Indian J. Pl. Genet. Resources 7(2): 223-226, 1994; Special Issue
Short Communication

PHYTOGEOGRAPHICAL STUDIES IN THE GENUS *MORUS* L. I. GEOGRAPHICAL DISTRIBUTION AND NATURAL VARIATION OF *MORUS SERRATA* ROXB.

S.B. Dandin[1], Basavaiah[1], R. Kumar and H.V. Venkateshaiah[1]

Central Sericultural Research and Training Institute,
Mysore 570 008 (Karnataka)

Key words : *Morus serrata*, geographical distribution, variation

Morus L. is an important genus of the family Moraceae and is distributed in temperature and subtropical regions of both the hemispheres. The genus is beleived to be originated in the temperate mountain regions of South east Asia. Vavilov has recognised 'China-Japan' gene centre as the centre of origin of this genus. Of the 68 species recognised from different parts of the world, 38 species are found in Asia and 14 in continental America (Sanjappa, 1989). The genus is also represented in middle east, Europe, and South Africa. Owing to the fast spread of sericulture to more than 60 countries in the recent past, numerous varieties belonging to different species have been introduced to all these countries. In India, *Morus* is represented by four species namely *M.alba, M. indica, M. laevigata* and *M. serrata* (Hooker, 1885), which are distributed in north-west, central and north-east Himalayas. The importance of wild species in mulberry improvement programmes has been realised in recent years. A systematic approach to study and collect the mulberry germplasm from Himalayas was taken on priority by C.S.R. & T.I., Mysore.

Three explorations were conducted covering the major growth seasons (spring and autumn) during 1985-89. The geographical areas covered include northwest Himalayan regions in Jammu and Kashmir and Himachal Pradesh; central Himalayas of Uttar Pradesh and north-east states, viz., Assam, Manipur, Meghalaya, Nagaland and West Bengal. For all the populations of *M.serrata* came across during the survey, details of habitat, population density, size of individual trees and other morphological characters which are important from sericulture point of view were recorded. Information was also collected on its

[1]Present address : Karnataka State Sericulture Development Institute, Thalaghattapura, Bangalore-560 062 (Karnataka)

use from the local inhabitants. Harbarium specimens were prepared which are preserved in institute's repository. Live specimens were collected in the form of stem cuttings and multiplied as bud grafts. In total 7 accessions which are found distinctly different from each other are included in the germplasm of the institute for further study. Preliminary cytological studies were made and their chromosome numbers are confirmed.

Morus serrata, is native of India and is known as Himalayan mulberry (Roxburg, 1832). Hooker (1885), Brandis (1906) and Osmoston (1927) have reported this species from north-western and central Himalayas. It has been recognised as a valuable timber species (Wlth. India, 1962). Its leaves are used as fodder and also rarely for feeding silkworm (Kanjilal, 1940). During the present survery, *Morus serrata* was found distributed in Himalayan regions of Jammu and Kashmir, Himachal Pradesh and Uttar Pradesh. In Jammu region

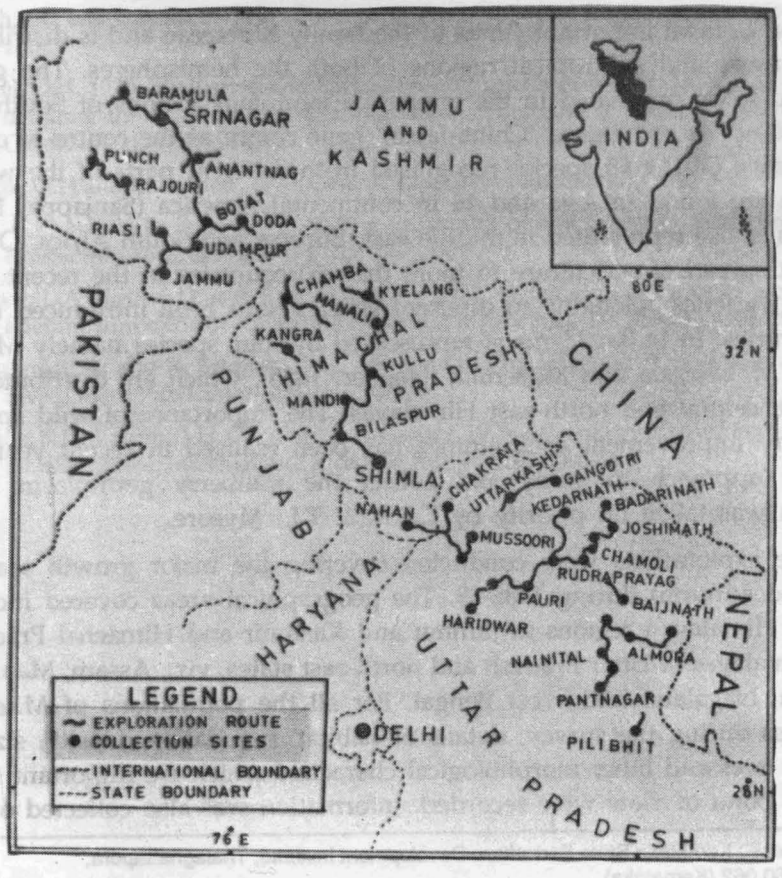

Fig. 1. Distribution of *Morus serrata* and sites of collection in north-west and central Himalayas

