

Sesamum alatum Thonn. (Pedaliaceae): A new addition to the flora of Rajasthan (India)

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Abstract

The *Sesamum alatum* Thonn. belongs to the family Pedaliaceae. This article deals with the information about *Sesamum alatum* Thonn. The plant has been reported first time from the state of Rajasthan, India. The current communication includes a complete citation, description, distributional notes, flowering and fruiting times and ecological information and comparisons with another related species *S. indicum* L.

Keywords: *Sesamum alatum*, new reporting, Rajasthan and Sikar

Introduction

Rajasthan is the largest state of India and occupies most of the part of the Indian Thar Desert. The state is situated between 23°3' and 30°12' N latitude and 69°30' and 78°17' E longitude and covers about 342239 km² land area. The average annual rainfall in the state is 52.5-67.5 cm and shows the desertic habitat.

The state covers arid, semiarid and deciduous vegetation habitats.

These unique habitats always attract plant lovers for their floral diversity.

Hence various papers on plant diversity with their ecological and taxonomical information are available for the state Rajasthan that are Puri [16]; Bhandari [2]; Sharma & Tiagi [17]; Shetty & Singh [19]; Pullaiah [15]; Sharma [18]; Singh & Singh [20] and Singh & Srivastava [21]. Kotiya [10] have also published a detailed floristic account in Rajasthan, India. Similarly, in recent years; Kotia [8 & 9]; Akila and Suhara Beevy [1], Yadav and Meena [24]; Tiwari [23]; Dhakad [3]; Kumar [12]; Solanki [22] and Kotiya [11] has further described little more taxonomical research work for the state, Rajasthan.

Distribution

The genus *Sesamum* L. comprises around 19 species distributed in tropical and temperate regions of the world. There are 6 species under record from India, within one species so far reported from Rajasthan i.e. *S. indicum* L. (Shetty and Singh, 1991) [19].

Materials and Methods

During botanical exploration, excursion tours were carried out to various parts of the Sikar district of the state Rajasthan. The plant observed at different sites in Sikar district i.e. shyampura (Fig. 1), ranoli and trilokpura. The authors have collected plant specimens along with their field data such as habit, habitat, flowering and fruiting time and for the processing of herbarium specimens, the methodology described by Jain and Rao, 1977 [5] was followed.

These specimens were identified with the help of regional floras and related research papers. After critical examination, the plant is identifies as *Sesamum alatum* Thonn. (Family-Pedaliaceae).

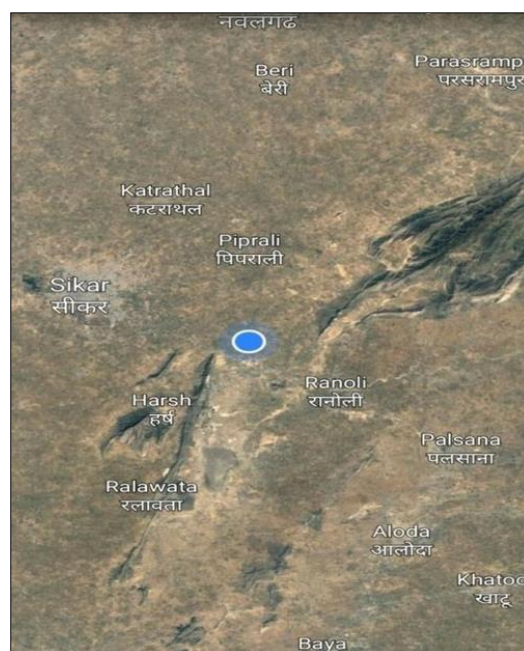


Fig 1

Taxonomic Description

Sesamum alatum Thonn., Beskr. Guin. Pl. 284. 1827. Ramanujam & Joshi in *J. Bombay Nat. Hist. Soc.* 52:657.1954. *S. ekambaramii* Naidu, *J. Bombay Nat. Hist. Soc.* 52:698.1953. *S. sabulosum*, A. Chev, *Etud. Fl. Afr. Centr. Fr anc.* 1: 229. 1913. *Volkameria alata* Thonn. Kuntze, *Revis. Gen.Pl.* 3:247.1898.

