

**A NEW VARIETY OF *JUNIPERUS SABINA* FROM
MONGOLIA: *J. SABINA* VAR. *MONGOLENSIS***

Robert P. Adams

Baylor University, Biology Department, P.O. Box 97388, Waco, TX
76798, USA

email Robert_Adams@baylor.edu

Andrea E. Schwarzbach

Department of Biological Sciences, University of Texas at Brownsville
Brownsville, TX, USA.

ABSTRACT

A new variety of *Juniperus sabina* L. (var. *mongolensis* R. P. Adams) is recognized from Mongolia. It was discovered growing on sand dunes south of Ulan Batar. It differs from *J. sabina* var. *arenaria*, which occurs on sand dunes at Lake Qinghai, China, in that it has more seeds per cone, the seeds are globose, and the terminal branchlets grow only on the top (upper) side of the branchlets. A key to the varieties of *J. sabina* is presented.

KEY WORDS: *Juniperus*, *J. sabina* var. *mongolensis*, taxonomy, Cupressaceae, Mongolia.

The genus *Juniperus* consists of approximately 67 species (Adams, 2004; Farjon, 2005), all native to the northern hemisphere, although, *J. procera* Hochst. ex Endl. grows southward along the rift mountains in East Africa into the southern hemisphere (Adams, 2004). A recent monograph of the genus (Adams, 2004) divides *Juniperus* into three sections: *Caryocedrus* (one species, *J. drupacea* Labill.); *Juniperus* (= *Oxycedrus*, with 11 species) and *Sabina* (the remaining 55 species). Section *Sabina* can be subdivided into junipers with serrate leaf margins vs. those with entire (smooth) leaf margins. The serrate leaf margined junipers are confined to the western hemisphere, except for *J. phoenicea* L. which seems more allied with the smooth leaf margined junipers (Schwarzbach et al., 2007).



Figure 1. Distribution of *Juniperus sabina* and its varieties. AR = *J. s. var. arenaria*; MS = *J. sabina* on Mongolian sand. Xs represent outlying populations of *J. sabina*.

The species of section *Sabina* of the eastern hemisphere can be further divided into two groups based on the number of seeds per female cone (often referred to as a berry) and female cone shape. The single seed/cone (single seeded) *Juniperus* of the eastern hemisphere have cones that are ovoid with a noticeable pointed tip, whereas the multi-seeded *Juniperus* are generally globose and often have an irregular surface. *Juniperus sabina* L. is a smooth leaf margined, multi-seeded juniper of the eastern hemisphere. It is very widely distributed from Spain through Europe to Siberia (Fig. 1). It is generally a small shrub less than 1m tall and ranging up to 1-2 m wide. However, in the Sierra Nevada of Spain, it forms a prostrate shrub on rocky areas and in Mongolia it occurs as a prostrate plant on sand dunes (MS, Fig. 1).

Recently, Farjon (2001) transferred *J. chinensis* L. var. *arenaria* E. H. Wilson to *J. sabina*, as *J. sabina* var. *arenaria* (E. H. Wilson) Farjon (AR, Figure 1). In addition, Farjon (2001) transferred *J. davurica* Pall. to *J. sabina* as *J. sabina* var. *davurica* (Pall.) Farjon.

DNA sequencing of nrDNA and trn C-trnD (Schwarzbach et al., 2007) has led to a different interpretation of the relationships within the *chinensis-davurica-sabina* complex (Fig. 2). *Juniperus chinensis* and *J. procumbens* (Siebold) ex Endl. are well supported (100%) as being distinct from *J. sabina* and its varieties (Fig. 2), as has been shown by their essential oils and RAPD data (Adams, 1999). Among the *J.*

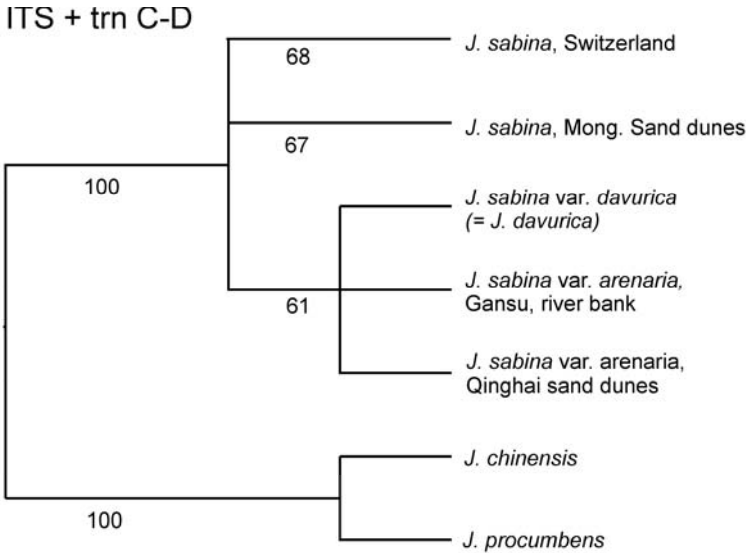


Figure 2. Phylogenetic tree adapted from Schwarzbach et al. (2007). Note the placement of *J. sabina*, on Mongolian sand dunes as a distinct taxon.

sabina, *J. s.* var. *arenaria* and *J. s.* var. *davurica*, samples, there was support (61-68%) for recognition of infraspecific taxa (Fig. 2).

