

## ADENOSCIADIUM OMANENSIS (APIACEAE), A NEW SPECIES FROM THE NORTHERN MOUNTAINS OF OMAN

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*Adenosciadium omanensis*, a species new to science, is described from the foothills of the northern mountains of Oman. It is closely related to *Adenosciadium arabicum* but differs in having a reniform leaflet with finely serrate margin, a compact inflorescence, lanceolate bracts and bracteoles with acute tip, a cylindrical fruit (schizocarp) with narrow commissure, oblong-oval terete mericarps with an exocarp covered with long forked hairs, and an emarginate endocarp on the commissural side. *Adenosciadium omanensis* is illustrated by photographs in its natural habitat. In addition, a comparative morphological analysis is presented that distinguishes it from *Adenosciadium arabicum*, the single species known in the genus, from southern Oman and Yemen. A distribution map for the two species in Oman is provided.

**Keywords.** *Adenosciadium*, Apiaceae, Arabian Peninsula, Eastern Hajar Mountains, endemics, new species, northern Oman, taxonomy.

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### Introduction

The Northern Hajar mountain range in Oman is classified as a local centre of endemism (Ghazanfar, 1998; Patzelt, 2015a). Although the plants of northern Oman are fairly well documented, particularly in the Western Hajar (Patzelt, 2015b), new records and new species are still being discovered (Patzelt & Hinai, 2019; Patzelt et al., 2020; Al Hatmi et al., 2024). The flora of the Eastern Hajar Mountains is poorly investigated because of the harsh climatic conditions and difficult topographical terrains.

*Adenosciadium arabicum* (T.Anderson) H.Wolf, the only species in the genus *Adenosciadium* H.Wolff, was first described almost a century ago. It was segregated from the genus *Ptychotis* T.Anderson based on its petal formation and the shape of the bristly fruits (mericarps), and suggested to be closely related to the genus *Trachyspermum* Link (Wolf, 1927). A recent molecular and carpological study supported the close relationship between *Adenosciadium* and some elements of the polyphyletic *Trachyspermum* (Pimenov et al., 2022). According to World Flora Online, *Adenosciadium arabicum* is an accepted species, with its distribution confined to Oman in southeastern Arabia (WFO, 2025); however, it has previously been reported as a regional endemic known from Oman and Yemen (Ghazanfar, 2007; Patzelt, 2014).

In the *Flora of Oman*, *Adenosciadium arabicum* is reported to occur in southern and northeastern Oman. On inspection of herbarium vouchers deposited at Sultan Qaboos University herbarium (SQUH) (herbarium codes follow Index Herbariorum, [updated](#)

continuously), it was noticed that the specimens from the north differ in vegetative structure, stems and leaves from those collected from the south. Unfortunately, at the time, species identity could not be confirmed due to the lack of mature fruits. A visit to the Oman National herbarium (ON) also revealed specimens of unidentified *Adenosciadium* with the same vegetative structures.

In January 2025, during fieldwork in the foothills of the Eastern Hajar Mountains in northern Oman, an area of limestone hills which rise to about 100 m above sea level and are dissected by gorges and wadis that flow towards the sea, the northern form of *Adenosciadium* was collected. The plants were observed growing gregariously in a scrub vegetation of *Commiphora*–*Vachellia* in a deep runnel formed as a result of a landslide (Figure 1A). As it was the beginning of the flowering season no mature fruits were found, but a later visit to the area allowed the collection of specimens with flowers and mature fruits. These observations confirmed that the specimens collected were indeed that of an undescribed species.

## Materials and methods

A morphological examination of the specimens of the putative new species of *Adenosciadium* was carried out. They were compared with herbarium collections of *Adenosciadium arabicum* from SQUH, ON and OBG. In addition, digitised specimens from the E and K herbaria were examined.

Vegetative and reproductive characters were carefully investigated for a comparative analysis following Kljuykov *et al.* (2004). Micromorphological structures were examined under high magnification and photographed using a digital microscope. A map was generated to show the distributional range of the two species, using geographical information from the examined herbarium vouchers.

