

NOTES ON EPHEDRA

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ABSTRACT. *Ephedra sinaica* H. Riedl, *sp. nov.*, (Ephedraceae) is described from Sinai. It differs from all other species with twisted micropylar tube in growth habit, bracts of the female flowers, seed size, possession of sessile male spikelets, and the number of stamens per flower. The unusual degree of variability of seed characters, including the micropylar tube, in *E. altissima* Desf. is discussed. *E. wetsteinii* Buxb. is reduced to a synonym under *E. altissima* Desf. *E. macedonica* Košanin is not considered sufficiently different from *E. fragilis* Desf. subsp. *campylopoda* (Fisch. & C.A. Mey.) Aschers. & Graebn. to be regarded as a separate species. *E. distachya* L. subsp. *monostachya* (L.) H. Riedl is recorded for Turkey (distr. Çanakkale) and compared with *E. major* Host.

An *Ephedra* collected in Sinai by Dr A. Danin and identified as *E. pachyclada* Boiss. differs from that species in the diameter and colour of the branches, size of seeds, twisted micropylar tube and several other less important characters. It bears a superficial resemblance to *E. intermedia* Schrenk & C.A. Mey., which has not been found west of Iran, but differs markedly from that species in its smaller seeds and the bracts of the female cones which are free for more than half their length. It also differs from the extremely polymorphic *E. altissima* Desf. in its general growth habit, mode of branching, sessile male spikelets, and less numerous stamens. In fact the collection from Sinai does not match any previously recognized species and is therefore described below.

***Ephedra sinaica* H. Riedl, *sp. nov.* Fig. 1.**

A speciebus ceteris tubillo contorto differt bracteis femineis minus connatis, spicis masculis sessilibus, antherarum numero. Ab *E. intermedia* Schrenk & C.A. Mey. etiam differt numero parum bractearum strobili feminei, seminibus parvulis, antheris in eodem flore 5-6 nec 6-8, ab *E. altissima* Desf. habitu, antheris 2-3 tantum in eodem flore.

Habitus et magnitudo totius plantae incerti, sed forsan suffrutex erectus vel prostratus ima basi lignosa. Rami primarii 3-4 mm crassi, rigidi, flavescetes, internodiis 22-30 mm longis. Rami secundarii (1-)2-5(-6) verticillati, erectiusculi, virides vel canescenti-, rarius olivascenti-virides, 1.5-2 mm crassi, internodiis basalibus breviusculis, 10-18 mm longis, ceteris (15-)18-25 mm longis, imprimis prope basin, sed interdum et altius ramosi ramis iis similibus vel tenuioribus, plerumque oppositis, geminatis, rarius singulis, partibus distalibus ramorum saepe carnosulis, flaccidis, superficie ramorum papilloso-punctata.

Folia squamiformia, minutissima, medio tantum viridia, ceterum scariosa, albida vel brunnescentia, bina opposita, pro maxima parte (2/3 ad 3/4 longitudinis) connata, infra flores femineos saepe 3, minus connata, acuta, 1.8-2 mm ad summum longa.

Spicae masculae dense glomeratae, sessiles ad nodos, \pm 4-4.5 mm longae, e floribus plerumque 4, rarius usque ad 6 compositae. Bractee late

