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Calligonum arborescens (Polygonaceae), a new record for the flora of India

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Summary. *Calligonum arborescens* is a large shrub or small tree, endemic to Iran to Central Asia. The present studies confirm its existence in South Asia from Indian desert, Rajasthan and report its extended distribution from South Asia. The present paper deals with *Calligonum* identification keys, plant description, distribution map and photo plate for its easy identification. *Calligonum arborescens* is native to Iran, Tajikistan, Turkmenistan and Uzbekistan. This species has also been reported from Iran and widely naturalized in sand-dune habitats. In the present study this species was reported for the first time from South Asia. It is reported from Napasar and Samandsar area of Bikaner district in Rajasthan. Authors suggest further field explorations in desert areas to disclose its actual distribution in Rajasthan and its conservation through *ex situ* means is highly recommended to increase its population.

Calligonum arborescens (Polygonaceae) – новый вид для флоры Индии

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Ключевые слова: Индийская пустыня, новая находка, охрана природы, Раджастан, Южная Азия.

Аннотация. *Calligonum arborescens* – крупный кустарник или небольшое дерево из семейства Polygonaceae, турано-пригималайский субэндемик. Этот вид впервые приводится для флоры Южной Азии, где он широко натурализовался в песчаных дюнах Индийской пустыни на территории техсиллов Напасар и Самандсар округа Биканер (штат Раджастан, Индия). За пределами Южной Азии *Calligonum arborescens* произрастает в Иране, Таджикистане, Туркменистане и Узбекистане. В данной статье представлены карта с отмеченным местом нахождения *Calligonum arborescens*, фототаблицы для идентификации этого вида, ключ для определения видов *Calligonum*, произрастающих в Индии (*Calligonum arborescens*, *C. comosum*, *C. crinitum* и *C. polygonoides*). Авторы рекомендуют провести дополнительные полевые исследования в пустынных районах Южной Азии для уточнения территории распространения этого вида в Раджастане, а также настоятельно советуют применять методы сохранения *ex situ* для увеличения его численности.

Introduction

India has a vast bio-geographical region, surrounded by water from south, south-east and south-west direction. Due to various topographical conditions, India exhibits varying vegetations in its different regions. Total 23134 angiosperms taxa are reported from India (Mao, Dash, 2020). Towards north-west direction, lies the Great Indian desert, which extends from Gujarat and Rajasthan upto some parts of Haryana. This region is characterized by low precipitation, stronger winds and high temperature during the day time and cooler nights. Despite harsh climatic conditions, this region has a good number of plant species, some of which are endemic to this region.

The genus *Calligonum* L., belonging to the family Polygonaceae Juss., was first described by Carl Linnaeus in “Species Plantarum” in 1753 and contains 41 species worldwide according to “Plants of the World Online” (POWO. URL: <https://powo.science.kew.org/>). The major distribution patterns of the genus are concentrated in Central and Middle Asia (Komarov, 1936; Borodina et al., 2005). In India, according to the last enumerating, three species, i. e. *C. polygonoides* L., *C. comosum* L'Hér. and *C. crinitum* Boiss., are well known (Shetty, Singh, 1991; Kumar, Purohit, 2015; Purohit et al., 2016; Purohit, Kumar, 2020). During the study of vegetation of Indian desert, a new record has been reported and the number of species was increased to four.

Calligonum arborescens Litv. was first described by Dmitry Litvinov in Schedae ad Herbarium “Florae Rossicae” in 1900 from Transcaspia (present-day Turkmenistan). Its native range is Iran, Tajikistan, Turkmenistan and Uzbekistan. This is for the first time that this species is being reported to South Asia from Indian desert. It seems that in desert and sand dune regions some more species of this genus may be found.

Sir George King (1879) was the pioneer explorer of Indian desert and compiled notes on Famine food of Marwar. After that a number of authors (Brandis, 1874; Duthie, 1888; Blatter, Hallberg, 1918–1921; Sankhla, 1951; Parmar et al., 1985; Bhandari, 1990; Shetty, Singh, 1991; Singh, Pandey, 1997; Sharma, Purohit, 2013; Kumar, Purohit, 2015; Purohit et al., 2019; 2021 2024; Purohit et al., 2020; Purohit, Meena, 2025) have contributed to the flora of different regions of Rajasthan.