## Taxonomic treatment

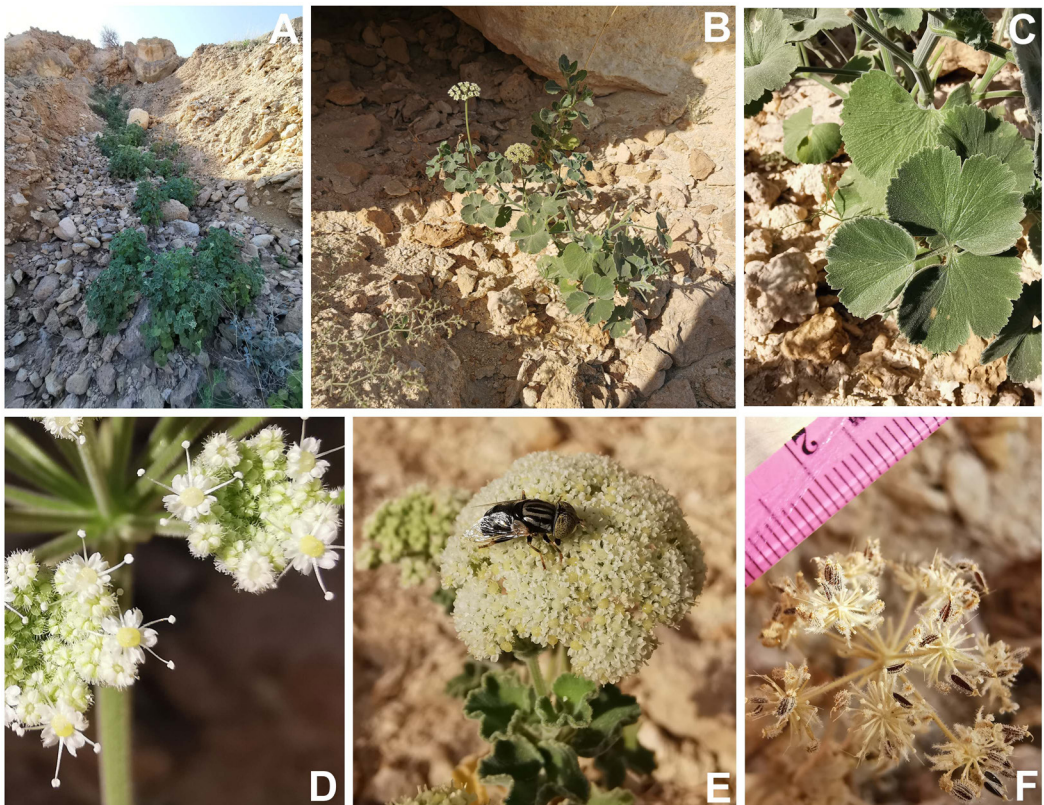
### *Species description*

***Adenosciadium omanensis* A. Al Farsi, sp. nov.**

*Adenosciadium omanensis* is closely related to *A. arabicum* in having a compound umbellate inflorescence, a fruit (schizocarp) with two adjoining mericarps, exocarp with five primary ribs, and single white hairs with forked end covering the surface of the mericarps. However, *Adenosciadium omanensis* is distinguished from *A. arabicum* by its perennial polycarpic habit (vs annual), tomentose indumentum (vs pubescent), and reniform leaflet (vs rhombic) with shallow dissections (vs deep dissections). In the reproductive part, it differs in having compact umbels with up to 30 flowers (vs lax umbels with up to 25 flowers), lanceolate bracts with acute tips (vs linear tips), narrow commissure (vs broad), terete mericarps with long hairs (vs dorsally compressed

mericarps with short hairs), and emarginate endocarp (vs convex). – Type: Oman, Eastern Hajar foothills, Quriyat, near Daghmar, 23°12'18"N, 58°55'3"E, limestone hill with rocks, stones and gravel soil, 42 m, 12 ii 2025, A. Al Farsi 885 (holotype SQUH [barcode no. SQUH00006894]). Figures 1, 2.

