JUNIPERUS DELTOIDES, A NEW SPECIES, AND NOMENCLATURAL NOTES ON *J. POLYCARPOS* AND *J. TURCOMANICA* (CUPRESSACEAE)

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ABSTRACT

A new species from the Mediterranean, **Juniperus deltoides** R. P. Adams is recognized based on published data on DNA (RAPDS, nrDNA) sequence, morphology and terpenoids. *Juniperus turcomanica* is recognized as a variety of *J. polycarpos*, based on RAPD data, terpenoids and morphology.

KEY WORDS: *Juniperus*, Cupressaceae, nomenclature.

Adams et al. (2003) examined the relationships among *Juniperus drupacea* Labill., *J. macrocarpa* Sibth. & Sm., *J. navicularis* Grand., *J. oxycedrus* L. (Greece and Spain), *J. oxycedrus* var. *badia* H. Gay comparing nrDNA (ITS) sequences, Random Amplified Polymorphic DNAs (RAPDs), Inter-Sequence Simple Repeats (ISSR) and terpenoids. Although the purpose of that work was to evaluate different kinds of data, we found that the two populations of *J. oxycedrus* (Greece, Spain) were as different in the these four data sets as the other recognized species in the study. Comparing the specimens of *J. oxycedrus* (Spain) with the type for *J. oxycedrus* (LINN!) revealed that they are the same. Thus, the plants from Greece are appropriately recognized as a new species:

Juniperus deltoides R. P. Adams **sp. nov.** TYPE: GREECE. 14 km e. of Archova, 420 m, Lat. 38° 26.720' N; Long. 22° 41.678' E, 22 May 2001, *R. P. Adams 9436* (HOLOTYPE: BAYLU; ISOTYPES: K, NY)

Plantas dioicas; frutices vel arbores usque 12 m, saepe coronis pyramidalis. Folia aciculares 9-17 mm longae 1.5-2.4 mm latae, base folio fere latiora quam lamina. Folia vittis glaucis duabus in superficiebus adaxialis plerumque non impressis. Strobilus in anno secundo maturescens, globosus viridis stramineo-brunneolescens atrorubens in maturitate. Semina plerumque tres.

Plants dioecous; shrubs or trees to 12 m, often with pyramidal crowns. Leaves acicular, 9--17 mm long, 1.5--2.4 mm wide, base of the leaf nearly as wide the blade, having two glaucous bands on the adaxial surface, generally not sunken. Cone ripening in second year, globose, dark red when ripe, green, turning to brownish yellow when ripening. Seeds usually 3.

Juniperus oxycedrus (sensu stricto) can be distinguished from *J. deltoides* by having a narrowing of the leaf base (Fig. 1, a), whereas the leaf base is almost as wide as the blade (Fig. 1, b) in *J. deltoides* (hence the name). In addition, the stomatal bands in *J. oxycedrus* are sunken (Fig. 1 a), giving the midrib a raised appearance. In contrast, in *J. deltoides*, most of the leaves have stomatal bands that are not sunken, giving the leaf a flattened surface (actually concave as illustrated in Fig. 1 b).

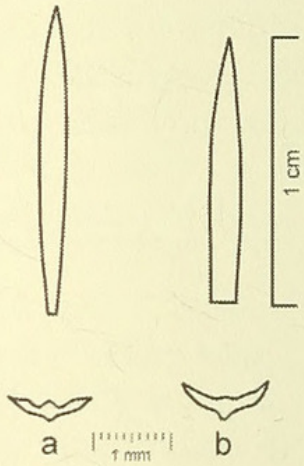

Fig. 1. Leaves *J. oxycedrus* (a) and *J. deltoides* (b).

Representative Specimens:

BULGARIA. s Varna, 7 Dec 1923, *B.Gilliat-Smith 373* (K).

CYPRUS. Troodos, Prodhromos, 19 Jun 1939, *H. Lindberg s.n.* (K). above Prodhromos, 15 May 1957, *L. F. H. Merton 3179* (K).

GREECE. Crete, Mt. Spathi, 1760m, 16 May 1967, *Barclay 257* (K). 14 km e Arachova, 420 m, 22 May 2001, *Adams 9436, 9437, 9438*

(BAYLU). 8 km w Lemos, 1010 m, 27 Aug 1999, *R. P. Adams, 8787, 8788* (BAYLU). Mt. Parnassus, 1280 m, 3 Aug 1987, *R. P. Adams 5642, 5643* (BAYLU). 10 km w Crysoritsi, 1200 m, 5 Aug 1987, *Adams 5649, 5650* (BAYLU). s side Mt. Parnis, 1070 m, 8 Aug 1987, *Adams 5656, 5657* (BAYLU). 7 km w Lemos, 1100 m, 5 Oct 1988, *Adams 5988, 5989* (BAYLU). Lake Prespa, 850 m, 3 Jul 1932, *Alston & Sandwith 1107* (K). Pyrgos, Athos Peninsula, 1938, *Loch 15* (K). 2 km from Mazia, 760 m, 15 Nov 1973, *Brickell & Mathew 8133* (K).

