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Arenaria acaulis (Caryophyllaceae), a new species from South Peru

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Abstract

During studies on the flora of Moquegua (Southern Peru), some interesting *Arenaria* populations (subgen. *Dicranilla*, Caryophyllaceae) were found. The morphology of the plants does not resemble any other neotropical *Arenaria* species. The most similar species known so far is *Arenaria boliviana* (from Bolivia and Peru) from which it differs in having a shorter stem length, ciliate (not glabrous) short branches; ovate rather than oblong-lanceolate leaves always covered with dense, long trichomes, never glabrous; pedicels shorter than or equal to the size of the calyx (not twice as long), sepals broadly ovate (not ovate-oblong) and with glabrous surface, as well as in the petals. Hence, a new species—*A. acaulis*—is here described and illustrated.

Resumen

Como parte de los estudios de la flora del departamento de Moquegua (Sur de Perú), unas poblaciones interesantes de *Arenaria* (Subgen. *Dicranilla*, Caryophyllaceae) fueron encontradas. La morfología de las plantas no se asemeja a otras especies neotropicales de *Arenaria*. La especie más próxima es *Arenaria boliviana* (de Bolivia y Perú) de la cual se diferencia en tener tallos más cortos longitudinalmente, ramas cortas y ciliadas (no glabras); hojas ovadas y cubiertas por densos tricomas alargados; pedicelos de menos o igual tamaño que el cáliz (no del doble de tamaño), sépalos anchamente ovados (no ovado-oblongos) y con la superficie glabra, al igual que en los pétalos. Como consecuencia, una nueva especie para la ciencia—*A. acaulis*—es aquí descrita e ilustrada.

Key words: *Arenaria*, new species, Peru, South America

Introduction

Arenaria Linnaeus (1753: 423) is a genus of about 200 species distributed in Eurasia, America, and northern Africa (Williams 1898, Zhou 1996, Hartman *et al.* 2005). The species of *Arenaria* are annual or perennial (often caespitose), with leaves ovate to lanceolate, petals usually with margins entire, stamens 10, disk more or less developed, (2–)3 styles and capsules opening with twice as many teeth as there are styles (Macbride 1937, McNeill 1962, Volponi 1985, Hartman 2005) Based on molecular data *Arenaria* was shown to be polyphyletic by Fior (2006, 2007) a result that was further corroborated by Harbaugh et al (2010) and by Greenberg et al (2011). Harbaugh *et al.* (2010) proposed to accommodate the members of *Arenaria* subgen. *Eremogone* (Fenzl 1833: 13) Fenzl (1842: 360) and subgen. *Eremogoneastrum* F.N.Williams (1895: 598) in *Eremogone* and to recognize *Arenaria* subgen. *Odontostemma* (Bentham ex G.Don 1831: 449) F.N.Williams (1895: 603) as a separate genus, The South American members of the genus (ca. 50 species) belong to subgen. *Dicranilla* (Fenzl 1840: 967) F.N.Williams (1895: 599) and subgen. *Leiosperma* McNeill (1962: 105). Several members of subgen. *Leiosperma* were shown to belong in *Arenaria* s.str. by Harbaugh *et al.* (2010), and by Greenberg *et al.* (2011), but no members of subgen. *Dicranilla* have been included in any phylogenetic study so far. A recent taxonomic review is lacking for both these South American subgenera,

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although several local taxonomic treatments and floras were published (Reiche 1860, McNeill 1962, Volponi 1985, 2012, Brako & Zarucchi 1993, Jørgensen & Ulloa Ulloa 1995, Zuloaga *et al.* 2008).

In Peru, 21 species are currently known to occur (Macbride 1937, Brako & Zarucchi 1993), of which two are recorded in Moquegua region, South Peru (Montesinos 2012). The mountain highlands of Moquegua are an interesting geographical area not least because of the high level of endemism. The highland plateaus and superficial rocky slopes are particularly interesting, and they are usually inhabited by cushion plants and leptophyllous shrubs, which provide niches for a wide variety of otherwise rare rosette plants, and other flowering plants.

