

A NEW SPECIES OF SALVADORA (SALVADORACEAE) FROM SINDH, PAKISTAN

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Abstract

A new species *Salvadora alii* belonging to family Salvadoraceae is described from Sindh Pakistan. Taxonomic description and a key to distinguish it from other species of *Salvadora* from this region has been provided, and its status is discussed.

Introduction

The genus *Salvadora* belongs to Salvadoraceae. In Pakistan family is represented by one genus with two species viz. *S. persica*, L. and *S. oleoides* Decne (Stewart, 1972; Qureshi, 1972; Pareveen & Qiaser, 1996). In an investigation into the variation of *Salvadora persica* L. a number of living plants and herbarium specimens of a distinct taxon were encountered from Sindh region. Some of the living plants and collected specimens bore striking white mature fruits which were previously identified under *S. persica*. In view of the morphological variations regarding leaf shape and fruit colour, a detailed study of seed protein structure and palynology was carried out. In our previous report, korejo, et al.(2010) clearly demonstrated that the taxon in question was quite different in number of characters including leaf shape and fruit colour from the two well known already recognized species of *Salvadora* from this region. However, at that time no taxonomic rank was accorded. To accommodate this undescribed taxon a new species *Salvadora alii* is described from Sindh, Pakistan. New species is discussed in relation to *S. persica* and *S.oleoides*. pollen description and key is provided, to distinguish the species in question from already described species of *Salvadora*.

Salvadora alii, M.T. Rajput & S. S. Tahir sp.nov.

Diagnosis: Elatus frutex ad, mediocris vel arbor. Foliar simplex opposites lanceolatus obtusus, integerrimus, crassus. Flori pallidus viridis. Petala 4, disceretus, usque ad basis stamen 4, filum usque ad basis. Ovarium globularis styli absentia, stigma capitatus. Fructus drupaceous, albus quum maturatio. Semen brunneolus, $\pm$ globularis, pagina fovearum. Pollen sphaeroidus, tricolporatus cum dilutes, sinuatus ordination; sexina crassus quam nexina.

Holotypus: Jamshoro, Dr. Tahir Rajput & Dr. Saleha Hassney, 281, 28-02-2008 (University of Sindh, Herbarium). (Fig. 1)

A tall shrub to medium sized tree $\pm$ olive grey in colour. Leaves thick, simple, lanceolate entire. Flowers pale green; petals 4, free to the base. Stamens 4; filament, free to base. Ovary globular, style absent; stigma capitate. Fruit 1-seeded drupe, white on maturation. Seed brown $\pm$ globular, surface pitted. Pollen spheridal tricolporate with light wavy pattern, colpi elongated, sexine thicker than nexine.



Holotype
Sindh University Herbarium

Botanical name: *Salvadora alii* sp. nov.

Family: Salvadoraceae

Common name: Pilu, Khabbar

Locality: Jamshoro

Distribution: Widely distributed in arid area of Sindh, Pakistan

Uses: Roots and young branches used as Miswak, Leave as fodder for camels

Ecological Remarks: Common in calcareous rocks on saline sandy soil.

Collector: Dr. Tahir Rajput & Dr. Saleha Hassney **Date:** 28-2-2008

Fig. 1. Holotype of *Salvadora alii*

Description: A tall shrub to medium sized tree. Leaves dull, simple, opposite, lanceolate, entire, thick, 3-6 x 0.75 cm. Petiole 1.75-2.25cm long. Inflorescence mostly axillary or sometimes terminal panicle. Flowers actinomorphic, Pale green, 1.5-2. mm cross. Pedicel, thick, green, 1.25-2. mm long, Calyx green, connate part 1-1.25mm long. Sepal lobes, thick reflexed $\pm$ 1.00 mm long, pointed. Corolla pale greenish (not campanulate), Petals 4, Pale green free upto the base, spatulate, cup-shaped not reflexed, 1.75-2.0 x 1.0 mm. apex round margin thick, center thick. Stamens 4, free to the base, anther light green, oblong, $\pm$ 1mm long, ovary globular, thick, light green, 1-locular, glabrous $\pm$ 1.25mm in diameter. Style absent; stigma capitate or $\pm$ round. darker than ovary. Fruit green while young white at maturation, Smooth. Seed roughly brown globular, rough, surface pitted, 4.0 - 4.5 x c.4.0mm wide. Pollen spheroidal, tricolporate, 6.50 μ m long 5.85 μ m wide. Colpi elongated, broad elliptical, pollen surface have light - way pattern, sexine, thicker than nexine.

Etymology: This species is named in the honour of Professor Dr. Syed Irtifaque Ali (Dr. S. I. Ali) renowned taxonomist, legume expert and senior Editor of the Flora of Pakistan, as a token of love and respect for him.