IRAQ. Sarsank, 16 Jun 1970, *S. Omar 37692* (K). 20 km ne Zarkko, 550 m, 4 Aug 1957, *Ali Rawa 23166* (K). Zawitah, 2750 m, 30 Aug 1933, *Rustam 4818* (K). Bekme Gorge, w end, 440 m, 13 Apr 1955, *H. Helbaek 764* (K). near Tabriz, 1927, *B. Gilliat-Smith 2117* (K).

ITALY. 3 km w Raiano, 520 m, 26 May 2001, *R. P. Adams 9445, 9446, 9447* (BAYLU).

MACEDONIA. near Zelenikovo, 23 Dec 1935, *Mrs. Ilic s.n.* (K).

SLOVENIA. between Parenzo & Rovigno, 16 Aug 1922, *W. B. Turrill 1009* (K). sw Trebnje, 18 Apr 1935, *Jackson & Turrill 86* (K).

TURKEY. 30 km n Eskieshir, 1064 m, 20 May 2001, *R. P. Adams 9430, 9431, 9432* (BAYLU). 8 km from Belen towards Antakya, 600 m, 6 May 1965, *M. J. E. Coode & B. M. G. Jones 524* (K). Macka, 300 m, 2 Apr 1960, *Stainton 8152* (K). Elmali, 1800 m, 19 Apr 1936, *T. A. Tengwall, 400* (K). Artvin, 700 m, 27 Jun 1957, *Davis & Hedge 30095* (K). above Ankara, 400 m, 5 Jul 1974, *P. H. Davis 13062* (K).

UKRAINE. Yalta, near Nikita, 150 m, 29 May 1959, *Davis 33086* (K).

Juniperus polycarpos K. Koch from central Asia is a very polymorphic species that is often included as a variety of *J. excelsa* M.-Bieb. (Farjon, 2001). Adams (2001) examined populations referable to *J. polycarpos* sensu stricto (Armenia), *J. seravschanica* Kom. (Kazakhstan, Pakistan), and *J. turcomanica* B. Fedtsch. (Turkmenistan). Both terpenoids and RAPDs showed *J. excelsa* to be quite resolved from the *J. polycarpos* complex (three aforementioned taxa). The leaf terpenoids showed that *J. turcomanica* to be somewhat different from *J. polycarpos* of Armenia and *J. seravschanica* from Kazakhstan and Pakistan. The RAPDs data suggest the recognition of *J. polycarpos* K.

Koch. var. *seravschanica* (Kom.) Kitamua and *J. turcomanica* as valid infraspecific taxa. Re-examination of the morphology of *J. polycarpos* and *J. turcomanica* suggests to the author that it would be prudent to recognize *J. turcomanica* as a variety of *J. polycarpos*.

Juniperus polycarpos K. Koch var. ***turcomanica*** (B. Fedtsch.) R. P. Adams, **comb. nov.**

BASIONYM: *Juniperus turcomanica* B. Fedtsch. in Fedtschenko & al., Fl. Turkmenii 1: 14. 1932. TYPE: lost or destroyed (Imkhaniskaya, 1990). (LECTOTYPE: *D. P. Gedevanov & D. A. Dranitsyn 148, 3 v 1912,* Turkmenia, Kopet Dag, Dschalilu, (chosen by Imkhaniskaya [1990] LE!)

Distribution: Elburz and Kopet Mts. of Iran and Turkmenistan.

The following key may be used to distinguish the recognized varieties of *J. polycarpos*:

1. Foliage slender, 0.7- 0.8 mm in cross section (on ultimate branchlets), seed cones 7-9(-10) mm long; scale leaves tightly appressed, giving a smooth branchlet, (1-)2-3(-4) seeds/cone.....var. *turcomanica*

1. Foliage stout, 0.9-1.0 mm in cross section (on ultimate branchlets), seed cones 9-11 mm long or more; scale leaves with a beak or keel so branchlet appears as a string of beads, 3-6 seeds/cone

   2. Seed cones 9-11 mm long, at least some scale leaves with very narrow, elongated, brown glands, not ruptured.....var. *polycarpos*

   2. Seed cones 8-10 mm long, scale leaves with clear, ellipsoid glands, often ruptured, with a clear exudates.....var. *seravschanica*

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