

FURTHER CONTRIBUTION TO THE FLORA OF KUTCH IN GUJRAT STATE

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ABSTRACT

The flora of Kutch has many species in common with Sind and Gujrat. The district has large sandy and saline marshy tracts which are colonised by xerophytic and halophytic species. A study of the recent collections from this area in Poona herbarium revealed that the following species have not been reported from the area so far and are, therefore, new plant records for the area.

Crotalaria indica L., *Sida spinosa* Gaill., *Zizyphus oleracea* Heyne, *Cassia nigricarpa* Vahl, *Trinobrya halimifolia* Edgew., *Dalmanella salina* DC., *Sesuvium spicatum* Jacq., *Hibiscus salina* Steud., *Crotalaria retusa* Choisy var. *axilliflora* Clarke, *Ipomoea pes-caprae* Choisy, *Tecoma indica* Stapf, *Schinus molle* Robinson A. Braun., *Pyralisia luteiflora* DC., *Phytolacca debilis* Herb., *Ulex europaeus* Roxb., *Chrysothamnus aureus* Stapf, *Croton siccavada* (L.) Lam., *Digiphan juncea* (Hochst.) Chiov., *Elagania pilosa* Beauv., *Rhynchospora chinensis* Chiov., *Sesuvia portulacastrum* (Rott.) Stapf, *Sporobolus vaginatus* Hochst., *Chenopodium molle* Chiov.

The district of Kutch in Gujrat State is situated approximately between the latitude 22° 50' to 24° 00' N and longitude 68° 25' to 71° 00' E. The area is surrounded on the west by the Arabian sea, on the north by the Great Rann of Kutch, on the south by the Gulf of Kutch and on the east by the Little Rann of Kutch. It is thus encircled by either water or swampy marshes or by vast low-lying saline and sandy tracts of the Rann. Kutch is rather a plain country with few low hillocks here and there. The highest hill is in northern district, the 'Kala Dungar' with an altitude of about 450 m. Dhinodhar hill situated towards the north-west of the district is slightly lower. The soil of Kutch is mostly sandy or rocky and all low-lying country has saline soil. The flora of these habitats, therefore, has xerophytic characters. Blatter (1908) has described in detail the xerophytic adaptations of some more common plants.

The area is botanically underexplored. Palni (1890) and Blatter (1908) gave lists of plants of this district. Indraj Thakar (1926) wrote in Gujrati a detailed account of the economically important plants of Kutch. Later Kapadia (1954 a & b) wrote short botanical papers on the area.

In order to explore the plant-wealth of the area, several botanical tours were undertaken in different seasons during the years 1957-60. A complete flora based on 637 species has been prepared (Puri, Jain & Deshpande, 1959) and this paper describes some species not mentioned therein. Other additions were made by Jain and Kapadia (1960), Deshpande (1960) and Jain (1961).

Kutch is very significant phytogeographically as it is the meeting ground for the arid African and Arabian element of flora with that of India.

Blatter (1908) gave a list of 345 indigenous species belonging to 74 natural orders. Indraj Thakar (1926)

described 508 species belonging to 71 natural orders; he has included some exotics also. Kapadia (1954) added about a dozen grass species to the flora.

The flora of Kutch has resemblance with that of Sind and Gujrat, the former affinity is more evident. Blatter also pointed out that out of his 345 species about 200 were common with Sind. It is interesting to observe that more and more plants reported from Sind are now being found in Kutch, and many of them do not occur eastwards of Kutch. The thorny scrub jungle forms dominant vegetation of Kutch. Several degraded stages of scrub vegetation are seen in overgrazed areas. In protected and moister situations such as valleys of the hills or Dhinodhar, Kala-Dungar and Motadholi the vegetation tends to develop into good deciduous forests, which show resemblance to the typical dry deciduous forests of the Deccan Trap, with species such as *Strychnos urens* Roxb., *Lumnitzera coromandelica* Merr., *Bauhinia racemosa* Lam., *Ehretia laevis* Roxb., *Salmdia mularbarica* Schott and Endl., *Cordia dichotoma* Forst. f., *C. rostrata* Roem. & Schult., *Moringa oleifera* Lam., *Lansonia thernis* L. etc. (Pl. 1).