In addition, there was support (67%) that *J. sabina* from the Mongolian sand dunes is a distinct taxon (Fig. 2). It is clear that this juniper is not the same as *J. sabina* var. *arenaria* from sand dunes at Lake Qinghai, China (Fig. 2). Comparing the *J. sabina* on Mongolian sands versus *J. s.* var. *arenaria*, the seeds are 2-4 per cone vs. (1) 2 (3-4), and are flattened globose with an obtuse tip (vs. an elongated ellipsoid with an acute tip that resemble a duck bill) and ultimate branchlets that grow from the top (upper) side of long lateral branches (vs. radially distributed branching). It is appropriate to recognize the prostrate *J. sabina* growing on sand in Mongolia as a new variety.

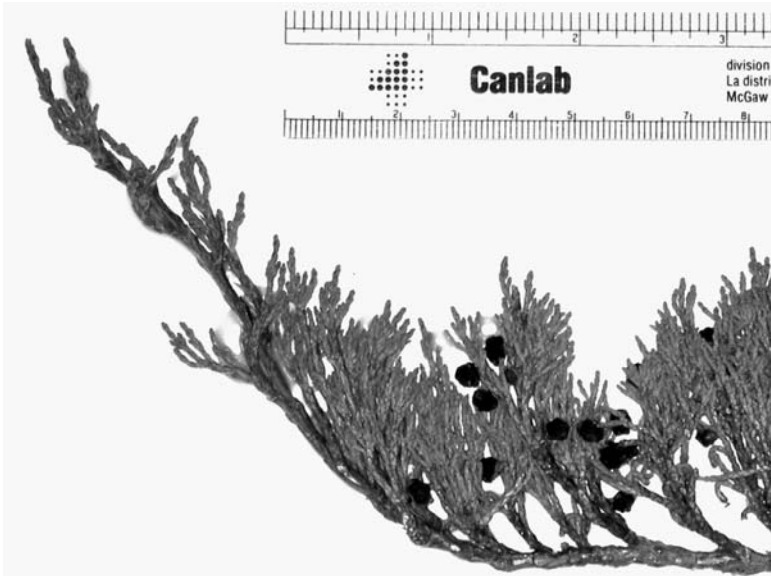


Figure 3. Specimen (*Adams 7255*) showing the branching on the upper portion of the lateral branchlets.

Juniperus sabina* var. *mongolensis R. P. Adams, **var. nov.** TYPE: Mongolia, 80 km sw of Ulan Batar, Mongolia, N 47° 36.691', E 105° 09.332', 1230 m, on sand dunes, 16 Jun 1994, *Adams 7255* (HOLOTYPE: BAYLU, TOPOTYPES: *Adams 7254*, *7256*, BAYLU), (Fig. 3).

Juniperus sabina var. *arenaria* similis sed differt strobilis femineis semina 2-4 efferentibus, seminibus globosis apicibus obtusis, et ramulis ultimis non nisi supra ramis lateralis crescentibus.

Similar to *Juniperus sabina* var. *arenaria*, but differing in the female cones containing [producing] 2-4 seeds, seeds globose with obtuse tips, and ultimate branchlets growing only on the top [upper] side of the lateral branches.



Figure 4. *Juniperus sabina* var. *mongolensis* growing on sand in Mongolia with very long terminal branches. All of the plants are prostrate. The shrubs in foreground are not *Juniperus*.

Other specimens examined: *J. chinensis*, CH, Lanzhou, Gansu, China, Adams 6765-67; *J. procumbens*, Japan, Adams 8683, 8684, 9150; *J. sabina*, Sierra Nevada, Spain, Adams 7197, 7199, 7200; Pyrenees Mtns., Spain/ France border, Adams 7573-7577; Switzerland, Adams 7611, 7612, 7614, 7615; Tian Shan Mtns., Xinjiang, China, Adams 7836-7838; *J. sabina* var. *arenaria*, sand dunes, Lake Qinghai, Qinghai, China, Adams 10347-10352; river bank, Gansu, J-q. Liu and Adams 10354-10356; *J. sabina* var. *davurica*, DV, 15 km se Ulan Bator, Mongolia, Adams 7252, 7253, 7601. Voucher specimens for all collections are deposited at Baylor University Herbarium (BAYLU).

The exact distribution of *J. sabina* var. *mongolensis* is not known at present, but it should be expected on sand in southern Mongolia (Fig. 4).

Key to *Juniperus sabina* varieties:

- 1. Both scale-like and whip- (decurent with free tips) leaves found on mature plants, interspersed on a single branchlet, not just at the ends of rapidly growing branchlets, occasionally, one leaf type predominates..... var. *davurica*
 1'. Whip (decurent) leaves found only on juvenile plants or at the ends of rapidly growing branchlets, otherwise all leaves scale like

- 2. Shrubs to 1 m; growing on rocky areas, seeds with an acute tip that tapers into a globose shaped base, 1-3 per globose cone..... var. *sabina*

- 2'. Prostrate plants with long lateral branchlets, growing on sand, seeds with obtuse (occasionally acute when only one seed per cone) tip on ellipsoid to globose shaped base, 1-4 per cone

- 3. Most seed cones bi-lobed, seeds (1) 2 (3-4) per cone, seeds an elongated ellipsoid with an acute tip that resemble a duck bill, ultimate branchlets radially distributed around lateral branches.....var. *arenaria*

- 3'. Most seed cones globose, seeds 2-4 per cone, seeds a flattened globose with an obtuse tip, ultimate branchlets growing from the top (upper) side of long lateral branches..... var. *mongolensis*

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