Phenology: Flowers are recorded between October to April. Fruit is edible

Habit: Common in calcareous rocks of Jamshoro on sandy soil, Sindh, Pakistan.

Specimen examined: Botanic Garden University of Sindh Jamshoro. *Farzana Korejo*, 30 - Feb. 2007 (SUH); Hussainabad, Hyderabad. *Farzana Korejo* 30-Feb, 2007 (SUH). Village Sehra, Taluka Moro, Dist. Naushehro Feroza. *Farzana Korejo*, 01-Mar, 2007 (SUH), Right Bank of K.B. Feeder, near Kotri. *Farzana Korejo*, 5-3-2007 (SUH), Jamshoro, *M. Tahir Rajput* & S.S. Hassney, 18-Feb. 2004 (SUH), Umerkot. *M.S. Chuttar* 7-2-1967 (SUH), Matiari, *Sardar Hussain Memon*, 20-02-2002 (SUH), Nawabshah. *A.M. Mangrio* 2-2-2002 (SUH) Moro, *Farzana Korejo* 22-02-2004 (SUH 5082) Govt. Degree College Nawabshah. *Farzana Korejo*, *Khair Mohammad Korejo*, 3-4-2006 (SUH), Jamshoro, *Dr. M. T. Rajput* & *Dr. Saleha Hassney*, 281, 28-02-2008 (SUH). Jamshoro Sindh University Campus. *Zahida Lashari*, 22-03-2009 (SUH)

Discussion: Most of the earliest taxonomic work on the genus *Salvadora* is based on simple morphological studies and recognized only two species namely *S. oleoides* and *S. persica* from Pakistan, (Qureshi, 1972; Parveen & Qaiser, 1996). While working on micromorphology and chemical investigation on the species of *Salvadora*, a remarkable variation has been observed in leaf, fruit, seed and pollen characters in the population previously described under *S. persica*. This new species is most similar to the *S. persica* L. which is widespread in Sindh region and other Asian and African countries but it differs in the leaf shape and leaf base. In *S. persica* leaf base is $\pm$ round whereas in this species the leaf base is pointed. The details of differentiating attributes are summarized in Table 1.

Korejo *et al.*, (2010) reported two protein bands of around 60-66 kDa from the seeds extracted protein which were common in all the species of *salvadora* and could be served as protein marker for this genus. They also reported some minor high molecular mass bands (>100kDa) in this new species which could not be observed in other two species viz. *S. persica* and *S. oleoides* while some other bands were common in all the species, but with different quantities, like wise low molecular mass protein bands (>20kDa) were totally absent in *S. persica* but present in low quantities in *S. oleoides* while very high quantities in species. Palynology through S.E.M and the protein banding obtained by using electrophoretic techniques, supports the erection of *S. alii* as a new species.

Table 1. Comparison of various taxonomic attributes of *Salvadora* species found in Pakistan.

Name of species	Leaf shape	Leaf size	Trichomes on leaves	Pollen type	Fruit Colour	Seed size in mm	Protein bands in seed
<i>S. persica</i> L.	Ovate	5.0-6.2cm long 2.5-3.0cm broad	Absent	Tricolpate	Pinkish-red	3.8-4.2	3 Major 2 Minor
<i>S. oleoides</i> Decne	Linear	7.8-8.5cm long 0.3-2.0cm broad	Present	Tricolpate	Redish-Brown	4.0-4.3	4 major 2 Minor
<i>S. alii</i> sp.nov	Lanceolate	4.0-5.5cm long 1.3-2.1cm broad	Absent	Tricolporate	White	3.6-9.2	6 Major 7 Minor

In the Botanic Garden of the University of Sindh, the three species of *Salvadora* are growing side by side which determines the novelty of species.

Key to the species of *Salvadora* found in Pakistan

1. Leaves linear, 7.0 – 8.5cm long, 0.3 – 2.0 cm wide.
Fruit pinkish – red.....*S. oleoides*
- 1*. Leaves ovate, lanceolate: 4.0 – 6.2cm long, 1.3 – 3.0 cm broad.
Fruit reddish brown or white.
2. Leaves ovate. Fruit white: Pollen tricolporate.
Seed surface with large number of prominent pitted.
Seed roughly globular.*S. alii*
- 2* Leaves lanceolate. Fruit pinkish-red. Seed surface with very
few less prominent Pits. Seed distinctly globular.....*S. persica*

Acknowledgements

We are grateful to Professor Dr. Muhammad Qaiser of Federal Urdu University of Arts, Science and Technology, Karachi for his valuable comments about this paper. Our thanks are also due to Mr. Altaf Hussain Gopang for typing this manuscript.

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