The thorny scrub forest in Kutch is composed of *Acacia senegal* Willd., *A. leucophloea* Willd., *A. arabica* Willd., *Capparis decidua* Pax., *C. grandis* L. f., *Zizyphus maurandiana* Lam., *Z. nummularia* Wight & Arn., *Mimosa katapa* Willd., *Euphorbia nerifolia* L., *Grewia villosa* Willd., *G. tenax* Ficof., *G. hircocens* Juss., *Premna resinosa* Schauer., *Balanites aegyptiaca* Dehlie and *Commiphora mukul* Engl. (Pl. 2).

The saline tracts and the riverain areas have sparse scrub forests of *Salvadora persica* L., *S. oleoides* Decne., *Tamarix* species and *Calotropis procera* R. Br.

Rocky habitats with poor shallow soil and waste lands are colonised by abundant growth of *Cassia* species of which four viz. *C. auriculata* L., *C. obtusa* Roxb., *C. holosericea* Friesch., and *C. angustifolia* Vahl are conspicuously seen in yellow flowers in the summer season.

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Dense colonies of *Echinops erhinatus* Roxb. occur on freshly exposed hard rocky soils along railway lines.

Mangroves occur all along the coast, mostly poor and disturbed. *Avicennia alba* Blume is the commonest mangrove plant, and grows to tree habit up to 4 to 5 meters high (Pl. 3). The sandy banks along sea-creeks have dense growth of *Asparagus dumosus* Baker, *Crotalaria barbata* Ham., *Aeluropus lagopoides* (L.) Trin. ex Thwaites and several grasses.

The low-lying tracts along sea-creeks and backwaters are covered by a number of halophytes such as *Sida frutescens* Forsk., *Aeluropus lagopoides* (L.) Trin. ex Thwaites, *Uroschandra setulosa* C. E. Hubb., *Juncea maritima* Lam. and *Croton ceylonicus* L. (Pl. 4).

An examination of our material and available published works, such as Hooker (1872-97), Cooke (1938), Bhatler (1908), Thakar (1926) and Kapadia (1954) revealed that a number of plants have not been reported from Kutch by earlier workers.

The following pages briefly describe 23 such species. Short notes on their general distribution in India have been added. Detailed descriptions have been avoided as they are available in published floras. References to those works have been given. Some of the plants described below have very restricted distribution in India and their occurrence in Kutch is of significance for their distribution patterns.

Cochlosoma tridentata L. Mant. 566, 1767; Hook f., Fl. Br. Ind., 1: 398.
(Tiliaceae).

An undershrub; leaves lanceolate, acute or acuminate; flowers in short cymes; capsule elongate, cylindrical with trifid beak.

Khavda, Jain 46872; Surendranagar (Saurashtra), Jain 11842.

The plant occurs in North-Western India, Gangetic plain, Bihar, Orissa and Madras. It is not reported from Kutch, Saurashtra, North Gujarat, Bombay and Kerala. Its earlier record from Western India is only from Sind. Its report from Kutch and Surendranagar fills a gap in its general distribution in India.

Sida prostrata Guill., Perr. & A. Rich., Fl. Scog. 1, 71, 1830; Hook f., Fl. Br. Ind., 1: 323.
(Malvaceae).

An undershrub; leaves 1.25-3.5 cm. long, downy; flowers pale yellow, carpels 7-8, nearly glabrous.

Rudramata, Jain 46844.

The plant is common in the drier parts of Western India, but is not reported from Kutch so far.

Zizyphus glabrata Heyne ex Roth., Nov. Pl. Sp. 159, 1821.
Syn. *Z. trinervis* Roxb., Hook f., Fl. Br. Ind., 1: 633.
(Rhamnaceae).

An unarmed tree; leaves elliptic, glabrous on both sides, fruit globose about 1 cm. diam.

Rudramata, Jain 46800.

This plant occurs in several parts of India but is

not reported from Kutch so far. The plant differs from other species of the genus in being unarmed.

Cassia amantifolia Vahl, Synb. Bot., 1, 29; Hook f., Fl. Br. Ind., 2: 264.
(Caesalpiniaceae).

A shrub or undershrub; leaflets 10-16, oblong-lanceolate, acute; racemes axillary, many-flowered, flowers yellow, legume flat.

Anjar, Jain 46688, growing in waste places in outskirts of the old town demolished by earthquake.

