latisque, filamentis staminalibus 1-1,6 mm longis, anthera 0,4-0,5 mm

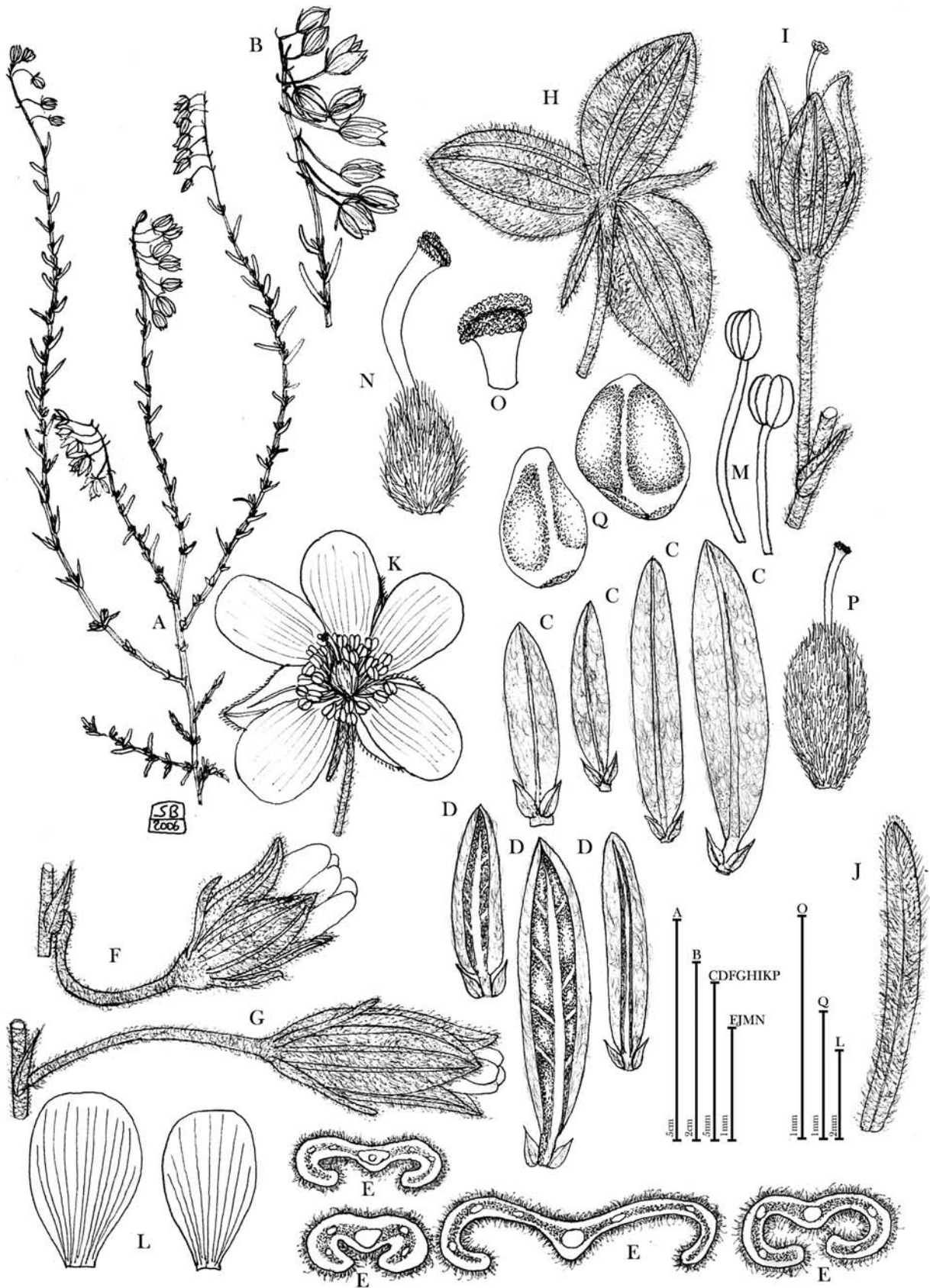


Fig. 1. *Helianthemum siccanorum* (Holotype, CAT): **A**, habit; **B**, detail of inflorescence; **C**, leaves (upper surface); **D**, leaves (below surface); **E**, leaves (transversal section); **F**, flower bud; **G**, closed flower; **H**, open calyx; **I**, fructified flower; **J**, terminal part of the outer sepal; **K**, open flower; **L**, petals; **M**, stamens; **N**, pistil; **O**, stigma; **P**, capsule; **Q**, seeds.

