Poplar Seedling Nuisance in the Paradise Valley

"Flying cotton", seedlings from the poplar tree, is fast becoming a menace in the Paradise Valley of Kashmir.

As temperatures soar across the Kashmir valley, fluffy white snow-like substances can be seen wafting across in high numbers settling on trees, on lawns, in gardens – virtually everywhere. These can cause allergies, fungal and bacterial infections, make water unfit for drinking, and even damage vehicle engines. The prime culprits are the poplar trees planted in large numbers across the length and breadth of the Kashmir valley.

Poplar trees, belonging to the genus Populus of the Salicaceae family, comprise a plethora of species, locally called Phras and identified as the “people’s tree”. This bewildering genus is entirely wind-pollinated, as distant from Willows of the same family, which are primarily insect-pollinated and include allergenic species namely Balsam Poplar (Populus balsamifera), Big-Tooth Aspen (Populus grandidentata), Eastern / common cottonwood / Russian poplar (Populus deltoides), Fremont’s cottonwood (Populus fremontii), Narrow-Leaf cottonwood (Populus angustifolia), Quaking Aspen (Populus tremuloides), Jungle phras (Populus ciliata), Daud phras (Populus caspica).

A Poplar/Cottonwood tree about 90 feet tall near the National Highway-I near Awantipora area in the Kashmir valley.
If you are going to plant a poplar seedling, be sure that their seed hair do not disturb you and your environment.

These have been extensively used as test organisms in research studies because of their easy propagation, fast growth, variety of clonal parentages and because of their capability of enriching the soil with litter. They have also been used to study the effect of air pollutants.

Being ideal for agro-forestry and social forestry, poplars were planted in the Kashmir valley in 1982. Envisaged by the State Forest Department (SFD) under the Social Forestry Project (SFP), this endeavour achieved great success. It was the need of the hour as raising the poplars changed the landscape, propelled the economy, and reduced the pressure on valuable green coniferous forests, which otherwise were used in manufacturing of fruit boxes, ply boards and for making paper, matchsticks etc.

Unfortunately, however, the exhaustive plantation of populus species by the Social Forestry Department and private landholders along the entire length and breadth of the Kashmir valley, without the identification of appropriate clones, has created the problem of “flying cotton”. The female clones of the cultivars on attaining maturity producing seeds enclosed in “cotton fluff”. This “white fluff” is a characteristic feature of female poplars and keeps people baffled as temperatures soar across the valley.

Thick, fluffy and highly inflammable cottony seeds from female poplar trees fallen on the ground like snow.
**Feature Article**

**Sampling over a three-year period indicated that poplar cotton and fungus spores are the major aeroallergens from early May to September in the Fairbanks area, Alaska. In yet another study, out of 26 patients with hay fever symptoms during June and July, eight patients had positive skin tests to cotton and 18 patients had positive nasal challenges.**

It is observed that meteorological factors such as temperature, rainfall, wind speed and direction usually affect the cotton fluff concentration in the atmosphere. There is positive correlation between the temperature and the concentration of flying cotton. Rainfall or low temperature normally causes a decrease in seed hair concentration, resulting in a lower incidence of coughing and sneezing.

**Poplar Trees**

Poplars are weak-wooded trees that lack ornamental flowers and fruits. They are dioecious, that is, each tree is either male or female (not both). The Populus genus is wind pollinated and easily known by its remarkable catkins – one-celled capsule fruits borne on long pendulous clusters. Usually male (staminate) and female (pistillate) flowers are located in drooping catkins, when fully developed, and are 10 to 15 centimetres long.

Each catkin carries about fifty separate flowers, and each flower consists of a basal bract and a green cup holding numerous stamens. Male catkins fall in April. Female catkins are looser, more open structures that have been likened to necklaces or strings of beads. Each carries about fifty flowers, and every flower consists of a single green bract, a basal cup, and a pear-shaped green ovary tipped by four styles. These flowers ripen rapidly to small green fruit-pods, which split to release masses of tiny seeds in the mid-summer (May and June) of the same year depending on region. Each seed is surrounded by tufts of long, white, silky hairs attached to the short stalks of the seeds.