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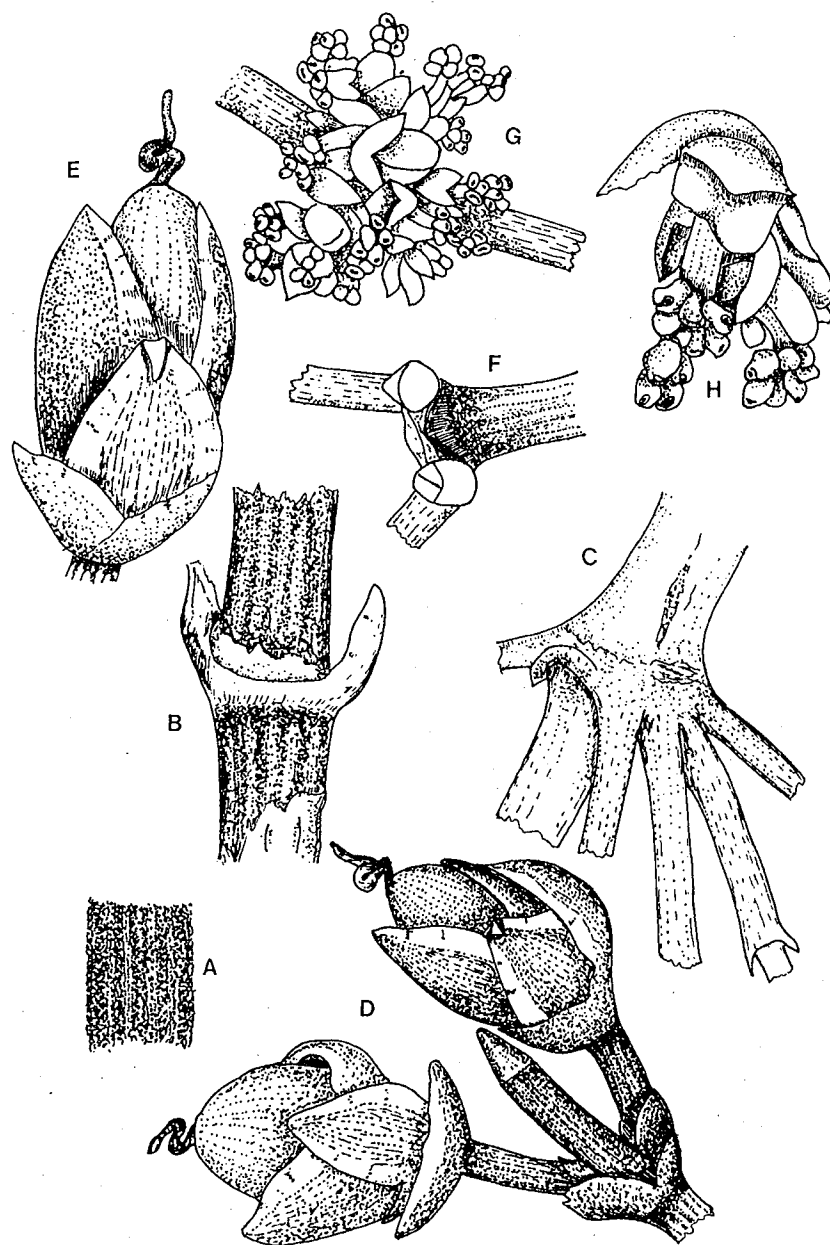


FIG. 1. *Ephedra sinaica* H. Riedl. A—E, female plant: A, part of major branch showing the ridges composed of tiny, wart-like papillae; B, major branch with cartilaginous leaves; C, main axis with several branches arising from the same node; D, two female cones on side-branches (the main branch ending sterile); E, female cone at higher mag. F—H, male plant: F, pseudodichotomy formed by two opposite side-branches, the main branch is dying off, two dormant buds are present; G, male inflorescence; H, part of male inflorescence at higher mag. A & B $\times 7.5$; C, F & G $\times 4$; D $\times 7$; E & H $\times 10$.

ovatae, ad partem tertiam vel ad partem quartam longae. 'Perianthium ovatum, manifeste superans, ovatum, cylindricum, staminalis cylindrica perianthio connata. Antherae sessiles, caput tantum in eodem flore.

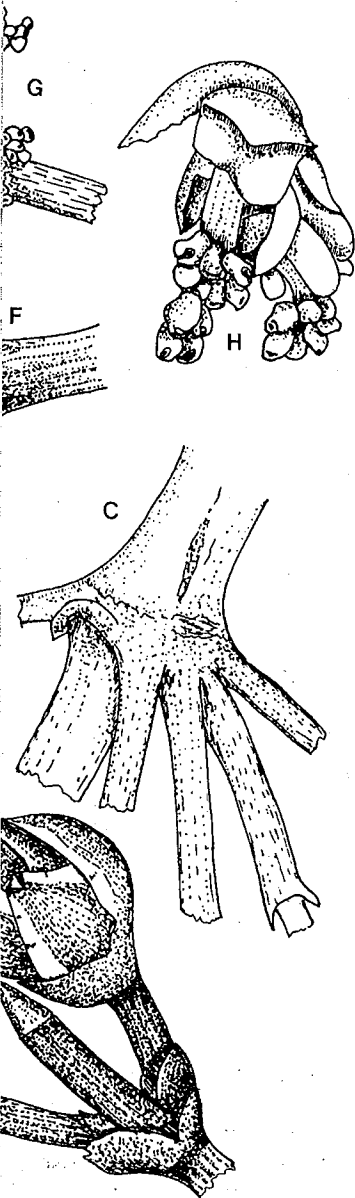
Strobili feminei 2–5 verticillati, longis, tenuissimis, interdum inclusis. Bractearum paria 3, sed parum quartum bractearum similis ovatae, acutae vel subacutae, \pm mediae interdum subcarinatae, quarta vel quinta inferiore connata vel quarta inferiore connata, angustissimo scarioso cinctae, galeiformi. Semina bracteis inclusa, submatura ± 5 mm longa, interiore plana vel paulo convexa, 1–2, semina 2mm fere superant (limbo) elongato, basi haud constricta, maturi bacciformes ignoti.