Perennial herb, 60–70 cm tall, aromatic (celery smell), branching from the base, all parts tomentose. *Stems* erect, grooved, lignified, densely covered with short erect hairs. *Leaves* simple or pinnatifid, densely hairy on both sides; leaflets reniform with shallow lobes, finely serrate margin; petiole up to 8 cm long. *Inflorescence* an axillary compound umbel, up to 4.5 cm wide; rays 5–30, umbellets bearing about 25–30 flowers, pedicles 4 mm long. *Bracts* lanceolate, 0.4 cm long, with acute tip, covered with dense white hairs. *Bracteoles* lanceolate, 2.5 mm long, densely hairy. *Flowers* green outside, white inside, 5-lobed, five anthers with long filaments radiating horizontally between the lobes. *Ovary* inferior, two ovules. *Fruit* schizocarp, oblong-oval with two adjoining mericarps; carpophore bifid, 2-cleft



**Figure 1.** Field photographs of *Adenosciadium omanensis* A. Al Farsi, sp. nov. A, Habitat; B, growth habit; C, leaf shape; D, flowers; E, inflorescence; F, mature mericarps. All photographs taken by A. Al Farsi: B–D, holotype (A. Al Farsi 885); E–F, A. Al Farsi 886.



Figure 2. Holotype of *Adenoscidium omanensis* A. Al Farsi, sp. nov.: A. Al Farsi 885 (SQUH).

to the base, commissure (width between mericarps) narrow. *Mericarps* up to 2 mm long, 0.7–0.9 mm wide, dark brown, oblong-oval, terete (in cross section), 5-ribbed, densely covered with long straight hairs with forked tips; median ribs keeled, lateral ribs keeled, marginal ribs not keeled; stylopodia conical; styles recurved. *Exocarp* (epidermis) separating from mesocarp at maturity. *Endocarp* (endosperm) emarginate on the commissural side.

*Distribution.* *Adenosciadium omanensis* is found in semi-arid areas in the Northern Hajar mountain foothills, in Masirah Island, and extends to the foothills of Al Wusta Governorate (Central Oman) and the drier areas of eastern Dhofar from Mirbat to Hasik, whereas *A. arabicum* is recorded from tropical habitats with moderate climate in Dhofar from Dhalkut to the foothills of Jebel Samhan (Figure 3). The former occurs on limestone slopes with well-drained, stony-gravel loose soils, and the latter grows in wadi beds or close to water springs with sandy-gravel soils.

