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FLORAL VARIATIONS AND SEED VIABILITY IN *TECOMELLA UNDULATA* (SM.) SEEM. IN INDIAN DESERT

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ABSTRACT

Tecomella undulata (Sm.) Seem. (Bignoniaceae), a common tree in the desert region produces yellow, orange-red and red coloured flowers. Only the seeds formed from yellow flowers are viable. The trees with yellow flowers are dominant and have been considered as most advanced and appear to be more suitable for arid environment.

INTRODUCTION

'Marwar teak' or 'Rohida', *Tecomella undulata* (Sm.) Seem. is an important desert tree highly prized for its yellowish-brown mottled wood for furniture, carvings and toy making. The leaves and flowers are palatably consumed by animals. It is the only desert tree which profusely flowers in winter season and spectacular bloom continues upto March or April. It is also regarded as a very useful species for afforestation of the desert tract. The colour of the flower ranges from yellow to orange-red and the haploid chromosome number is 11 in two variants (Shankarnarayan and Nanda, 1962). Little work is reported on the autecology of *T. undulata* and the present investigations relate to one such study.

MATERIAL AND METHODS

For the present study 10 plus trees of *T. undulata* were selected from different locations (Rai-ka-bagh, University New campus) at Jodhpur. Leaf and flower samples were taken for two years (1986, 1987) from all plus trees in triplicate during January to March. Flowers were studied by examining carpels under a dissecting microscope. Features of pollen grains and other parts of the flowers were recorded by ocular micrometer fitted in a compound microscope. The weight of 100-seeds was recorded with a monopan balance. Seed viability was tested by 0.1% solution of TTC (2, 3, 5-triphenyl tetrazolium chloride) (Misra, 1968).

RESULTS AND DISCUSSION

T. undulata trees usually flower during winter season. Curiously, some of the trees were observed blooming unusually early with yellow flowers (at Rai-ka-bagh) in the month of September. Distinct colour variations existed in the flowers of *T. undulata* from yellow, orange-red and red. Flowers also varied in shape. The trees which bear yellow flowers were more (72%) than those with red or orange-red flowers. The detailed floral characteristics observed at different locations are given in Table 1.

The mean leaf area was unusually high (28.33 sq cm) in yellow flowering trees. Flowers are simple, bracteate, bracteolate, bisexual, pentamerous, gamosepalous (2 + 3), calyx persistent with black mottling in sepals more in yellow flowers. The maximum size of the petals was observed in orange red flowers. The smaller flower and the comparatively compact inflorescence (yellow flowers) are attributed to the trees which have advanced characters. The inner side of the corolla tube of yellow flowers showed a red tinge. In the posterior region, the outer side of corolla tube was yellow in all types of flowers, which clearly shows that the yellow colour is dominant. Anteriorly, the colour of the corolla tube varied from yellow to red tinge.

The staminode in the yellow flower is comparatively small. Compared to red and orange-red flowered stamens, the length of the anther lobes did not show any variations but filament length in yellow flowers was shorter than in others. The pollen grains of yellow flowers were larger and round in shape than in others.

Ovary is situated on annular disc, stigma bilamellate, conical in shape and the margins slightly serrate. Style and stigma were observed to persist sometime even after the corolla and stamens dried up and withered away.

The colour of the mature fruits was greenish from yellow flowers and reddish-brown from orange-red and red flowers. The length of the fruit produced by yellow flowers (26 $\pm$ 2 cm) did not vary much as compared to others. The fruit is considered to be the longest (Fig. 2) among the desert trees (Prakash and Sen, 1987).

The seeds are compressed dorso-ventrally, slightly concave on ventral side, and winged(Fig. 3). The viability was 100% only in the seeds from yellow flowered trees The 100-seed weight, though maximum for seeds, from yellow flowers, did not vary much for seeds from different colours of the flowers (Table 2).

The advanced characters like small size of flowers, bright yellow colour of petals and sepals, production of numerous viable seeds early flowering rhythm, etc. were present in yellow flowered trees. The tress with yellow flowers are, therefore, considered more resistant, advanced and suitable for afforestation of arid zones.