Type. S. Sinai. 13 km a monasterio Nebi Sale austro-orientem versus, iv 1971, A. Danin s.n. (holo. σ masculinum, amb. E).

Ephedra altissima & *E. wettsteinii*

In a careful study of the literature, contradictory descriptions of this species (according to some authors it is *S. sinensis*), while others say that it is *S. sinensis* (Maire (1952, p. 155, fig. 92). The character with the taxonomic formulae are indicated. According to Stapf, it is the twisted one but in a few specimens correlation with age: generally, it is twisted tubes. Clearly this usually applies to this particular species.

The size of the seeds is another character of plants with comparatively small seeds which are up to 10 mm long (var. *altissima*). It has also been called *E. wettsteinii* Burdet. This taxon at W and WU, which have been written on the French authors writing on the internodes in the branches bearing the variability of *E. altissima* in all other specimens of *E. wettsteinii* to *E. altissima* and it is the latter species. As neither the shape of the seeds (*E. wettsteinii*) nor the size of the seeds is the highest rank which could be



nt: A, part of major branch showing the branch with cartilaginous leaves; C, main le; D, two female cones on side-branches at higher mag. F—H, male plant: F, iches, the main branch is dying off, two part of male inflorescence at higher mag.

ovatae, ad partem tertiam vel ad medium fere connatae, omnino scariosae, 1.5–1.8 mm fere longae. ‘Perianthium’ (sensu Stapf, 1889) bracteas manifeste superans, ovatum obtusum, 2–2.5 mm longum. Columna staminalis cylindrica perianthio vix vel paulo longior, usque ad apicem connata. Antherae sessiles, capitatum glomeratae, plerumque 5–6, rare 4 tantum in eodem flore.

Strobili feminei 2–5 verticillati, breviter pedunculati, pedunculis 1–4 mm longis, tenuissimis, interdum in vaginis foliorum supremorum omnino inclusis. Bractearum paria 3, sed interdum folia suprema valde approximata parum quartum bractearum simulantia. Bracteae infimae late triangulari-ovatae, acutae vel subacutae, ± 1.2 mm longae, ima basi exclusa liberae, mediae interdum subcarinatae, late ovatae, 2.2–2.7 mm longae, in parte quarta vel quinta inferiore connatae, intimae ± 4 mm longae, in parte tertia vel quarta inferiore connatae, late ovatae, obtusae, omnes margine angustissimo scarioso cinctae, intimis exclusis apice apiculatae apiculo galeiformi. Semina bracteas intimas vix superantia, juvenilia diutius inclusa, submatura ± 5 mm longa, bina, oblongo-ovata, obtusiuscula, facie interiore plana vel paulo convexa; tubillus manifeste contortus torsionibus 1–2, semina 2mm fere superans (sed multo longior), labio exteriori (= limbo) elongato, basi haud constricto, truncato, item contorto. Strobili maturi bacciformes ignoti.

Type. S. Sinai. 13 km a monasterio Sta Catharina orientem versus, 10 km a Nebi Sale austro-orientem versus, 1350–1400 m alt., in fissuris graniticis, 7 iv 1971, A. Danin s.n. (holo. specimen femineum, paratypus specimen masculinum, amb. E).

Ephedra altissima & E. wettsteinii

In a careful study of the literature on N African *Ephedra* I found contradictory descriptions of the micropylar tube of *E. altissima* Desf. According to some authors it is short and straight (the condition in the type specimen), while others say that it is twisted: both types are illustrated by Maire (1952, p. 155, fig. 92). No correlation of the variation of this character with the taxonomic forms and varieties recognized by that author are indicated. According to Stapf (1889) the straight tube is a juvenile form of the twisted one but in a few specimens I found both forms without clear correlation with age: generally, however, plants develop either straight or twisted tubes. Clearly this usually diagnostically reliable character varies in this particular species.

The size of the seeds is another character of unusual variability. While plants with comparatively small seeds prevail there are instances of grains which are up to 10 mm long (var. *tripolitana* Pampanini). Such plants have also been called *E. wettsteinii* Buxbaum (1926). The type specimens of this taxon at W and WU, which have been overlooked by practically all the French authors writing on the N African flora, have unusually short internodes in the branches bearing female flowers but fall within the variability of *E. altissima* in all other respects. Buxbaum did not compare *E. wettsteinii* to *E. altissima* and it is here regarded as a new synonym of the latter species. As neither the shape of the micropylar tube (twisted in *E. wettsteinii*) nor the size of the seeds seem to be correlated geographically, the highest rank which could be assigned to plants differing only in these

characters is that of variety, but such recognition does not seem desirable at the present state of knowledge.