Materials and Methods

While working on the vegetation of Indian desert, the authors noticed a population of *Calligonum* (noticeably different from all *Calligonum* species known for India) with large and yellowish fruits near Napasar and Samandsar of Bikaner district in Rajasthan. The voucher specimens were taken, preserved and submitted in Herbarium of Botanical Survey of India, Arid Zone Regional Centre (further AZRC) (BSJO). After detailed scrutiny of available literature (Pavlov, 1936; Drobov, 1953; Nabiev, 1971; Pandey et al., 1983; Bhandari, 1990; Shetty, Singh, 1991; Li et al., 2003; Maassoumi, 2011; Soskov, 2011; Purohit et al., 2016; Purohit, Kumar, 2020; Jagdish et al., 2025) and major herbaria (CAL, BSJO, BLAT, K), the specimen was identified as *Calligonum arborescens* Litv. The taxonomic key, morphological description, macro and micro photographs, distribution map and other relevant details are also provided.

Results and Discussion

Calligonum arborescens Litv.: “Rajasthan, Bikaner, near Punrasar village, 28°12'46.16"N, 73°49'20.08"E, 221.3 m. 29 X 2023. C. S. Purohit, Amit Kumar. No. 38556” (BSJO); “Rajasthan, Bikaner, near Punrasar village, 28°12'45.77"N, 73°49'20.07"E, 225 m. 03 IV 2025. C. S. Purohit, Amit Kumar. No. 41673” (BSJO) (Figs. 1, 2).

Distribution. China, Russia, Iran, Tajikistan, Turkmenistan, Turkiye and Uzbekistan (*Calligonum arborescens*, 2026). In the present study this species was reported from South Asia for the first time (sandy habitat in the Rajasthan State of India) (Fig. 3).

Habitat. *Calligonum arborescens* is known to be a sand fixer and thus prefers sandy areas having less rainfall. In the present study it was found along the road side in the arid region of the Indian desert. Other plant species growing in nearby were *Leptadenia pyrotechnica* (Forssk.) Decne., *Calotropis procera* (Aiton) W. T. Aiton, *Echinops echinatus* Roxb., *Calligonum polygonoides* L., *Lasiurus scindicus* Henrard, *Acacia jacquemontii* Benth., etc.

Note: *Calligonum arborescens* is very close to *C. caput-medusae* Schrenk ex Fisch. et C. A. Mey. but differs in shape of the nuts and density of the setae. *Calligonum arborescens* has ovoid or broadly ovoid fruit with sparse setae whereas in *C. caput-medusae*, fruits are globose or subglobose with dense setae.