Erect, annual herb, 30 cm to 2 m high. Stem - simple, solid, smooth, angular (quadrangular) and green in colour. Leaves-decussate, heteromorphic, lower leaves with 4-7 cm long petiole, prickly outgrowth present on leaf petiole, lamina 3-5 foliate, each lobe are narrow, linear-lanceolate, margin entire or undulate. Upper leaves simple with the short petiole of 2-5 mm long, glabrous, lamina 7-10 cm long, linear-lanceolate and narrow, entire margin. Purple-coloured glands present at the leaf axis. Flowers shortly pedicellate, solitary axillary, bisexual and complete. Calyx 3-4 mm long, polysepalous, 5 sepals, lanceolate-linear, hairy. Corolla ca 3.1cm long, gamosepalous, hairy, the exterior side corolla is pink or light

purple and interior side red or dark-coloured with reddish-purple spotted at lower side obliquely campanulate and constricted at the base. Stamens 4, epipetalous. Ovary-6 mm long, bicarpellary, syncarpous, style- 1.4 cm long, slender, purple colour; stigma- 10-15 mm long, bifid with unequal lobes, hairy and purple. Fruit- capsule, 4-5 cm long, narrow oblong, long-beaked loculicidal, 4 grooved, 3-4 cm long. Seeds small winged at both ends, dark brown-black, rough, 2.5-3 mm long (Fig. 2 & 3).

Flowering & fruiting: April-September.

Ecological note: Usually grow in sandy soil along the roadsides near the boundaries of agricultural fields.

Distribution in India: Andhra Pradesh, Kerala and Rajasthan.

World: African countries (Namibia) and Arabian Peninsula.

Specimen examined: Rajasthan: Sikar, shyampura, ranoli and trilokpura villages roadside 27°34' 25" N and 75°14'50" E (shyampura), 10-06-2021, *Sushila* 27 (field number). The plant grows usually in sandy soils, on roadsides near the edges of agricultural fields.

The species are found in the roadside area. It makes pure association but some annual weed i.e. *Verbesina encelioides* (Cav.) Benth. & Hook. f.ex A. Gray, *Tribulus terrestris* L., *Cenchrus biflorus* Roxb., *Croton bonplandianus* Baill. species are associated with it.

Critical notes: It is closely allied with *Sesamum indicum* L. from which it can be identified by the following characters given in the table (Table: 1).



Fig 2: (A) Plant habitat (B) Flowers with upper leaves (C) Single flower

Table 1: Differences between *Sesamum indicum* L. and *S. alatum* Thonn.

| Sr. no. | Attributes | <i>Sesamum indicum</i> L. | <i>Sesamum alatum</i> thonn. |
|---------|------------------------|--|--|
| 1 | Habit | Herb | Herb |
| 2 | Stem | 3-4 angled | 4 angled |
| 3 | Phyllotaxy | Opposite-alternate | Lower leaves- Opposite, Upper leaves- subopposite |
| 4 | Leaves shape | Elliptic-lanceolate Upper leaves entire and lower 2-3 segmented | Upper leaves- simple, linear- lanceolate, Lower leaves 3-5 segmented and prickly outgrowth present on the leaf |
| 5 | Leaves size | 4-15×0.5-4.5 cm | Petiole Upper- 8-11.7×0.2-0.3 cm long Lower- 12.2-1.25×1.2-1.5 cm long |
| 6 | Lamina | Entire and serrate | Entire and undulate |
| 7 | Leaf margin | Upper leaves margin entire Lower leaves margin serrate | Upper leaves margin entire Lower leaves margin entire- undulate |
| 8 | Inflorescence | Solitary axillary | Solitary axillary |
| 9 | Pedicels | Short pedicel | Short pedicel, 5-7 mm long |
| 10 | Flower appearance | Pink, purple, or rarely white | Pink or light purple outside and red to dark purple in side with reddish-purple spotted within |
| 11 | Anthers | Anther white or green | Anthers dark red or purple |
| 12 | Fruit | 1.5-3.0×0.6-0.8 cm long, Oblong quadrangular Deeply 4-grooved, short- beaked at the apex | 4-5 × 0.5-0.6 cm long, Fruit narrow oblong, long-beaked loculicidal capsule one on each axis |
| 13 | Seeds | Black or white, smooth-rugose | Winged at ends, black, rough, 2.5-3 mm long. |
| 14 | Flowering and fruiting | August-November | April-September |



Fig 3: (D) Flower L.S. (E) Stamens with scale (F) Pistil (G) Immature fruit L.S. (H) Fruit with scale (I) Mature fruit

Key to species

- 1a. Lower leaves 2-3 segmented, nectar glands yellow, seeds non winged*S. indicum*
- 1b. Lower leaves 3-5 segmented, nectar glands purple, seeds winged at both ends*S. alatum*

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Reference

1. Akhila H, Beevy SS. *Sesamum alatum* Thonn. (Pedaliaceae)-A new record for the flora of Kerala. The journal of Indian Botanical Society,2013:92(1&2):104-106.
2. Bhandari MM. Flora of the Indian Desert. Scientific Publisher, Jodhpur (India), 1978.