Ephedra macedonica Košanin

This species has not been mentioned by Markgarf (1964) nor by the present author (Riedl, 1967). Košanin (1926) described it from a sterile specimen collected in the Vardar Valley near Demirkapija climbing on trees of *Juniperus excelsa* on serpentine rocks. The original publication has been kindly made available to me by Prof. Dr Miroslav Gajić, Beograd, to whom I express sincere thanks. From Košanin's illustration there can be no doubt that the plant belongs to *E. fragilis* Desf. subsp. *campylopoda* (Fisch. & C. A. Mey.) Aschers. & Graebn., typical forms of which grow in the same area on calcareous rocks. The characters which are supposed to differentiate *E. macedonica* from *E. fragilis* subsp. *campylopoda* are the erect, more rigid, untwisted branches and the longer leaves. Admittedly Košanin's plant with its branches in long, loose fascicles looks rather unusual, but this might be due to its growing on serpentine, and recognition at specific level does not seem justified: further collections would be required to determine whether it deserves infraspecific status or is a mere synonym.

Ephedra distachya L. in Turkey

Two recent collections of *E. distachya* give the first unequivocal evidence of this species in Turkey. These are:— A1 (E): Çanakkale, Ariburnu, sandy shores, 18 v 1970, A. Baytop 17891 (♂ & ♀), and ibid., 31 vii 1971, A. Baytop 20851 (both at ISTE). The specimens have been identified correctly by Prof. A. Baytop, who made them available to me and to whom I wish to express my sincere gratitude. Prior to these collections there was little evidence of this species in Turkey: Coode & Cullen (1965) did not see any specimens themselves but quoted a few older references to the species from literature, while Krause (1936) doubted its occurrence at all.

In this Turkish material of *E. distachya* the micropylar tube has a twisted limb at least sometimes, the seeds scarcely reach 5 mm and the branches are smooth or nearly smooth. This indicates that the plants belong to subsp. *monostachya* described by Riedl (1967). This subspecies grows from Hungary eastwards to the coast of the Sea of Japan in Siberia, whereas the other subspecies, subsp. *distachya* H. Riedl, is confined to the western and central Mediterranean area.

Ephedra podostylax Boiss. described from Kayseri is generally regarded as a synonym of *E. distachya*, but after examination of the type specimen at G the present author is more inclined to regard it as a separate taxonomic unit (Riedl, 1969).

Ephedra distachya & *E. major*

The closely related *E. major* Host was found relatively near the locality of the two collections of *E. distachya* mentioned previously:— A1 (A): Balıkesir, Marmara adasi, E of Marmara, on the slopes, 8 v 1971, A. Baytop 19623 (ISTE). Careful examination shows that *E. major* and *E. distachya* cannot be confused provided the following characters are used for identification:

- NOTES
- 1a. Branches (1-)1.2-1.5(-) secondary branches only with 8-10 flowers, short subsessile.
 - 1b. Branches 0.7-1(-1.2) mm extending to the upper male spikelets with 6-8 flo

The characters of the mature sometimes useful in separating *major* do not hold in Turkish sp have to be used for the identification & Cullen (1965) the branches in *E. major* are whorled but the character is not reliable.

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by Markgarf (1964) nor by the (1926) described it from a sterile ear Demirkapija climbing on trees. The original publication has been Miroslav Gajić, Beograd, to whom illustration there can be no doubt subsp. *campylopoda* (Fisch. & C. ms of which grow in the same area h are supposed to differentiate *E. ylopoda* are the erect, more rigid, Admittedly Košanin's plant with rather unusual, but this might be ognition at specific level does not e required to determine whether it synonym.

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ound relatively near the locality of entioned previously:— A1 (A): ra, on the slopes, 8 v 1971, A. ion shows that *E. major* and *E. e* following characters are used for

- 1a. Branches (1-)1.2-1.5(-2) mm in diameter; often yellowish; secondary branches only from sub-basal nodes; male spikelets with 8-10 flowers, shortly stalked (1-2 internodes), rarely subsessile. *E. distachya*
- 1b. Branches 0.7-1(-1.2) mm, rarely yellowish; secondary branches extending to the upper nodes, decreasing in length upwards; male spikelets with 6-8 flowers, sessile or subsessile. *E. major*

The characters of the mature seed and micropylar tube which are sometimes useful in separating female material of *E. distachya* and *E. major* do not hold in Turkish specimens and therefore vegetative characters have to be used for the identification of such material. According to Coode & Cullen (1965) the branches in *E. distachya* are opposite, whereas those of *E. major* are whorled but the present author's experience indicates this character is not reliable.

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