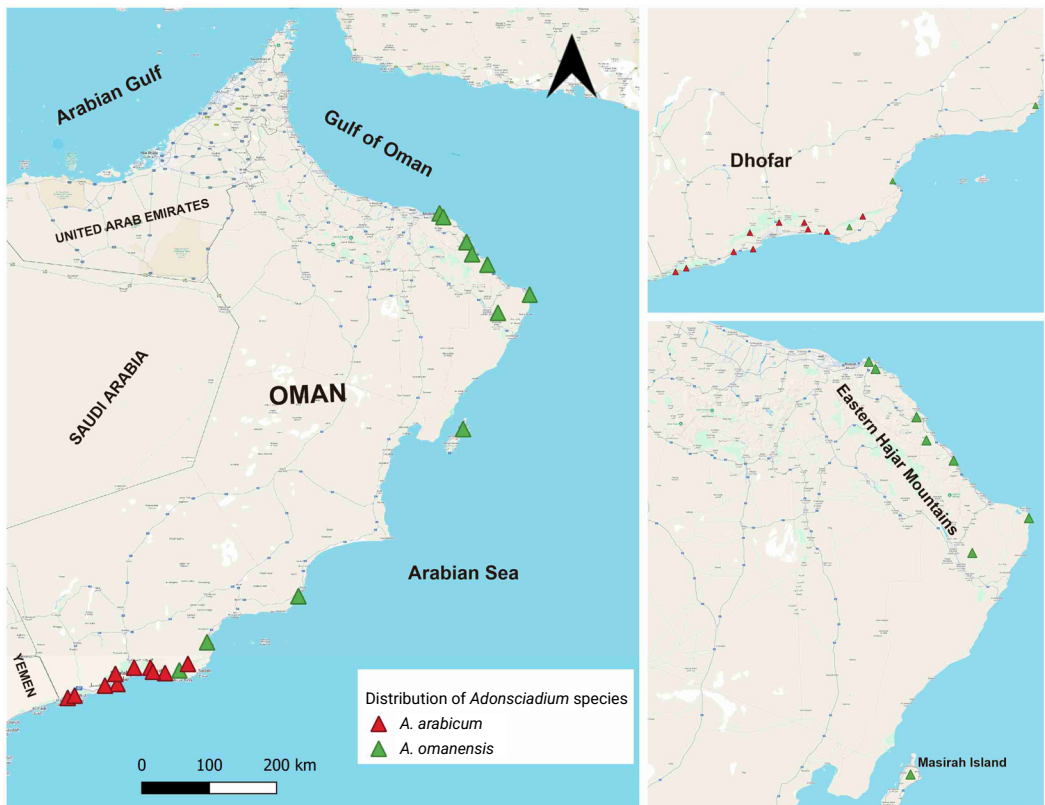


Figure 3. Map of Oman, showing the distribution of *Adenosciadium arabicum* (red triangles) and *A. omanensis*, sp. nov. (green triangles), based on geographical information from the studied herbarium vouchers.

*Habitat and ecology.* The new species is part of scrub vegetation and dominating a steep slope starting from the middle to near the summit of a limestone hill. The vegetation of the area is characterised by annuals with some shrubs, mainly *Vachellia* sp. *Commiphora* sp. Flowering February to May, fruiting August to December.

*Etymology.* The specific epithet, *omanensis*, refers to the Sultanate of Oman, where the species was discovered.

*Proposed IUCN conservation category.* Field observations revealed that *Adenosciadium omanensis* is a gregarious plant forming small populations on the slopes of the Eastern Hajar mountains and foothills. Two populations in the northern foothills were monitored during this study. In one population the estimated number of individuals is fewer than 100, while the other population has fewer than 20 individuals. Herbarium collections showed that this species is widely distributed along the coastal foothills from northern to southern Oman. The collection localities in northern Oman (Eastern Hajar foothills) suggest that the subpopulations of *Adenosciadium omanensis* are not very far from each other. The main area of occurrence is in Quriyat, with three locations, which are 8–30 km apart from each other. However, other populations towards the south are more distant and isolated, mainly those in Masirah Island and the foothills of Jebel Samhan in Dhofar. Therefore, it is estimated that fewer than 10,000 mature individuals represent the entire species range.

These plants occur close to main roads, and new constructions and development projects are likely to pose future threats to these localities. Moreover, pastoralism is still being practised in the northern Oman. Therefore, overgrazing by livestock and increased numbers of feral donkeys form another threat to the existence of these populations. The Eastern Hajar range is relatively dry compared with the Western Hajar, where erratic rainfall and long periods of drought pose challenges for the survival of plants. Similar climatic conditions are also affecting the eastern foothills in Dhofar. *Adenosciadium omanensis* is therefore assessed as Vulnerable (VU) C2a(i) based on small subpopulations and number of mature individuals, following IUCN guidelines (IUCN Standards and Petitions Committee, 2024).