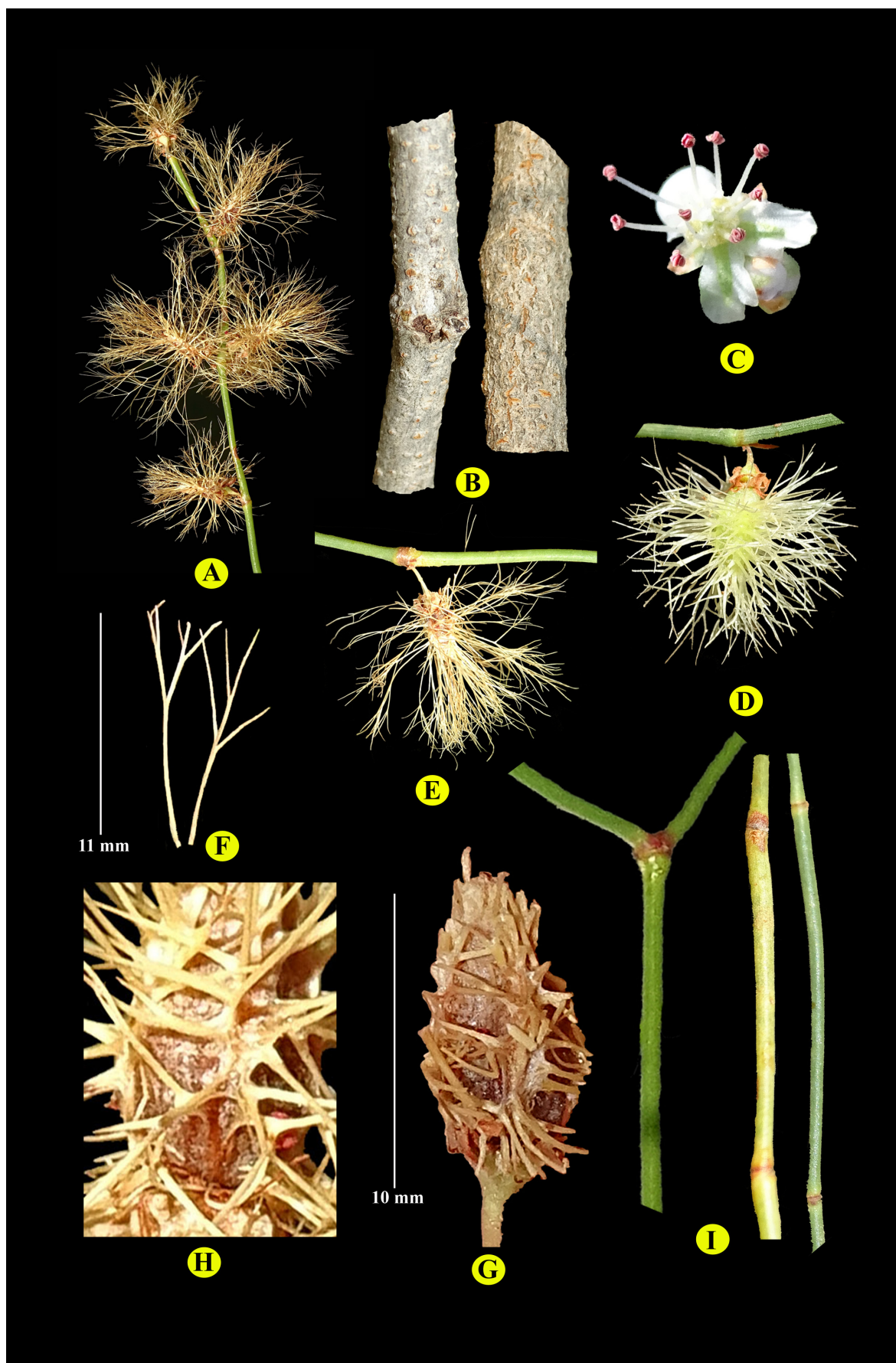


Fig. 1. *Calligonum arborescens* Litv.: A – fruiting twig; B – close-up of Old Stem; C – flower; D – young fruit; E – mature fruit; F – setae; G – close-up of achene with twisted ribs; H – setae arising from rib; I – young branches with red patch.