Poplars generally are prolific annual seed bearers and produce enormous quantities of cotton virtually every year. The cotton is dispersed only by female trees, and for only about 5-8 weeks of the year to distribute their seeds as widely as possible. Though both sexes flower, only the female trees produces fruit. Seedlings from cottony seeds develop profusely on moist soils during the month of July, where competing vegetation is minimal for 1 or 2 years after establishment. Germination is epigeal. Seed germination capacity is retained only a few days under natural conditions. Seeds of Populus deltoides can be stored for at least 6 years at -20°C (-4°F) and 6 to 10 per cent moisture without substantial loss in viability.

The cotton-ball appearance of the groups of seeds is responsible for the name cottonwood, which is applied to some species of the genus. A common misconception is that the trees are pollinating when they release their cotton fluff into the air. The release or load comes after the trees have actually pollinated. Cottonwood is the popular name for the poplar trees that send all that summer snow into the air in the early summer. They fill the sky as if snow were falling. It is now determined that these are seeds enclosed in cotton fluff, from certain female poplar trees and the fluff is a bit like the larger scale dandelion (Taraxicum officinale) seeds.

**Cotton-free Poplars**

Poplars make a striking and important contribution to the landscape and economy of Kashmir. Poplars along with willows are the frontline economic tree species and act as the backbone for the fruit industry and some other sectors. It is not possible to fell the female clones extensively at once. This problem can be tackled by adopting standardized biotechnology procedures by combing, identifying, selecting, isolating and propagating cotton free clones.

It also becomes imperative to preserve the gene banks of both the sexes in nurseries located in inner forest areas, which is regarded as the basic and fundamental pre-requisite in biodiversity conservation. Forestry, unlike agriculture, is a long-term proposition – mistakes committed once are reflected after several years.

To give fillip to this prioritized research theme, the Jammu and Kashmir Forest Department must give special emphasis to survey, identification and marking of male Populus trees, including the native and introduced ones all long the entire valley by using techniques such as gel electrophoresis, isoenzyme markers, etc. The cotton-free clones (i.e. male poplars) thus identified, may then be propagated on trial basis under nursery conditions for further evaluation with respect to growth characteristics, wood quality and ultimately mass propagated to have both cotton-free as well as fast-growing Populus plants. All we need to do is to identify male plants, locate them and mass propagate them as well as discourage the planting of female plants immediately at once, so as to get rid of the nuisance of this flying cotton.

It is due to the menace of this flying cotton that female poplar plants have been banned in most developed countries from future plantation programmes. Most nursemen in these countries prefer to sell male poplars raised as cuttings from male trees, because they never shed seeds. Though it is a laborious and time-consuming process to differentiate different clones of a species (which are morphologically identical), it seems like there is no other option to escape from this ever-increasing environmental threat.

Further, according to news reports, the Sher-e-Kashmir University of Agricultural Science and Technology (SKUAST-K), Kashmir has recently obtained some male clones of poplar tree from WIMCO, India, Pvt. Limited, UR which will hopefully solve the problem of flying cotton. Now, in order to make this practice a thumb rule, where the task is challenging and facilities are limited, most of the research work has to be done by taking the maximum advantage of nature.

**Adverse Effects of Poplars**

Studies suggest that there could be several adverse effects of the fluffy poplars.

- Airborne pollen and spores trapped in poplar cotton, on entering the human nose and throat, result in pollen allergy, which is a type of seasonal allergic rhinitis. It is more commonly known as hay fever and also triggers asthma, conjunctivitis and fever. Visible signs of these ailments include post-nasal drip with sneezing and coughing, stuffy nose, itchy and watering eyes along with inflammation of eyelids causing redness, headaches, sore throat, temporary loss of smell sense and trouble in breathing.
They also include dark circles under the eyes caused by restricted blood flow near the sinuses or middle ear problems (allergic shiners) and persistent upward rubbing of the nose that cause a cease on the nose (allergic salute). Allergy to white poplar silky seed hairs containing pollens of other species has been shown to be one of the ten most important aeroallergens resulting in clinical symptoms in an eastern province of Saudi Arabia, where 38% of 1,159 patients were skin prick test positive to cotton flake pollen and also in 614 respiratory allergic patients in Turkey. A Hungarian study found that 6.8% of hay fever patients were sensitized to cottonwood tree flakes, thus in this group of patients, cotton was not an important cause of hay fever.