*Notes.* *Adenosciadium omanensis* differs morphologically from *A. arabicum* in both vegetative and reproductive characters (Table). The former is a sturdy, polycarpic (fruiting many times) perennial herb, densely hairy, with leaves with a velvety touch, and the latter is a pubescent annual. The stems of *Adenosciadium omanensis* become lignified and new shoots sprout from seemingly dry branches. This phenomenon is not observed in *A. arabicum*. The leaf outline and leaflets are distinct in the two species. In *Adenosciadium omanensis* the leaves have a circular-oval outline, and leaflets with a round apex, a cordate-truncate base, and a finely serrate margin. By comparison, the leaves of *Adenosciadium arabicum* are rhomboid in outline because of the rhombic leaflets, which are deeply

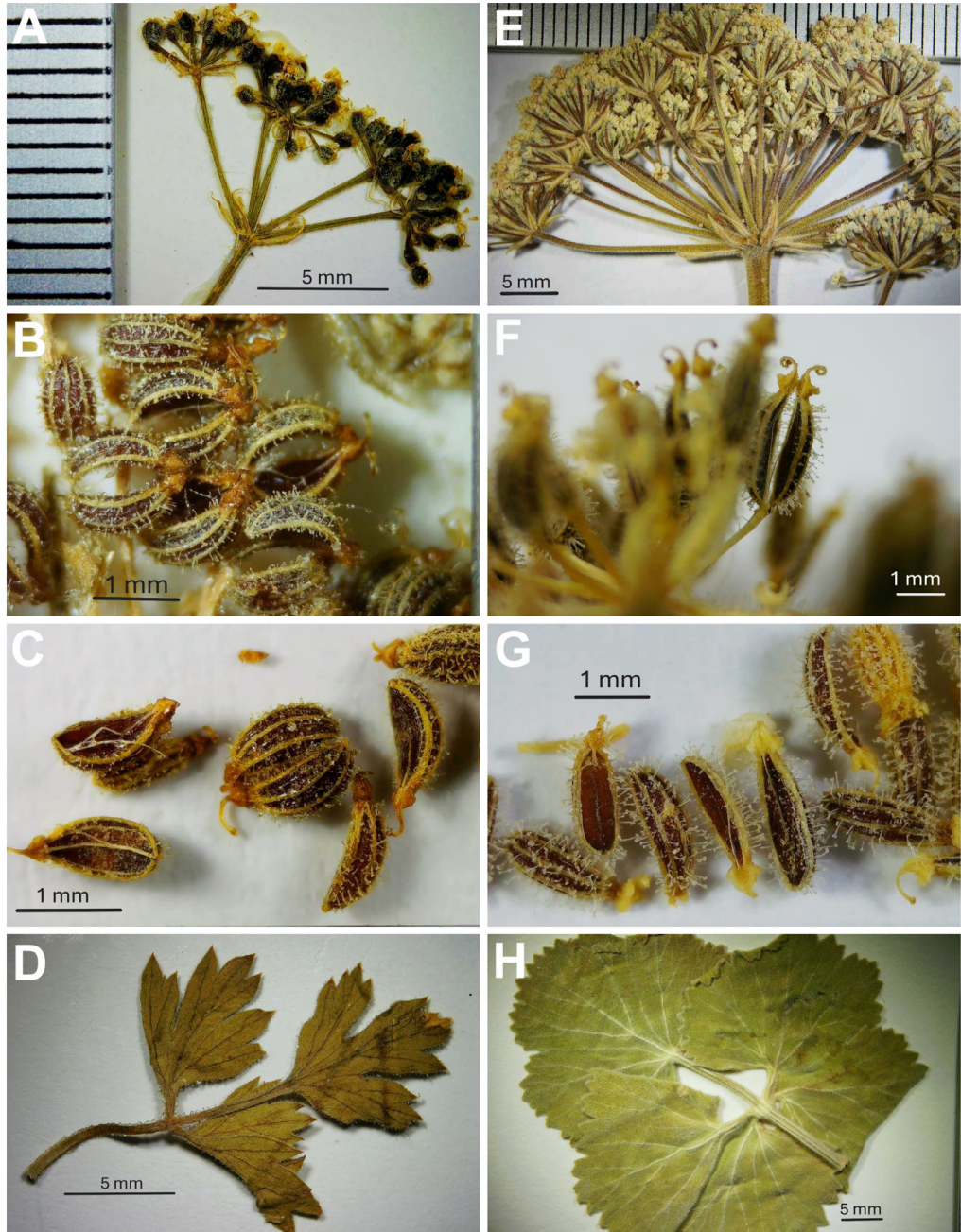
**Table.** A comparison of the morphological and reproductive characters of *Adenosciadium omanensis* A.Al Farsi, sp. nov., and *A. arabicum*<sup>a</sup>

