Studies on flowering and receptivity of stigma in mulberry (*Morus* sp) germplasm

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ABSTRACT

Seven species of mulberry namely Morus indica (x, hp and black), M. rubra, M. alba, M. rotundiloba, M. cathyana, M. australis and M. multicaulis maintained in the germplasm bank of Central Sericultural Research and Training Institute, Berhampore, West Bengal, India were studied for flowering and reproductive behaviours specially receptivity of stigma during regular flowering season January to April. Days taken on flowering were 2.5 – 6 days and 2.6 – 5.7 days in exotic and indigenous, respectively. Receptivity period of stigma revealed that pollination index (PI) was significantly higher between 10th and 14th day of emergence of catkins from the scale leaves. PI was low before 8th and after 18th day of bagging in all the species. Significant positive correlation observed between the seed set and size of sorosis, seed set and weight of 100 seeds and seed set and seed germination indicated that the higher receptivity period of stigma lies between 10th and 14th day which increased the number of seeds per sorosis alongwith sorosis weight, size, seed weight as well as rate of seed germination. The information may be useful for the breeders for synchronizing of flowering in parents and creating heterozygous progenies in mulberry.

Key word: Flowering mulberry and stigma receptivity

Among the mulberry species available in India namely *Morus alba*, *M. indica*, *M. serrata* and *M. laevigata* are indigenous. Many mulberry germplasm viz. *M. multicaulis*, *M. nigra*, *M. rotundiloba*, *M. cathayana* and *M. tiliaefolia* introduced in India are promising ones. Mulberry being the sole food plant of silkworm (*Bombyx mori* L.), development of high yielding and qualitatively superior varieties is the aim of mulberry breeding. Selection of parents and their effective utilization in suitable combinations to obtain desirable genetic diversity among the progenies are the pre-requisite for mulberry improvement. The cross-pollinated and heterozygous perennial mulberry is propagated vegetatively through stem / shoot cuttings since propagation through seeds are not ideal as every individual seed is different from each other individual in the particular cross combination. For developing mulberry variety with high productivity and quality, like other crop plants, it is necessary to generate detailed information on parents to be utilized in breeding programmes. Among different characters, flowering behaviour of parents, efficiency of pollens, receptivity of stigma etc. are the important factors for synchronization of flowering. Information on the flowering, sex expression, receptivity etc. in mulberry though available for different varieties / cultivars, information on behaviours of stigma of different species are meagre. Since a number of mulberry accessions of different species are being conserved at germplasm banks, present study was undertaken in order to generate information on flowering, receptivity of stigma and pollination success in mulberry species for using them in breeding programmes.

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MATERIALS AND METHODS

Mulberry species namely *Morus indica* (x, hp and black), *M. rubra*, *M. alba (Rangoon)*, *M. rotundiloba*, *M. cathyana*, *M. australis* and *M. multicaulis* maintained in the germplasm bank of Central Sericultural Research and Training Institute, Berhampore, West Bengal, India (24°6'N and 88°15'E) were studied during the flowering season i.e., January to April. Data of three plants of each species were recorded on size of inflorescence (catkin), number of florets per catkin, length of style and stigma, receptive period of stigma, size of fruit (sorosis), fruit weight, seed set, setting % weight of 100 seeds, and seed germination %. Female inflorescences were covered with the paper bags after their emergence from the scale leaves. Immature inflorescences and apical buds were clipped off to ensure uniformity in treatment. Ten bags each of ten catkins were covered for each treatment. Pollens of Mandalaya (S1) having more than 90% viability were collected in the Petri dish during the dehiscence of anthers between 10 AM to 11.30 AM.. Pollen fertility were tested with 0.5% aceto-carmine, and confirmed by pollen germination with 10% sucrose solution by hanging drop method. Pollination was done starting from 4th day of bagging and continued every alternative day upto 24th day. Few bags were left without pollination as control. Fruits (sorosis) were harvested at maturity. Seeds were collected from each