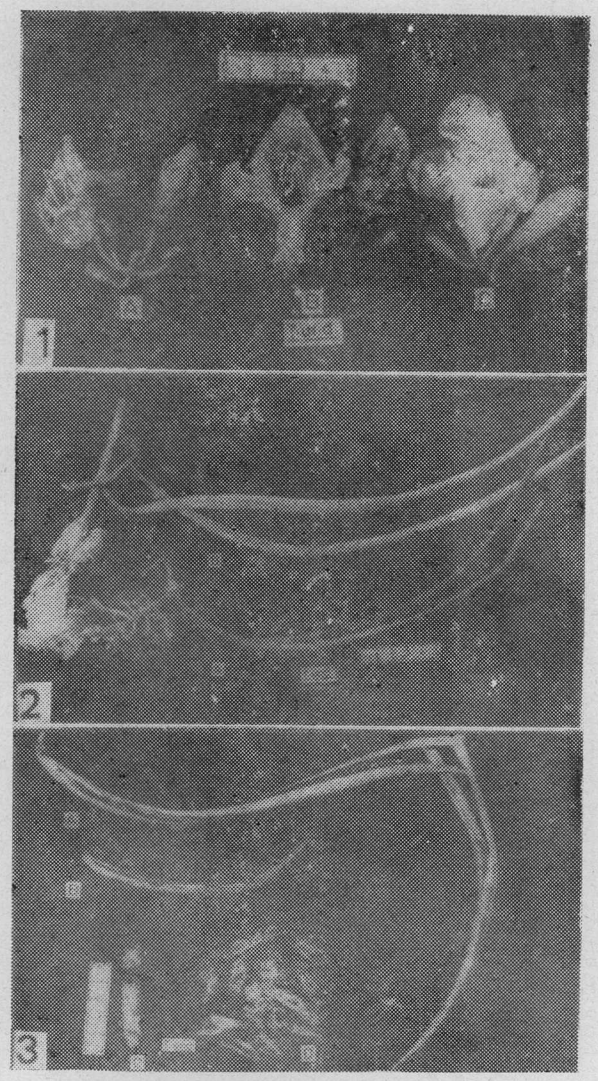

Fig. 1. Flowers of *T. undulata* red (A), orange red (B). and yellow (C);
2. Fruits of *T. undulata* red flowered (A), and yellow flowered (B) trees;
3. Mature fruits (A, B) and seeds (C, D) of *T. undulata*.

Table 1. Comparative morphological screening of floral features of *T. undulata*

Location	Colour of inflore-scence	Leaf area (sq cm) 4th node	Colour, shape and mottling on sepals	Size of petals (mm) Anterior L	Anterior B	Posterior L	Posterior B	Length of filaments (mm) Long	Short	Stam-inode	Size of anther lobe (mm) Long	Short	Pollen grains Shape	Size (μ) L	Size (μ) B
Jodhpur :															
(i) Rai-ka-basgh	Yellow	28.83 ±4.31	Greenish yellow, round, intense mottling	35.6 ±0.5	25.0 ±0.0	54.0 ±2.6	41 0 ±0.0	35.66 ±1.1	27.0 ±1.7	7.3 ±2.3	5.0 ±0.0	3.33 ±0.57	Round	49.5 ±4 5 (D)	
(ii) New Campus (Garden)	Orange red	16.66 ±1.52	Greenish orange, obtuse, moderate mottling	51.6 ±0.3	29.0 ±2.6	57.6 ±4.9	51.3 ±0.5	343.0 ±1.7	34.0 ±1.0	19.3 ±2.0	5.33 ±1.0	4.0 ±1.0	Oval	55.5 ±2.54	48.0 ±2.59
(iii) New Campus (Near Audito-rium)	Red	8.08 ±3.81	Reddish green, blunt, light mottling	43.6 ±0.3	23.0 ±0.2	51.0 ±1.0	44.0 ±5.2	38.3 ±1.1	31.0 ±1.0	26.0 ±1.7	5.33 ±0.57	3.6 ±0.57	Oval	57.0 ±5.19	43.5 ±2.59

L = length, B = breadth, D = diameter, H = height.

Table 2. Seed characteristics of *T. undulata* from different locations

Location	Size of seed (mm)		Weight of 100 seeds (mg)	Viability (%)
	Length	Breadth		
i) Rai-ka-bagh	20.7±0.1	9.8±0.06	910.±5.0	100.0
ii) New Campus (Garden)	20.5±0.7	7.5±2.12	520±4.24	0.0
iii) New Campus (Near Auditorium)	24.3±0.15	8.4±0.15	360±8.32	0.0

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