Character	<i>A. omanensis</i>	<i>A. arabicum</i>
Life form	Perennial, polycarpic, up to 70 cm long	Annual, up to 50 cm long
Indumentum	Tomentose	Pubescent
Stem	Lignified	Not lignified
Leaflet	Reniform, shallow dissection, margin finely serrate	Rhombic, deeply dissected, margin coarsely serrate
Petiole	Up to 8 cm long, 1.5 mm thick	Up to 8 cm long, 1 mm thick
Inflorescence	A compact compound umbel, with 5–30 rays; umbellets hold up to c.30 flowers	A lax compound umbel, with 3–25 rays; umbellets hold up to c.25 flowers
Bracts	Lanceolate, densely hairy, acute tip	Lanceolate, sparsely hairy, tapering into a linear (wiry) tip
Bracteoles	Lanceolate, densely hairy, acute tip, 2.5 mm long, shorter than pedicles	Lanceolate, sparsely hairy, tapering into a linear (wiry) tip, 3 mm long, more or less equal to pedicles
Fruit (schizocarp)	Two adjoined mericarps, dark brown, cylindrical shape	Two adjoined mericarps, red brown, ovoid shape
Mericarps	Oblong-oval, terete, up to 2 mm long, 0.7–0.9 mm wide	Ovoid-globular, dorsally compressed, up to 1.2 mm long, 0.6–1.0 mm wide
Commissure	Narrow	Broad
Marginal ribs	Not keeled	Slightly keeled
Exocarp	Separating from mesocarp (between ribs) at maturity, covered on the outside with long forked hairs	Separating from mesocarp (between ribs) at maturity, covered on the outside with short forked hairs
Endocarp	Emarginate on commissural side	Convex on commissural side

<sup>a</sup> Character terminology is based on Kljuykov *et al.* (2004).

segmented or lobed with an obtuse apex, cuneate-truncate base, and coarsely serrate margin (Figure 4).

The inflorescence structure as well as the shape and size of the mericarps are characteristic in the two species (Figures 4, 5). The inflorescence of *Adenosciadium omanensis* is a compact umbel subtended by lanceolate bracts and bracteoles with an acute tip and mostly composed of 5–30 rays, and the bracteoles are shorter than the pedicels. By contrast, *Adenosciadium arabicum* has a loose umbel subtended by lanceolate bracts and bracteoles with a linear tip and usually composed of 3–12 rays, and the bracteoles are as long as the pedicels. The fruit is a schizocarp consisting of two adjoining mericarps. In *Adenosciadium omanensis* the fruit is cylindrical, as the mericarps appear comparatively flat to slightly curved with a narrow commissure. However, in *Adenosciadium arabicum* it is ovoid due to the strongly curved mericarps and broad commissure. The mericarp in *Adenosciadium omanensis* is oblong-oval, twice as long as wide, and densely covered with long hairs. By comparison, the mericarp of *Adenosciadium arabicum* is ovoid-globular, as



**Figure 4.** Comparison of characters of *Adenosciadium arabicum* (A–D) and *A. omanensis*, sp. nov. (E–H): A and E, inflorescence; B and F, fruit shape and commissure size; C and G, mericarp; D and H, leaflet. All photographs taken by A. Al Farsi: A, M. Thulin 11424; B–D, S. Ghazanfar & L.T. Evangelista 1640; E, A. Al Farsi & A. Al Wahaibi W21; F, A. Al Farsi, 898; G, A. Al Farsi 886; H, A. Al Farsi, 859.