3. Dhakad M, Kotiya A, Chandrawal K, Khandal D, Meena SL. (Urticaceae): a new generic record to the flora of Rajasthan, India. Indian Journal of Forestry,2019:42(1):49-51.
4. Ghazanfer SA. Flora of Oman. National Botanic Garden, Belgium, 2007, 2.
5. Jain SK, Rao RR. A handbook of field and herbarium methods.-New Delhi: Today and Tomorrow's Printers and Publishers, 1977.
6. Kobayashi T. The wild and cultivated species in the genus *Sesamum*. Sesame: Status and improvement. Proceedings of Expert Consultation, Rome Italy, 8-12 Dec 1980. FAO Plant Production and Protection Paper,1981:29:8689.
7. Kotia A. Threatened plants and their habitats in the Indian Thar Desert. Special Habitat sand Threatened Plants of India. ENVIS Bulletin (ENVIS-center Wildlife Institute of India, Dehradun),2008;11(1):93-99.
8. Kotia A. Biodiversity losses of Indian Thar Desert (Rajasthan) special reference to endemic and threatened plants species, In: Biodiversity in India: Assessment, scope and Conservation Lambert Academic Publishing, Germany, 2014, 09-18.
9. Kotia A, Tiwari U, Rawat GS. Semiarid region of India: vegetation characteristics and Threatened Plants. Habitats and Threatened Plants of India. ENVIS Bulletin (ENVIS- centre Wildlife Institute of India, Dehradun),2008:11(1):109-116.
10. Kotiya A, Solanki Y, Reddy GV. Flora of Rajasthan. Published by Rajasthan State Biodiversity Board, Jaipur, Rajasthan, 2020, 359.
11. Kotiya A, Solanki Y, Singh, J, Gupta S, Kumar V, Gunpal D. *Solanum violaceum* Ortega (Solanaceae): A new species for Rajasthan state, India. International Journal of Botany Studies,2021:6(1):102-104.
12. Kumar A, Solanki Y, Kotiya A, Mohil P. *Solanum villosum* Mill. (Solanaceae): New Addition to the Flora of Rajasthan, India. Ambient Science,2020:07(1):34-35.
13. Mabberley DJ. The Plant-Book: A Portable Dictionary of the Vascular Plants. Cambridge University Press, Cambridge, UK, 2008.
14. Nayar TS, Rasiya-Beegam A, Mohanan N, Rajkumar G *et al.* Flowering Plants of Kerala-A handbook. Tropical Botanic Garden and Research Institute, Thiruvananthapuram, Kerala, India, 2006. 1069.
15. Pullaiah T, Ramakrishnaiah V, Rani SS, Rao PN. Flora of Guntur District, Andhra Pradesh. Regency Publication, ND. Special Habitat sand Threatened Plants of India, 2000, 259
16. Puri GS, Jain SK, Mukerjee SK, Sarup S, Kotwal NN. Flora of Rajasthan. Records of the Botanical Survey of India. Records of the Botanical Survey of India, 1964, 19.
17. Sharma S, Tiagi B. Flora of North-East Rajasthan. Kalyani Publishers, New Delhi, 1979.
18. Sharma SK, Katewa SS, Bhatnagar C. New records of the plants from Rajasthan. Zoos' Print Journal,2005:20(9):1984-1985.
19. Shetty BV, Singh, V. Flora of Rajasthan. Botanical Survey of India, Howrah, Kolkata, 1991, 2.
20. Singh V, Singh, M. Biodiversity of Desert National Park Rajasthan. Botanical Survey of India, Kolkata, 2006.
21. Singh V, Srivastava AK. Biodiversity of Ranthambhore Tiger Reserve Rajasthan. Scientific Publisher, Jodhpur, India, 2007.
22. Solanki Y, Kumar, A, Kotiya A, Mohil P. *Solanum americanum* Mill. (Solanaceae) An addition to the flora of Rajasthan: In the arid and semiarid region of India. International Journal of Botany Studies,2020:5(2):210-212.
23. Tiwari UL, Ravikumar K, Balachandran N, Sharma SK. Some new records of plants from the state of Rajasthan. Journal of Threatened Taxa,2016:8(3):8632-8637.
24. Yadav BL, Meena KL. *Solanum sisymbriifolium* Lam: A new record for Rajasthan. Journal of Economic and Taxonomic Botany,2016:32(3):749-753.