Sampling over a three-year period indicated that poplar cotton and fungus spores are the major aeroallergens from early May to September in the Fairbanks area, Alaska. In yet another study, out of 26 patients with hay fever symptoms during June and July, eight patients had positive skin tests to cotton and 18 patients had positive nasal challenges. Cottonwood flake has been demonstrated to be a major allergen during the pollen season in Tehran, where the tree pollen season extended from the first week of February through the middle of October.

- Since these cotton flakes are extensively moving along with air currents, they are also reported to be carriers of certain fungal and bacterial infections. They can often blow indoors through open windows and doors, spreading diseases.
- The mass of white fluffs also make paths and lawns untidy. It also sticks to fresh paint, window and door meshes of the buildings.
- Falling cotton flakes make water of open water bodies unfit for drinking and get trapped in the check-valves of water motors and filtration plants causing damage. It also gets accumulated in engines of motor vehicles causing heating damages to them.
- Poor pollination coupled with low yield is a major challenge in today’s horticulture and agriculture. Flying cotton has an inherent potential to trap other pollens moving with air currents, thus keeping them away from reaching their pollination venue.

- Since these cotton flakes are moving in the atmosphere like snow and may possibly have the potential to stop infra-red rays coming from the sun to the earth to a considerable extent, they may perhaps be a cause of global cooling, the other side of global warming, the effects of which are crystal clear in the prevailing climatology of Kashmir.

Treatment and Precautions

Here are some ways to avoid the offending cotton flakes:

- Avoid intense outdoor activities during the afternoon hours, when flying cotton counts are highest. Wear masks during afternoon when the poplar cotton flake count is highest.
- Wash hands after petting animals that have been outside because cotton flakes settle on their coat. Shower and soap hair after being outside to rid the body of cotton flakes.
- Change into fresh clothes, and wash clothes that have been used outside.
- Don’t allow cotton flakes to move indoor by closing the doors, windows of rooms and vehicles.
- Don’t dry washed clothes outside, where they act as a filter trap for cotton flakes; instead dry the clothes indoors or at places that are out of reach of cotton flakes.
- Avoid unnecessary exposure to irritants such as dust, insect sprays, tobacco smoke etc., that can aggravate the symptoms.
- Usually, the removal of dust from a room is an effective way of avoiding pollinosis (Fahlbusch et al., 2001).
- Regular cleaning to remove seed hairs, public awareness and choosing a suitable time (after seed dispersal) to visit places of public interest is suggested to avoid possible pollinosis caused by poplar seed hairs.

At-Home Treatments

- Nasal irrigation is a safe and effective practice that can be performed daily. It uses salt water to flush seed hairs, bacteria and dry mucus out of the nose and sinuses.
- Steam helps to ease allergy symptoms, as it helps the body to release toxins and allergens through sweat.
- Steam inhalation is often used to break up mucus and reduce congestion. Steam can soothe and moisturize irritated nasal membranes, and unlike nasal irrigations, it also helps to soothe sore throats and congestion.

Medication

- Symptoms can often be controlled with medication available on prescription, such as antihistamines (useful in relieving sneezing and itching in the nose, throat, and eyes and in reducing nasal swellings and drainage), nasal decongestants (reduce nasal congestions by constricting blood vessels), corticosteroids (used to decrease inflammation and inhabit mucus production) and cromolyn sodium (effective in controlling allergic symptoms by preventing histamine release). However, according to health experts, prevention, rather than taking medicines is the best cure for pollinosis.

Poplars are fast-growing road side trees and thus act as green muffler. If you are going to plant a poplar seedling, be sure that their seed hairs do not disturb you and your environment. And, if you decide to go ahead with your plan to plant a “cottonless poplar”, plant a male one so that you don’t have the mess of flying cotton, which keeps you always coughing and sneezing!

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