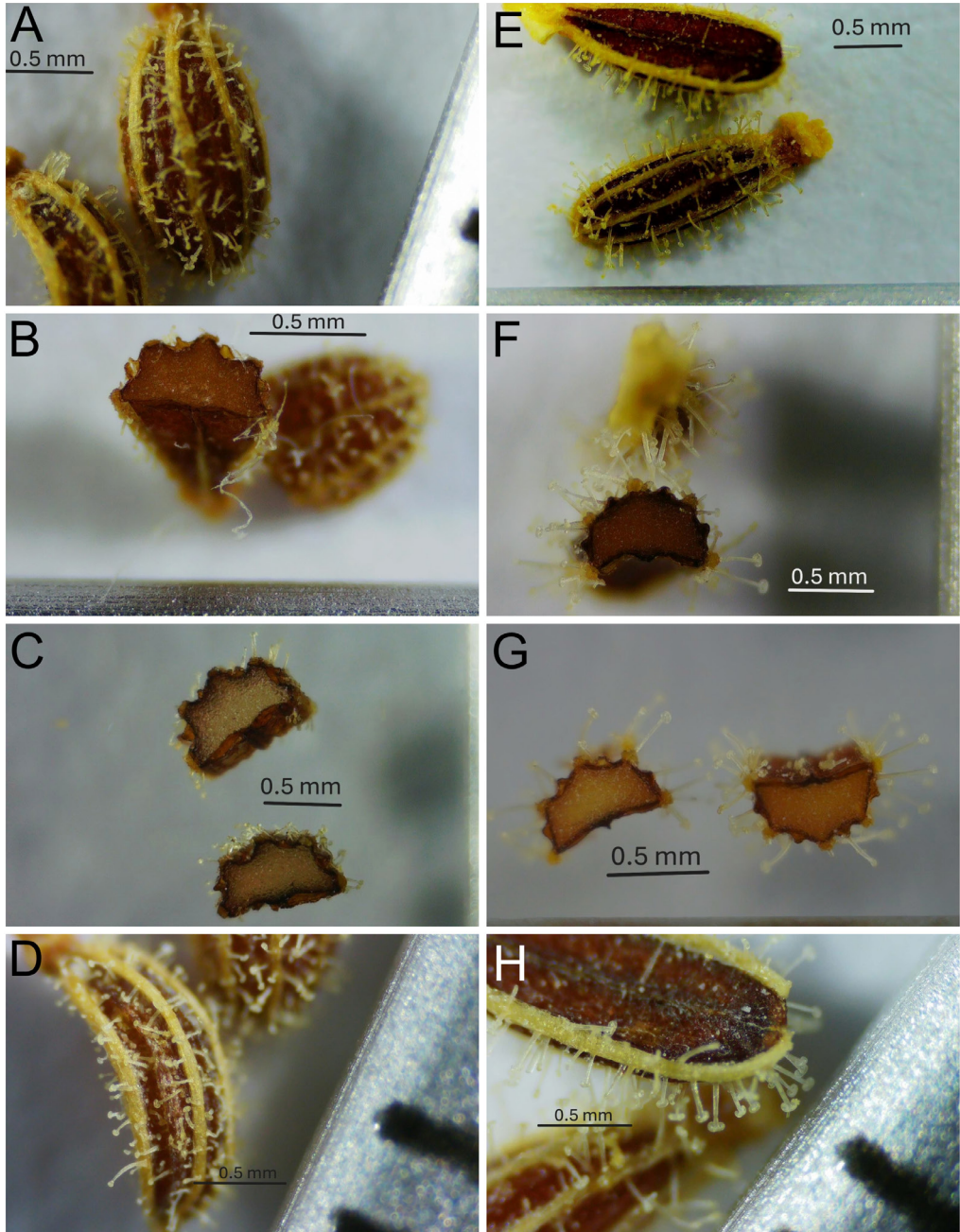


Figure 5. Comparison of characters of *Adenosciadium arabicum* (A–D) and *A. omanensis*, sp. nov. (E–H): A and E, primary ribs; B and C, F and G, cross sections of the mericarp, showing position of the primary ribs, exocarp and endocarp; D and H, shape of hair. All photographs taken by A. Al Farsi: A–D, S. Ghazanfar & L.T. Evangelista 1640; E–H, A. Al Farsi 886.

wide as it is long, and sparsely covered by short hairs with a forked tip. In cross section, as shown in [Figure 4](#), the mericarp of *Adenosciadium omanensis* appears to be terete, as compared with the dorsally compressed shape in *A. arabicum*. In addition, the endosperm (endocarp) on the commissural side is emarginate in *Adenosciadium omanensis*, as opposed to the convex shape in *A. arabicum*.