This plant is a native of tropical Africa; it also occurs in Arabia. Dalzell and Gibson (1861) remarked that the plant was first grown in India at Hivre garden near Poona from seed obtained from Aden. It is reported to be cultivated on a limited scale in Madras also. The plant seems to have been wild in Kutch of recent.

Tournefortia indiarica Edgew., J. Linn. Soc., 6: 203, 1862; Hook f., Fl. Br. Ind., 2: 661.
(Aizoaceae).

A prostrate succulent herb; leaves fleshy; capsule 8-12 seeded.

Nakhatrana road, Jain 11564.

This plant occurs in drier parts of North-Western India, it has not so far been reported from Kutch and other northern parts of Gujarat.

Oleolantia aspera DC., Prodr. IV, 428, 1830; Hook f., Fl. Br. Ind., 3: 65.
(Rubiaceae).

An annual herb, 15-40 cms. high; branches scabrid, leaves whorled; flowers blue in terminal cymes; corolla tube long, capsule scabrid.

Khavda, Jain 46865.

The plant grows in North-Western, Central and parts of Southern India. It has not been reported from Gujarat and Kutch so far.

Sceloscyphus africanus Jacq., Ic. Pl. Raz. 17: 1782; Hook f., Fl. Br. Ind., 3: 305.
(Compositae).

An erect herb, flowers yellow in heads, palea of the receptacle boat-shaped, enclosing the curved, gibbous ribbed achenes.

Dhinochar, Jain 46932.

Good (1923) included the genus *Sceloscyphus* under genera restricted to America and continental Africa only. *Sceloscyphus africanus* is not reported from Aden or Arabia. In India it occurs in Western Himalayas, Upper Gangetic Plain, Madras and parts of Bombay State. It is not reported from Western Rajasthan, Kutch or Sind.

Heliotropium calcareum Stocks in Kew J. Bot., 4: 174, 1852; Hook f., Fl. Br. Ind., 4: 150.
(Boraginaceae).

A small plant with woody base, leaves hairy; flowers 1-ranked in scorpioid cymes; calyx densely hairy.

Mundra-Mandvi, Jain 11760.

Hooker (*loc. cit.*) & Cooke (1908) reported this plant only from Sind. Macadam (1890) mentioned it in her list of Jodhpur plants. There is no report so far of its occurrence in Kutch or elsewhere in India.

Convolvulus rotlierianus Choisy var. *tenella* Clarke in Hook. f., Fl. Br. Ind., 4: 219.
(Convolvulaceae).

A herb; leaves sessile, linear, acute; sepals glabrous.

Dhinosdhar, Jain 46936.

C. rotlieriana Choisy occurs in the Deccan peninsula; the present variety differs from it in its sepals being glabrous outside. The variety is reported only from Sind and nowhere in present boundaries of India.

Stoeckl (*loc. cit.* 172) described this plant as a distinct species. Clarke (*loc. cit.*) reduced it to a variety of *C. rotlierianus* with which it resembles very closely.

Ipomoea romicifolia Choisy, Convol. Orient., *Mém. Soc. Phys. Genev.*, 6: 447, 1834; Hook. f., Fl. Br. Ind., 4: 207.
(Convolvulaceae).

A sparsely hirsute prostrate herb; leaves subterraciform; flowers white.

Dhinosdhar, Jain 46905.

Hooker (*loc. cit.*) reported this plant only from hills of South India. It is not reported from North-Western India such as Punjab, Rajasthan, Kutch, Saurashtra or from Bombay.

L. andica Stapf, *Kew Bull.*, 346, 1894; Cooke, Fl. Bombay, 2: 313, 1905.
(Convolvulaceae).

An annual prostrate hispid herb, leaves oblong hastate or deltoid hastate, flowers in few-flowered cymes.

Khuvda, Jain 46858.

The plant has been reported from several drier parts of Western India but it is not so far recorded from Kutch.

Schweinfurthia sphaerocarpa A. Braun, *Montab. Akad. Wiss. Berl.*, 875, 1866; Hook. f., Fl. Br. Ind., 4: 252.
(Scrophulariaceae).

A herb, leaves thick, flowers axillary lilac, capsule 6-8 mm, globose.

Gundhadham, Jain 61401; growing on loose rocky soil along railway line.

