

Poplar (*Populus deltoides*) in Jammu and Kashmir, India: facts and fiction

Poplar (*Populus deltoides*) is popular among people of North India for its wide range of utility from plywood to pencil industries. This tree is commercially grown in India, and has witnessed its own rise and fall unlike other tree/crops. It is widely accepted as a popular agroforestry system practised in the form of boundary plantation, block plantation and also intercropped majorly with wheat and sugarcane¹. It is the only popular deciduous tree species belonging to family Salicaceae (willow family) facing frequent controversies. In India, there are nine species of poplar, of which four are endemic (*Populus ciliata*, *P. gamblei*, *P. jacquemontii* and *P. rotundifolia*) and five are exotic (*P. deltoides*, *P. alba*, *P. euphratica*, *P. nigra* and *P. laurifolia*). *P. deltoides* (which originated from America) is widely preferred by farmers due to its fast growth rate, better tree-crop interactions, remunerative returns, high yield, easy harvest and ease in marketing. The first systematic and scientific effort of introduction of poplar clones was done by the Forest Department of Uttar Pradesh (now Uttarakhand) during 1950. WIMCO and NABARD had pioneered in expanding this tree for widespread plantation in Punjab, Haryana and western Uttar Pradesh from 1976 onwards and currently, it has been planted in an area of 2.70 lakh ha in North India¹⁻⁵.

In Jammu and Kashmir (J&K), traditional indigenous species of poplar are planted in and around field boundaries (slow-growing) to fulfil the demand for fuelwood, fodder and small timber. It attains economic rotation only after 30–40 years. The boom in poplar cultivation in the J&K valley started in 1981–82 under the Social Forestry scheme funded by the World Bank for meeting the basic requirements of the rural poor, in an area of 44,000 ha (ref. 6). This expansion has boosted economic returns, improved scenic value of the valley and reduced the pressure on natural forests⁷. Under this scheme, exotic *P. deltoides* trees popularly traded as North America cotton tree (NACT), were bought from USA and planted along the roadsides, field boundaries, monoculture plantations, canal sides and degraded lands. NACT is locally known as ‘Russian poplar’, which

is a misnomer. A plethora of scientist has also reported that, the female poplar tree produces white cotton covered seeds which shred dandruff-like substance locally known as ‘russi’ and this term was misinterpreted as ‘Russian poplar or russi fras’.

Moreover, J&K is the leading state in apple production which constitutes 60% of the total production in India (http://nhb.gov.in/report_files/apple/APPLE.htm). According to estimates, fruit industry in the valley requires roughly 30 million wooden boxes for fruit transportation purposes. Poplar wood is chosen for making such boxes due to its light weight. This justified the reason for the flourishing poplar plantations in the valley. Tariq and Khanna⁸ reported that annually 80% of poplar trees are being utilized in packaging industries and the remaining 20% for veneer, plywood, cricket bat handles, scaffolding and roofing purposes. So the multiple utility of poplar trees makes it a significant contributor for improving the livelihood of the farmers, as a single tree provides an income of Rs 4000–5500 after eight years of rotation. Poplar holds second position in income generation in J&K, after apple cultivation. Despite its uses there are no accurate data on the total number of poplar trees in the valley (an approximate estimate is 10 to 20 million trees). Although the uses of poplar are well known, this tree has also faced some controversies in the recent past.

P. deltoides being dioecious in nature (male and female flowers appear on separate trees), produces flowers (cluster of catkin) when the trees are leafless in spring season (April and May), wherein the pollens from flowers of the male plant are transferred to the stigma of the female flowers. The female poplar produces fruits, i.e. capsules which consist of hairy, cotton-like structures with small lofty seeds; this has been wrongly considered as pollen by many, as evident from media reports. The capsules split during mid-summer (May–June) and get dispersed with the help of parachute-like hairy structures up to a few kilometres. The white, tufted, silky hairy cotton is produced in enormous quantities every year, and is carried by the wind miles away from its origin. Single mature trees

have the potential to produce more than 50 million seeds⁹. Since ‘pollen seeds’ of most of the angiosperms are allergic to humans, especially to the elderly population and children, the issue gained importance based on a PIL filed by a citizen of Srinagar, J&K. On 5 May 2015, the High Court of J&K issued a judgment regarding felling of poplar trees and a ban on new plantations in the valley. The Court also directed the Tehsildars to take necessary action for felling of the trees keeping in view Article 21 of the Indian Constitution, i.e., right to life can only become meaningful, only if a person is healthy. Problems due to cotton from female poplar trees have been reported in the literature⁷⁻⁹. These include:

- Nasal congestion, sneezing, throat infection, fever, irritation in the eyes, headache, breathing trouble, loss of smell, etc.
- Pollen serves as natural trap to spread other allergic pollens of chinara and grasses which further causes fungal and bacterial infection.
- Clogging of window, gutters, air-conditioners, air filters, water pumps, etc. The falling cotton flakes on water bodies reduces quality of water and make it unfit for drinking.
- There is misconception regarding pollination of other important horticultural crops, as pollen gets attached to crops due to sticky nature. But in contrast, the cotton balls are shed in May–June, i.e. when majority of crops have already completed fruit setting.

Recently, after the COVID-19 outbreak, it was claimed that ‘pollen grains of female poplar may be carriers of the SARS-CoV-2 virus’. The Government of Kashmir issued an order for the felling of about 42,000 female poplar trees, even though many environmentalists and scientists provided evidence that pollen from poplar causes meagre effect on human health when compared to other trees and it has no relation with COVID-19.

- A study from Spain during 1979–93 indicated that the largest airborne presence was from *Quercus* species

(17%), followed by *Platanus* species (15%), *Poaceae* species (15%), whereas only 4% presence was due to *Populus* species¹⁰.

- More than infestation from poplar pollen, their co-sensitivities to other tree pollens such as oak, maple and olive, which pollinate between March and April, could be responsible for the symptoms during this period¹¹.
- Hu *et al.*¹¹ reported that seed cotton or hair of poplar acts as a pollen trap net of allergen tree species.

Experts also suggest that the silky cotton seed of poplar may not cause much harm, but it has been misinterpreted due to carrier nature of other pollen grains. On the other hand, unscientific harvesting of millions of poplar trees could result in desert-like conditions in the future and also affect the livelihood opportunity of farmers and local people in J&K. This controversy has put the scientific community, public, stakeholders and government organizations in a hassle. Therefore, there is an urgent need to conduct widespread scientific studies to test the allergy potential of female poplar in the J&K valley. There is also a need to devise management plans to reduce the menace as indicated below:

- The economic rotation of poplar is 8–10 years and it achieves 3ft at breast height on an average. The reproductive phase likely starts after 8–10 years depending on the genotype and site conditions. It is pertinent to mention that, poplar can be felled once it attains the rotation age, i.e. before flowering.
- Timely pruning of canopy up to two-third of tree height before the onset

of winter could reduce flowering in poplar to a significant extent.

- Advanced mechanization in plywood and saw machine will help to peel out veneers from small diameter-sized poplar trees, which will ultimately discourage farmer's practice of retaining the trees for long.
- The Forestry Department of J&K should come up with a road map for poplar management in the valley, in consultation with experts from the university, research institutions, medical professionals, NGOs, farmers and the administration.
- Selective felling of large-sized poplar trees in ecologically fragile areas may be taken up, with planting of suitable tree species over the felled area.
- Research avenues like development of sterile poplar male trees, reduction in flowering of poplar through chemicals, sustainable poplar farming practices, should be taken up to safeguard human health and protect the species.

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S. B. CHAVAN^{1,*}
A. KEERTHIKA²
SHEERAZ SALEEM BHAT³
A. K. HANDA¹
K. RAJARAJAN¹
SUHEEL AHMAD³

¹ICAR-Central Agroforestry Research Institute,
Jhansi 284 003, India

²ICAR-Central Arid Zone Research Institute,
Regional Research Station,
Pali-Marwar 306 401, India

³ICAR-Indian Grassland and Fodder Research Institute,
Regional Research Station,
Rangreth,
Srinagar 191 132, India

*For correspondence.
e-mail: sangramc8@gmail.com