longa, ovario 1-1,2 mm longo, stylo 1,4-1,6 mm longo, stigmatum papillis multis brevibusque (0,01 mm longis) cooperto, capsula 3,5 × 1,8-2 mm longa lataque atque pilis 0,1-0,3 mm longis tecta seminibusque brunneo-rubrescentibus atque 1-1,1 mm longis.

Small shrub 20-30 cm tall, stems laxly caespitose, branched from the base, erect to ascending, with stellate hairs and shorter simplex hairs 0.1-0.3(0.4) mm long. Indumentum tomentose-canescens and appressed in the stem and leaves. Leaves linear to linear-oblongate 3.5-10 mm long, 1-2(3) mm wide, strongly revolute at the margins with petiole 0.3-0.8 mm long. Stipules ovate-lanceolate, longer than the petiole, 1-1.5 mm long, 0.4-0.6 mm wide. Inflorescence one-sided, 5-10 flowered. Bracts lanceolate, 1.5-2 mm long. Pedicels exceeding or equalling the calyx, 5-7 mm long, patent or deflexed. Calyx white-sericeous, green-purplish, with simplex hairs 0.1-0.2 mm long. Outer sepals subulate 2-3 mm long, rounded at the apex; inner sepals oblong-ovate, lightly obtuse at apex, 4-5.5 mm long, 2.8-3.2 mm wide, 3-nerved. Corolla exceeding or equalling the calyx, with petals yellow 4-5 mm long, 2-2.5 mm wide, many nerved, often not opening (cleistogamous flowers). Stamens numerous with filament 1-1.6 mm long and anther 0.4-0.5 mm long. Ovary ovoid, densely hairy, 1-2 mm long. Style white, curved 1.4-1.6 mm long. Stigma sulcate, sub-plane, covered by numerous short papillae (ca. 0.01 mm). Capsule ellipsoid, 3.5 mm long, 1.8-2 mm wide, densely pilose, with hairs 0.1-0.3 mm long. Seeds brown-reddish, minutely punctate, 1-1.1 mm long.

Holotype: Sicily, Gela, litorale roccioso presso Torre Manfredia, 30-VII-2005, *Sciandrello s.n.* (CAT; isotypes, CAT, FI, MA).

Etymology. The specific epithet refers to "Sicani", an ancient civilization settled in Sicily from the second millennium to the fifth century B.C.

Distribution. This species is known only for a small population of no more than 50 individuals, circumscribed to Torre Manfredia near Gela, (S Sicily), along a narrow strip of rocky coast.

Habitat. *Helianthemum sicanorum* grows on Pliocene marly limestones facing the sea, where it colonizes steep and hardly reachable slopes (Fig. 3). From the bioclimatic viewpoint the area at issue belongs to the bioclimatic belt with a lower thermomediterranean thermotype and upper semiarid ombrotype (Brullo & al. 1996). This species plays an important physiognomic role within the thermophilous garigues characterized by undersized chamaephytes linked to really arid habitats. In particular, it is a member of the *Diplocladus crassifoliae-Reaumurieta*



Fig. 2. *Helianthemum sicanorum*: inflorescence (from the type locality, July 30th 2005).

vermiculatae (Table 1), a xeric plant community described by Brullo & al. (2000) belonging to the Cisto-Micromerietea class. Within this association, some North African species (*Reaumuria vermiculata* L., *Diplocladus crassifolia* (Rafin.) DC., etc.), usually rare for the Sicilian flora, are frequent too.