The plant has not been reported from Kutch so far. It occurs in drier parts of Sind and Rajasthan.

Peltidium humifusum Del., *Descrip. de l'Egypte*, 148, 1812; Hook. f., Fl. Br. Ind., 4: 287.
(Scrophulariaceae).

A small prostrate herb with fleshy leaves; flowers axillary 1-3-nate.

Khursara Talao, Jain 61490, growing among stones on the embankment of tank.

This plant occurs at several places in Deccan Peninsula. It has not been reported so far from Kutch, Saurashtra or any other parts of Gujrat.

Phyllanthus debilis Herb. Ham. ex Wall. Cat., 7892, 1828; Hook. f., Fl. Br. Ind., 5: 299.
(Euphorbiaceae).

A slender glabrous annual herb, flowers axillary on short pedicels.

Dhinosdhar, Jain 46938.

The plant occurs in several parts of India; it has not so far been recorded from Western India, such as Rajasthan, Kutch, Saurashtra and Bombay.

Chloris montana Roxb., *Hort. Beng.*, 82, 1814; Hook. f., Fl. Br. Ind., 7: 292.
(Gramineae).

A grass with narrow linear acuminate leaves and 2-6 erect spikes.

Bhuq, Mahajan 11450.

This grass occurs in the Gangetic plains and southwards to the Peninsula. It has not so far been reported from Rajasthan and Kutch.

Chrysopogon aucheri Stapf, *Kew Bull.*, 211, 1907; Hook. f., Fl. Br. Ind., 7: 195.
(Gramineae).

Dhinosdhar, Jain 46972.

Hooker (*loc. cit.*) and Blatter and McCann (1936) reported this grass only from Sind and nowhere else in India. No species of the genus *Chrysopogon* is reported from Kutch so far.

Cyperis schoenoides (L.) Lam. *Encyc.*, 1, 166; Syn. *Helyochloa schoenoides* Hout. Hook. f., Fl. Br. Ind., 7: 235. (Gramineae).

An annual prostrate grass; leaves narrowly lanceolate; acuminate; inflorescence a spike-like ovoid, oblong compressed panicle sessile on the dilated sheath of the uppermost leaf.

Phatal Talao, Puri 31533.

This grass occurs in Punjab, Western Himalayas and Sind and has not been reported so far from Rajasthan, Kutch and Saurashtra.

Digitaria pennata (Hochst.) Chiov., *Result. Scient. Miss. Stefanni Paoli*, 1, 183.

Syn. *Paspalum pennatum* Hook. f., Fl. Br. Ind., 7: 16.
(Gramineae).

A tufted leafy grass with spreading characteristically hairy spikes (Pl. 51).

Dhinosdhar, Jain 46960.

The grass occurs in drier parts of North-Western India and in Upper Gangetic Plain. It has not been reported from Saurashtra, North Gujrat & Kutch.

Eragrostis pilosa Beauv., *Agrost.*, 71, 1812; Hook. f., Fl. Br. Ind., 7: 323.
(Gramineae).

Chitrod, Jain 46772; Anjar, Jain 46797A; Bhirandiyara, Jain 46818.

The grass is common almost all over India; but it had not been reported earlier from Kutch.

Rhynchelytrum villosum Chiov., Ann. Inst. Bot. Roma, 7: 310, 1908.

Syn. *Tricholena wighti* Nees & Arn. ex Steud. Hook. f., Fl. Br. Ind., 7: 85. (Gramineae).

A tufted stout or slender grass, spikelets variable in size, silky hairy.

Dhinothar, Jain 46942.

The grass is generally distributed in Upper Gangetic Plain, Madhya Pradesh and Deccan. It is not reported from Saurashtra, North Gujrat, Kutch & Sind so far.

Schinus nervosum (Rottl.) Stapf, Fl. Trop. Af., 9: 36, 1917.

Syn. *Ischaemum latum* Br., Hook. f., Fl. Br. Ind., 7: 136. (Gramineae).

A perennial grass, 60-90 cm. tall, racemes solitary.

Dhinothar, Jain 46971.

This grass is common in several parts of India, but is not reported from Kutch so far.

Sporobolus marginatus Hochst. ex A. Rich. Tent. Fl. Abyss., ii, 397.

Syn. *S. arabicus* Boiss. Hook. f., Fl. Br. Ind., 7: 252. (Gramineae).