Materials and methods

Since 2009 the first author has examined over 800 specimens of *Arenaria* occurring in the Andes and housed in Peruvian herbaria (CUZ, HSP, HUT, HUSA, MOL, USM), from institutions abroad (B, BR, F, KEW, L, LPB, MO, P, WAG), and material from the first author's recent fieldwork. Digitised specimens were viewed via online herbarium catalogues of Tropicos (2014) and JSTOR (2014). Acronyms follow Thiers (2014+).

All morphological characters were studied under a NSZ-405 1X-4.5X stereo microscope and an AmScope M100C-LED 40×-1000× compound microscope. Conservation assessments were undertaken using the IUCN Red List Criteria (IUCN 2014).

Results and discussion

Arenaria acaulis Montesinos & Kool, *sp. nov.* (Figs. 1–2)

Type:—PERU. **Moquegua Region:** General Sánchez Cerro Province, Ubinas District: Larsepesca site, terrestrial on clayey rocky soils on the plateau peaks between Coalaque and Tassa towns, 4653 m, 16°08'32''S, 70°43'08''W. 4 April 2009, *Montesinos 2475A* (holotype USM!, isotypes MO–2219338!, HUPCH–4221). Image of the isotype at MO available at http://tropicos.org/Specimen/100196348

Diagnosis:—The new species is morphologically similar to *Arenaria boliviana* but is clearly distinguished by the shorter stem length, ciliate (not glabrous) short branches; ovate rather than oblong-lanceolate leaves always covered with dense, long trichomes, never glabrous; pedicels shorter than or equal to the size of the calyx (not twice as long), sepals broadly ovate (not ovate-oblong) and covered with trichomes as opposed to usually glabrous, as well as by the presence of petals.

Description:—Perennial herb, deep rooted, pulvinate, forming solitary tufts 0.8–1.2 cm tall and 4–6 cm in diameter. *Stems* 5–10 mm long, often densely branched and covered by older leaves in the central and lower parts; internodes short, less than 0.2 mm in length. *Leaves* opposite, imbricate, gradually reduced in length and width upward on stem, the largest near the central portion and base; lamina ovate, 1.2–1.9 mm × 0.8–1.2 mm, densely covered by thin trichomes (about 0.1–0.4 mm long) on the margins except in the surfaces and the base; base truncated and apex acute; leaves light green with greenish round dots near the pale red midrib, margins also pale red. *Flowers* solitary, with short pedicels of about 0.2–0.5 mm long and covered with short, fine trichomes. *Calyx* cylindrical to narrowly campanulate, the 5 sepals mostly 0.8–1.2 mm long, ovate, apically obtuse or rounded, light green and inconspicuously 1-veined, with densely scarious margins. *Corolla* tubular in early anthesis, becoming narrowly campanulate, the petals shorter than the sepals, ca. 1.2 mm long, the blades broadly ovate, glabrous, apically rounded or obtuse, pale white-greenish, with an inconspicuous midrib. *Stamens* usually 10, spreading-ascending, the filaments linear (ca. 0.8–1.2 mm long), white, the anthers elliptical, pale-yellow and reniform (ca. 0.2 mm long). *Ovary* ovoid, ca. 0.7 mm long, pale yellow-white; styles 3, at anthesis 1–1.5 mm long, erect or slightly spreading, the curved, minute, scarious stigmas ca. 0.35 mm long. *Capsule* broadly ovoid, enclosed by the persisting calyx and petals, 1.7–2 mm long and somewhat incurved; *seeds* 10–16, rounded, 0.4–0.6 mm in length, rounded to some extent elliptic, surface reddish-brown, shiny, and rarely granulate.

Etymology:—The epithet *acaulis* refers to the tufted and acaulescent habit of the species.