Phenology: flowering February to July; fruiting April to August.

Conservation status. At present, *H. sicanorum* is a threatened species at high risk of extinction as a result of the low number of individuals (less than 50) circumscribed to a narrow stand close to the sea. Therefore, since this species is seriously endangered by several human activities (such as tourist facilities, fire, urban sprawl, agricultural exploitation, and so on), we deem it should be added to the Regional Red List of Threatened Species as critically endangered (CR). Based on the criteria adopted by IUCN (2001, 2003, 2005), it is proposed its inclusion in the following category: CR B1a, B2a, D.

Taxonomic remarks. According to the classification proposed by Grosser (1903) for the genus *Helianthemum*, this new species has to be referred to the Sect.



Fig. 3. Habitat of *Helianthemum sicanorum*. Locality of holotype, within garigue of *Diplofaxio crassifoliae*-*Reaumurietum vermiculatae* (Cisto-Micromerietea), July 30th 2005.

Eriocarpum Dunal. This section groups deserticolous shrubs characterized by unbranched inflorescence, persistent and pungent when dried, stamens 15-20, style ascending to geniculate, capsule rounded-trigone, pubescent to hirsute, flowers often cleistogamous with petals contorted at the apex, enveloping the capsule as a mitre. In its morphology, *Helianthemum sicanorum* is quite similar to *H. kabiricum*, a species widespread in the South Mediterranean countries, described and illustrated by Delile (1813) from northern Egypt. Both these taxa are small shrubs with a woody subspinescent habit and branches covered by dense whitish tomentum, but several different features allow them to be easily distinguished. In particular, *H. kabiricum* has a patent and longer indumentum with hairs from 0.5-1.5 mm long, and linear lanceolate leaves up to 20 × 7 mm. The petiole is 0.5-2 mm long, the inflorescence up to 12-flowered, bracts 0.2-0.5 mm long, pedicels 2-5 mm long, and the calyx villous with simplex patent hairs 0.5 mm long. The outer sepals are lanceolate-subulate, acute at apex, 3-6 mm long, inner

sepals 5-7 mm long, acute at apex, 4-nerved, corolla shorter than calyx with petals 2.7-3 mm long and 1.5-1.8 mm wide, stamen filaments 0.6-1 mm long, anther 0.3-0.4 mm long, ovary 1.2-1.4 mm long, style 0.8-1 mm long, stigma covered by few longer papillae (0.03-0.06 mm long), capsule 4-5 mm long and 2.3-2.5 mm wide, covered by hairs 0.3-0.5 mm long, and the seeds are dark-brown 1.2-1.3 mm long (Fig. 4). From the point of view of chorology, and based on the following authors [Bonnet & Barratte (1896), Grosser (1903), Muschler (1912), Pampanini (1914), Post (1932), Quézel & Santa (1963), Zohary (1972), Jafri (1977), Pottier-Alapetite (1979), Collenette (1985), Mouterde (1970), Migahid (1988), Feinbrun-Dothan & Danin (1998), Raynaud (1999) and Boulos (2000)], *H. kabiricum* is a Saharo-Arabian element usually growing in desertic or the semi-arid places of N Africa, Sinai, Palestine, Syria, Iraq and Saudi Arabia (Fig. 5). Because of this, it seems quite possible that *H. sicanorum* should be as a geographical vicariant of *H. kabiricum*, replacing it in Sicily.

Table 1. *Diplotaxio crassifoliae* - *Reaumurietum vermiculatae* Brullo, Guarino & Ronsisvalle 2000.