A slender annual grass.

Dhinothar, Jain 46812, 46914; Anjar, Jain 46785.

This grass is recorded from several places in North-Western India. It has not been reported from North Gujrat, Western Rajasthan and Kutch. It has been found to be common in several parts of Kutch.

Tetrapogon tenellus Chiov., Ann. Inst. Bot. Roma, 7: 352, 1908.

Syn. *Chloris tenella* Koenig ex Roxb. Hook. f., Fl. Br. Ind., 7: 290. (Gramineae).

A slender grass with solitary rather flat erect spikes.

Anjar, Jain 46693.

The grass is common in Western India but has not so far been recorded from Kutch.

The following is an additional list of plants which were not reported by Blatter, Thakur & Kapadia from Kutch. These have recently been collected and reported from there, Jain, 1960; Jain and Kanodia, 1960; Deshpande, 1960.

1. *Tamarix articulata* Vahl.
2. *Trigonella occulta* Del.
3. *Astragalus prolixus* Sieb.
4. *Xanthium strumarium* L.
5. *Heliotropium rariflorum* Stocks.
6. *Trichodema amplexicaule* Roth.
7. *Premna resinosa* Schau.
8. *Euphorbia dracunculoides* Lam.
9. *Asparagus dumosus* Baker.
10. *Juncus maritimus* Lam.
11. *Ephedra foliata* Boiss.

We are grateful to Dr. J. C. Sen Gupta and Dr. G. S. Puri for their kind advice and help in preparation of this paper. Our thanks are due to the officers of the Forest Department of Kutch who gave facilities in field work.



Pl. 5. *Digitaria pennata* (Hochst.) Chiov.

REFERENCES

1. BLATTER, E. L.—On the flora of Kutch, *J. Bombay nat. Hist. Soc.*, 18: 256-277 & 19: 157-176, 1908.
2. — Flora of Aden, *Rec. bot. Surv. India*, 7: 1-415, 1914.
3. — Flora Arabica, *Dist.*, 8: 1-519, 1919-36.
4. BLATTER, E. L. & McCANN, C.—The Bombay Grasses, 1935.
5. COOKE, T.—The flora of Bombay Presidency, 3 vols., 1958 (Reprinted).
6. DALZIELL, N. A. & GIBSON, A.—The Bombay Flora Suppl. 25, Bombay, 1861.
7. DESHPANDE, U. R.—*Premna resinosa* Schau., an addition to Indian Flora—*Curr. Sci.*, 1960.
8. HOOKER, J. D.—Flora of British India, 7 vols., 1872-97.
9. INDRAB TILAK, J.—Plants of Kutch and their utility (in Gujarati), 1926.
10. JAIN, S. K.—A Note on *Juncus maritimus* Lam., *Bull. Bot. Surv. India*, 2 (3 & 4): 307-308, 1960.
11. JAIN, S. K. & KANODIA, K. C.—Additions to the flora of Kutch, *Curr. Sci.*, 29 (9): 361, 1960.
12. KAPADIA, G. A. (a)—Statistical Synopsis of the Flora of Kutch, *Guj. Res. Soc.*, 16: 90-107, 1954.
13. — (b)—Notes on Kutch Grasses, *Guj. Res. Soc.*, 16: 328-340, 1954.
14. MUMFORD MISS.—A list of trees and plants of Jodhpur, 1886.
15. PALIN, C. T.—A list of plants of Kutch, *Bom. Geogr.*, 5: 1880.
16. PURI, G. S. & JAIN, S. K.—Vegetation of Kutch, *Proc. Indian Sci. Congr.*, Pt. III, 326, 1958.
17. PURI, G. S., JAIN, S. K. & DESHPANDE, U. R.—The flora of Kutch, *Proc. Indian Sci. Congr.*, Pt. III, 291, 1959.
18. SANTAPPA, H.—Plants of Saurashtra, Rajkot, 1953.
19. SANTAPPA, H. & RAJADA, M. B.—Contribution to the flora of Gir Forest in Saurashtra, *Indian For.* 80 (7): 379-389, 1954.
20. SAXTON, W. T. & MCKEWEE, I. J.—Plants of Northwest Gujrat, *Rec. bot. Surv. India*, 6 (7): 207-325, 1918.