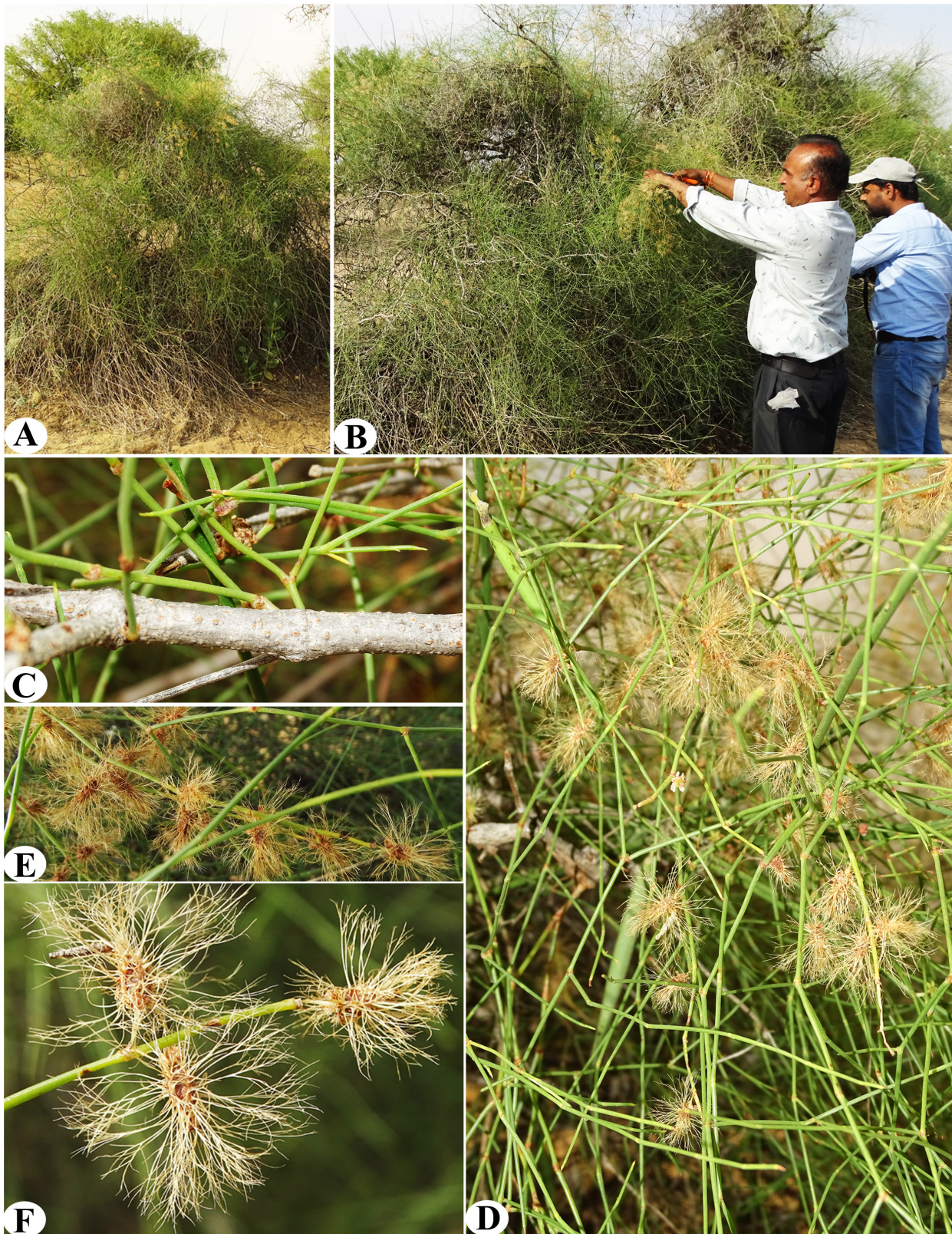


Fig. 2. *Calligonum arborescens* Litv.: A – natural location at Napasar, Bikaner, B – herbarium sample collections by officials; C – woody stem; D – fully fruiting plant; E – mature fruit, F – close-up of fruit with twisted ribs.