Number of inventory	1	2	3
Surface (m ²)	20	10	10
Cover (%)	60	70	60
Exposition	S	S	S
Gradient (°)	50	50	50
Characteristic of association			
<i>Helianthemum sicanorum</i> Brullo, Giusso & Sciandrello	2	2	1
<i>Reaumuria vermiculata</i> L.	1	+	1
<i>Diplotaxis crassifolia</i> (Raf.) DC.	1	+	+
Characteristic of Cisto-Ericion & Cisto-Micromerietea			
<i>Thymelaea hirsuta</i> (L.) Endl.	1	1	2
<i>Coridothymus capitatus</i> (L.) Rchb.f.	3	3	3
<i>Phagnalon rupestre</i> (L.) DC. ssp. <i>annoticum</i> (Jord. ex Burnat) Pignatti	1	1	2
<i>Teucrium capitatum</i> L.	.	1	1
Other species			
<i>Reichardia picroides</i> (L.) Roth	1	1	1
<i>Daucus gingidium</i> L.	3	2	1
<i>Lygeum spartum</i> L.	1	2	1
<i>Trachynia distachya</i> (L.) Link	+	+	1
<i>Asparagus horridus</i> L.	1	+	1
<i>Sedum sediforme</i> (Jacq.) Pau	2	1	2
<i>Artemisia arborescens</i> L.	+	+	+
<i>Capparis spinosa</i> L.	1	.	+
<i>Pistacia lentiscus</i> L.	+	.	+
<i>Salsola oppositifolia</i> Desf.	.	+	+
<i>Plantago macrorrhiza</i> Poir.	2	.	.
<i>Limbarda crithmoides</i> (L.) Dumort.	+	.	.
<i>Suaeda vera</i> Forssk. ex J.F. Gmel.	1	.	.
<i>Teucrium fruticans</i> L.	.	1	.
<i>Dactylis hispanica</i> Roth	.	+	.
<i>Valantia muralis</i> L.	+	.	.
<i>Prasium majus</i> L.	.	.	1

In conclusion, *H. sicanorum* represents an endemic with thermo-xerophilous requirements, showing a punctiform distribution area, which is likely to be the result of the long geographic isolation of the Sicilian population from the southern Mediterranean ones.

Representative specimens

Helianthemum sicanorum

Sicily: Gela, litorale roccioso presso Torre Manfreda, 24-VII-2005, *Sciandrello s.n.* (CAT); *ibid.*, 8-I-2006, *Sciandrello s.n.* (CAT); *ibid.*, 4-IV-2006, *Brullo, Giusso & Sciandrello s.n.* (CAT).

Helianthemum kabiricum

Egypt: Gebel Mokattan, 2-III-1898, *Marchesetti s.n.* (FI); *ibid.*, pr. Cairo, II-1898, *Marchesetti s.n.* (FI). Heluan, 25-II-1898, *Marchesetti s.n.* (FI). Wadi Hof, sandy soil, 25-II-1961, *Khattab s.n.* (FI). Bassa Tebeide, nei valloni e burroni dell'altipiano del Mokattan, verso il Cairo nonché nelle montagne della Regione Sinaica, IV, *Figari* (FI). Summit Jebel Mokattan about 5 miles SE of Cairo, 4-IV, *Scott Elliot, 3617* (FI). Sull'altopiano calcareo della Valle Nilotica (Mokattan e Gebel Ghioceseli), IV, *Figari* (FI). Prope Cairo, s.d., *Samaritani s.n.* (FI). Nel deserto di Alessandria che segue il litorale del deserto di Ramba e di Abuk, V-1867, *Figari s.n.* (FI). Comune in luoghi rupestri della Regione del Sinai, ed è pure del deserto montano d'Egitto, s.d., *Figari s.n.* (FI). **Libya:**



Fig. 4. *Helianthemum kahiricum* (Libya, CAT): **A**, habit; **B**, detail of inflorescence; **C**, leaves (upper surface); **D**, leaves (below surface); **E**, leaves (transversal section); **F**, flower bud; **G**, closed flower; **H**, open calyx; **I**, fructified flower; **J**, terminal part of the outer sepal; **K**, open flower; **L**, petals; **M**, stamens; **N**, pistil; **O**, stigma; **P**, capsule; **Q**, seeds.