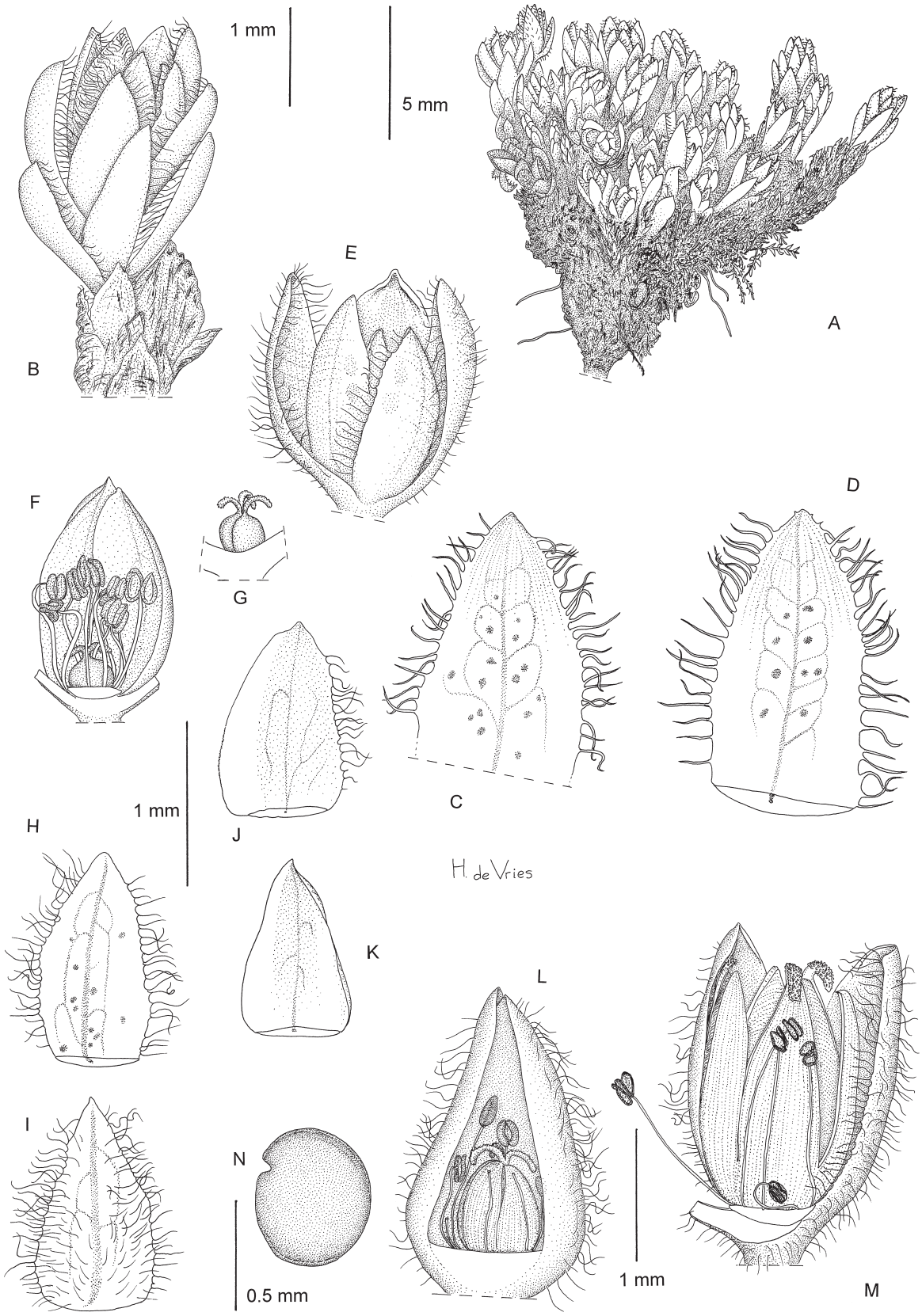

FIGURE 1. A. Habitus: complete plant (X 8) **B.** Branch with flower (X 30) **C.** Leaf, outside (X 50) **D.** Leaf, inside (X 50) **E.** Flower (X 50) **F.** Flower, opened (X 50) **G.** Ovary (X 50) **H.** Sepal, inside (X 50) **I.** Sepal, outside (X 50) **J.** Petal, inside (X 50) **K.** Petal (other), inside (X 50) **L.** Opened flower = very young fruit (X 40) **M.** Fruit, 1 sepal and 1 petal removed (X 40) **N.** Seed (X 65). Drawing by H. de Vries.

Ecology and distribution:—*Arenaria acaulis* is distributed on highland plateaus of the Moquegua Region (South Peru). It grows on rocky slopes at an elevation of 4450–4700 m.a.s.l. Associated species are: *Astragalus peruvianus* Vogel (1843: 18), *Azorella compacta* Phil. (1891: 28), *Mniodes pulvinata* Cuatrec. (1954: 5), *Pycnophyllum molle* J.Remy (1846: 355), and the endemics: *Nototriche digitulifolia* A.W. Hill (1948: 127), *Senecio moqueguensis* Montesinos (2014: 3–6) and *Senecio sykorae* Montesinos (2014: 6–11). Flowering and fruiting between March and April.

Taxonomical notes:—The new species is unique among the Neotropical *Arenaria* because of its dense cover of trichomes and the tufted, cushion–like habit. *A. acaulis* most closely resembles *A. boliviana* (Williams 1898: 425) MacBbride (1936: 597–598). It differs by its shorter stem and internode length, the short branches being ciliate; the leaves ovate and densely covered by long trichomes; pedicels shorter or equal to the size of the calyx, sepals broadly ovate and densely covered with trichomes, and by the presence of petals.

FIGURE 2. Habit of *Arenaria acaulis* (along road between Matazo and Querala, Ubinas district, at 4584 m).