large trees measuring an height of 10-15 m were found as forest component in Rajouri, Punch and Botat at an elevation of 1300-2200 m. They showed broad, 3-5 lobed, dull-green leaves sharply pointed uneven serrations. Majority of the trees were males with 3-6 cm long catkins. Leaves are the common source of fodder and the wood is commonly used for the preparation fo agricultural appliances. Large trees of 100-200 years age were also found in Kangra, Chamba, Kullu and Nahan districts of Himachal Pradesh. They grow along roadsides, hillsides and river beds. Most of them were stunted due to continuous lopping of branches for fodder. Striking variations were observed in the size. lobation, texture and greenness of the leaves of different trees within the same population.

In Garhwal Himalayas of Uttar pradesh, this species constitutes a major floristic component alongwith oak. Large populations were recorded around Korawa, Astar, Dakyarna, Magralli, Larloo and Kwara villages in Chakrata tahsil of Dehradun district at an elevation of 1900 m. They were large trees of 20-30 m height and are mainly used as timber. They showed large unlobed to trilobed leaves with deep serration and sharp teeth. In some areas due to large scale denudation, trees were confined mostly to bunds of encroached areas. Tall trees measuring an height of 10-12 m are concentrated in Badrinath, Gopeshwar, Chamoli, Pauri, Urghum and Haridwar. They showed large trilobed leaves measuring 20-30 cm length and 20-25 cm width. In village like Salna, Lyari, Badiginda, Devagram etc., these trees were conserved on bunds of terraces for fodder purposes and also for feeding silkworms occasionally. In Kumaon region, large trees of *M. serrata* were distributed in Nainital, Pithoragarh and Almora at an elevation of 1100-2200 m. Both male and female plants were found in this region. In Pilibhit area, only isolated trees were found as sporadic occurance. This species was not observed in north-eastern regions during the present exploration. However, Kanjilal (1940) has reported it from the Khasi hills of Meghalaya.

Morphological variability in different populations of *M.serrata* has been described taxonomically. It is a large decidious tree, 20-45 m tall and 3-4 m girth; dark greyish brown as rough, branches lenticellate, young shoots pubescent, leaves 5-25 × 5.5-15 cm size, dull green, membranous to thick, ovate/cordate, unlobed or variously lobed or heterophyllous, acuminate, serrate, densely tomentose dorsally; dioeious, predominantly male, male catkins 2-6 cm. long, flowers sparse on catkins, female catkins 1-3 cm long and fruit 1-1.5 cm long, sweet and purple. It flowers during March-May and is locally called as 'Ki mu'.

Of the seven collections which are being maintained as important from sericultural value in the germplasm, two are triploids and five are hexaploids. The sacred tree of Joshimath (Rau, 1970) is found as a natural hexaploid with

2n=6x=84 (Basavaiah *et al.*, 1990). The stem cuttings of all the collections showed poor rooting capacity. Root grafts made on root stocks of local variety showed 30-40 per cent survival. However bud grafting technique is proved more successful witn 70-80 per cent survival. Silkworm feeding trials showed that the leaves are acceptable to worms. This species may not be of much use for sericulture purpose as the leaves are coarse. It may be exploited in higher altitudes of temperate regions. The diploid ancestor of presently available triploids and hexaploids may be of some use, which should be explored. This wild species may also find a place in disease/pest resistance breeding programmes of mulberry.

REFERENCES

Brandis, D. 1906. Indian trees. London.

Hooker, J.D. 1885. Flora of British India V : 491-493. L. Reeve and Co. Ashford, Kent

Kanjilal, 1940. Flora of Assam. L : 272-274.

Osmoston, A.E. 1927. A forest flora of Kumaon. Govt. Press. Allahabad.

Roxburgh, W. 1832. Flora Indica, Vol. 3. Serampore.

Sanjappa, M. 1989. Geographical distribution and exploration of the genus *Morus* L. (Moraceae). *In*: Genetic resources of mulberry and utilization. K. Sengupta and S.B. Dandin (Eds.) C.S.R. & T.I., Mysore. p 4-7.

Basavaiah, S.B. Dandin and Mala V. Rajan. 1989. Microsporogenesis in Hexaploid *Morus serrata* Roxb. *Cytologia* 54 : 747-751

Rau, M.A. 1967. The sacred mulberry tree of Joshimath, U.P. *Indian Forester* 93 (8) : 330-335.

Wlth. India. 1962. The Wealth of India - Raw Materials. A dictionary of Indian Raw materials Vol. VI Publications and Information Directorate CSIR, New Delhi. p. 438-439.