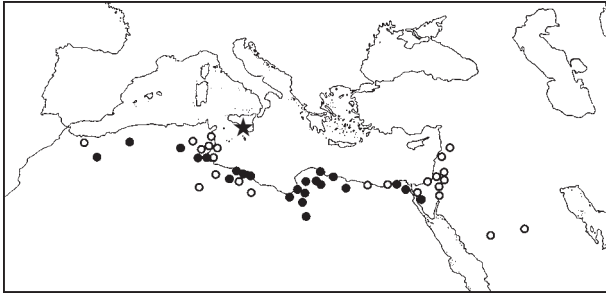


Fig. 5. Distribution map of *Helianthemum sicanorum* (star) and *H. kahircum* (literature data empty circle and herbarium specimens full circle).

Cirenaica, Msus, 20-III-1933, *Pampanini 5172* (FI). *ibid.*, Amseat a sud di Bardia 24-III-1963, *Pampanini 5173* (FI). *ibid.*, fra El Aghelia e Agedabia, 22-V-1937, *Servizi Agrari Pirenaica 233* (FI). *ibid.*, Uadi Faregh, Maatan Giafar a sud di El Aghelia, 15-III-1933, *Pampanini 5171* (FI); *ibid.*, Saniet El Hamar a sud-est di Agedabia, 12-III-1933, *Pampanini 5169* (FI); *ibid.*, Gebel el Bab, presso il Marabutto, 18-V-1981, *Brullo & Furnari s.n.* (CAT); *ibid.*, Ajedabia, 19-V-1981, *Brullo & Furnari s.n.* (CAT); *ibid.*, 80 Kil. De Derna (Soud de Tobruk), 24-IV-1938, *Maire & Weiller 178* (FI); *ibid.*, Martuba, a sud-est di Barce, U. el Bgor, 8-IV-1933, *Pampanini 5180* (FI); *ibid.*, Uadi Faregh, Maaten Giofer, 8-IV-1934, *Pampanini & Pichi-Sermolli 5181* (FI). Sirtica or., a sud di Gas es Sahabi, 20-IV-1928, *Krueger s.n.* (FI); *ibid.*, fra l'Uadi Feregh e Maatan Risam, 18-IV-1928, *Krueger s.n.* (FI). Marmarica, Porto Bardia, 20-VII-1926, *Krueger s.n.* (FI); *ibid.*, Tobruk, 1918, *Cassinea* (FI). Tripolitania, Taruna, Uadi Ksea, Ras Argobinam, 8-IV-1913, *Pampanini 2448* (FI); *ibid.*, Mesellata, Msid di Cesellata, 9-IV-1913, *Pampanini 2580* (FI); *ibid.*, colline a N-NW di Cussabat, 12-IV-1913, *Pampanini 2951* (FI); *ibid.*, Cussabat, Ras Gelà, 13-IV-1913, *Pampanini 3134* (FI); *ibid.*, Uadi Gherrim, 15-IV-1913, *Pampanini 3265* (FI); *ibid.*, Garian, Uadi Garian, 29-IV-1913, *Pampanini s.n.* (FI); *ibid.*, Ras Bu-Ganus, 27-IV-1913, *Pampanini 3983* (FI). **Tunisia:** Entre Bir et Hagué et Bir Teura, 14-IV-1887, *Letourneux s.n.* (FI). In collibus aridis deserti ad Sidi Bout-Baba prope Gabes, 7-III-1854, *Kralik s.n.* (FI). **Algeria:** In lapidosis arenosis montis Melia prope Figiug, 1000 m, 17-IV-1932, *Maire s.n.* (FI). Bistra, in glareosis planit. et in rupibus montium "Djebel Maovia, Djebel Snia", V-1896, *Chevallier 16* (FI); *ibid.*, sur les coteaux pierreux, 20-IV-1853, *Balansa* (FI). Rochers de la Region Latoricum Tiaut, 24-IV-1896, *Cbauber s.n.* (FI).

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