The new species is further differentiated from *A. dicranoides* Kunth (1823: 34) by the habit, plant size, height and leaf shape, where in *A. acaulis* leaves are smaller and have a smooth tip, not coriaceous. *A. nitida* (Bartling 1831: 12) Rohrbach (1872: 249) differs in its leaves being larger and bisulcate and also by the glabrous sepals.

Conservation status:—On the basis of the IUCN criteria and categories (IUCN 2014), a status of Critically Endangered (CR) is assessed. The total area of occupancy (AOO) is less than 10 km² (ca. 5 km²) (criterion B2), only one population is known, despite extensive fieldwork in the area by the first author (B2a), habitat inferred to be continuing to decline [B2b(i–v)), population estimated to number fewer than 150 individuals (criterion D). The suitable habitats for *A. acaulis* on the mountain summits of the north of Moquegua are indicated as endangered because of overgrazing of grasslands, changes in annual rainfall, volcanic activity, and exploitation of natural resources, all potentially reducing their extent.

Additional material examined (paratypes):—PERU. Moquegua Region, General Sánchez Cerro Province, Ubinas District, terrestrial on highland rocky slopes near Larsepesca, Coalaque town, 4677 m, 16°08′19″ S, 70°43′15″ W, 21 March 2009, *Montesinos 2475B* (USM, MO–2274701); Moquegua Region, General Sánchez Cerro Province, Ubinas District, terrestrial on clayey rocky soils on the Querala plateaus, 4618 m, 16°07′12″ S, 70°50′09″ W, 24 March 2013, *Montesinos 4026* (USM, HSP); Moquegua Region, General Sánchez Cerro Province, Ubinas District, terrestrial on rocky slopes close to the road between Matazo and Querala, 4584 m, 16°10′02″ S, 70°43′15″ W, 28 March 2015, *Montesinos 4241* (USM, HSP, HUT).

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