*Additional specimens examined.* OMAN. **Muscat Governorate:** Ruwi direction to Al Bustan, dolomite slopes, 100–300 m, 22 ii 1983, *W. Frey & H. Kurschner* 83-443 (ON); Ruwi hill, track road to Yiti & GTO tower, 23°37'N, 58°32'E, steep limestone hills with stones and gravel, 200 m, 27 iii 1992, *S. Ghazanfar* 1824 (SQUH); Suwayh village, Wadi Al Arbeyen, 23°1'58.7"N, 58°59'20.7"E, Alluvium soil in wadi bed, 65 m, 21 i 2013, *L. Al Harthy* et al. HIM 7 (OBG); Suwayh village, Wadi Al Arbeyen, 23°1'58.4"N, 58°59'51.8"E, wadi bed with shallow to deep sand soil, strongly flooded, 106 m, 20 x 2014, *A. Patzelt* et al. AP 4711 (OBG); Quriyat, near Daghmar, 23°12'18"N, 58°55'5"E, a limestone hill on slope with loose stones and gravel, 48 m, 29 i 2025, *A. Al Farsi* 858 and 859 (SQUH); Quriyat, near Daghmar, 23°12'18"N, 58°55'5"E, a limestone hill with rocks, stones and gravel soil, 42 m, 30 v 2025, *A. Al Farsi* 886 (SQUH). **Ash Sharqiyah South Governorate:** Sur, Ras Al Junayz, rocky slope, 27 xii 1986, *J. Hirst s.n.* (ON); Tiwi, white beach, 22°53'N, 59°13'E, coastal hill, sand soil, 20 m, 5 ii 1999, *A. Patzelt* AP OM265 (SQUH); Masirah Island, 0 m, 20 xii 2012, *S. Smith* AP 4254 (OBG); Ash Sharqiyah region, Jabal Qahwan, summit area, 22°11'47.6"N, 59°22'2.7"E, deep vertical crevices on upper mountain rocky slopes, 1291 m, 08 iv 2013, *M.F. Gardner & S.G. Knees s.n.* (E-image); Masirah Island, Jabal Al Akmar 20°32'6.5"N, 58°52'10"E, Lower mountain slope, 146 m, 5 x 2020, *L. Al Harthi & S. Al Hatmi* LHS 156 (OBG); Quriyat, Bamah, 23°2'9"N, 59°4'20"E, slope in a sinkhole with stones and gravel, 20 m, 17 vii 2025, *A. Al Farsi* 898 (SQUH). **Al Wusta Governorate:** Central Oman, plateau above Sawqirah, boulder strewn wadi bed, 200 m, 19 ix 1989, *A.G. Miller & J.A. Nyberg* M.9445 (ON); Sahil Al Jazir, escarpment above Sawqirah, 18°9'9.8"N, 56°31'1.1"E, rock outcrop with shallow soils, 99 m, 25 x 2016, *A. Patzelt* et al. SHP 206 / AP 4842 (OBG); Al Jazir, Sawqirah, 18°9'3"N, 56°31'7"E, limestone mountain hills among rock boulders, 55 m, 13 iii 2023, *A. Al Farsi & A. Al Wahaibi* W21 (SQUH). **Dhofar Governorate:** lower valley of the wadi Al Ayn, on rock, 107 m (350 ft), 10 i 1966, *J. Lavranos* 4308 (K-image); Dhofar, Wadi Dahanoot, N of Hasik, 17°29'2.7"N, 55°12'7.22"E, low xeromorphic scrubland, 36 m, 20 viii 2007, *A. Patzelt* et al. AP 3173 (OBG).

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