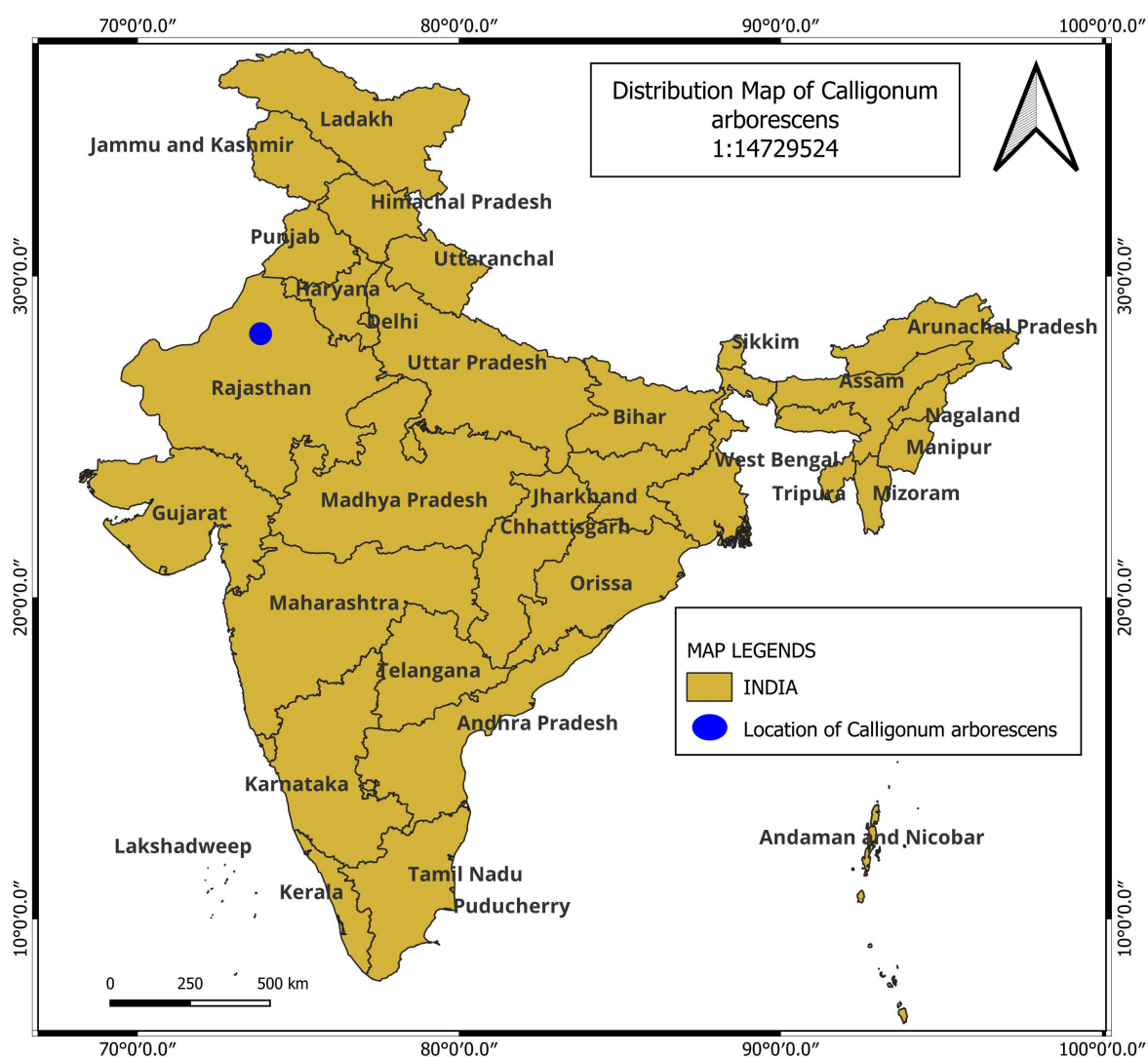


Fig. 3. Distribution of *Calligonum arborescens* Litv. in India.

Taxonomic key for the Indian species of *Calligonum*

- | | |
|--|------------------------|
| 1. Nuts wing | 2 |
| + Nuts not winged | <i>C. arborescens</i> |
| 2. Nuts with setae 10–18 mm | 3 |
| + Nuts with setae 20–30 mm across . | <i>C. crinitum</i> |
| 3. Leaves longer, 8–16 mm long, flowering pedicel longer than the perianth lobes | <i>C. polygonoides</i> |
| + Leaves smaller, 1–6 mm long, flowering pedicel usually smaller, rarely equaling the perianth lobe | <i>C. comosum</i> |

Calligonum arborescens: A large shrub or tree, up to 4 m high, branching from base, old branches silvery white, often longitudinally splitting and young branches green with brown stripes, herbaceous

branchlets of current year gray-green. Leaves scale like, 1–2 mm, with a brown mucro; ochrea united with leaf, bordered with a hyaline-membranous edge, sheathed. Pedicel up to 3 mm long, jointed below middle. Perigonium segments broadly linear, rounded at apex. Flowers 2–3 at leaf axils. Tepals broadly linear oblong, apex rounded, reflexed in fruit. Stamens 10–16. Filaments persistent, dilated and bearded base, anther purple. Fruit yellow or red when young and becoming yellow or light brown at maturity, ovoid, 1.5–2.5 × 1–2 cm. Achenes ellipsoid, strongly coiled or twisted clockwise up to 90 degrees; prominently 4-ribbed, very twisted to left. Ribs cleft, growing at base, extending to the base of the styles, valleys more or less narrow, sometimes wrinkled, separated and covered with 2 rows per rib setae, thus the setae 8-seriate. Setae yellow,

10–12 mm, arranged, slightly flat and separate at base, denser and longer at summit, 2- or 3-forked above middle, divaricate, not including achenes. *Flowering and fruiting*: March – May.

Conservation Status. *Calligonum arborescens* has not been globally assessed by “The IUCN Red List of Threatened Species” (IUCN. URL: <https://www.iucnredlist.org/>).

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