

WILDLIFE DAMAGE TO POPLAR

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Introduction

Wild animals and vegetation have co-existed and developed in association with each other since time immemorial. Undisturbed or less disturbed forests with thick vegetation are still the preferred territories for most of the wildlife. Of late, the depletion in vegetation cover is leading to depletion in the shelter and food for wildlife and ultimately their population. Most work plans for wildlife development therefore largely have an integrated component for vegetation development. Agroforestry development during the last four decades has increased green cover at various locations on agricultural land in many parts of the country which invariably attracts a lot of terrestrial animals, rodents and birds for hideout, shelter and food. According to the Forest Survey of India, there is 92769 km² area under trees outside forests (major part of which is in agroforestry) which constitutes 2.82% of the geographical area of the country (FSI, 2009).

Poplar (*Populus deltoides*) is extensively grown agro forestry tree in selected districts of Punjab, Haryana, Uttar Pradesh and Uttarakhand. Approximately 2 crore saplings planted per annum throughout the poplar growing region has created verdure sylvan landscape in agricultural land (Dhiman, 2009). These saplings quickly grow, form thick forests and attain 10% crown cover for both block (400 trees/ha) and boundary plantations (one ha base) in the first year itself (Dhiman, 2009) and qualify as forest as per the crown parameters used by the Forest Survey of India (FSI, 2009) much faster than other tree species grown both inside and outside farms and forests. The crown cover of poplar block plantations (estimated from crown size of individual trees without overlapping) with 400 trees per ha for 1 to 8 years age has been estimated as 21.24%, 32.22%, 52.84%, 78.56%, 95.06%, 105.72%, 113.16%, 126.72% respectively (Dhiman, 2009).

Based on the average number of over 800 saplings/farmer supplied by Wimco during 2010, it is estimated that the average size of the poplar agroforest in the country is around two hectare. It is further estimated that presently over 30,000 farmers undertake fresh poplar plantations each year and therefore equal number of poplar agro forests are replaced with the older

ones on their harvest. The normal size of the nurseries grown by Wimco is 5-8 ha. Bulk of the poplar in the country is planted in Hoshiarpur, Ropar, Nawan Shahar, and Ludhiana Districts in Punjab; Yamuna Nagar District in Haryana; Saharanpur, Muzaffar Nagar, Meerut, Rampur, Bareilly and Pilibhit districts in Uttar Pradesh and Udham Singh Nagar and Haridwar districts in Uttarakhand, where it forms thick continuous or isolated patches of thick green cover. These poplar plantations and nurseries inside agricultural land remain green for most of the year (except winters) especially during dry spell of summers when wildlife unable to find necessary life supporting resources in their traditional territories move out to these patches for their sustenance. Agricultural crops especially wheat, maize, sugarcane, cherry etc. grown inside poplar plantations are also luring greenery for wild animals since the availability of grasses inside forests during hot summer is practically nil. In China, poplar plantations are used as breeding grounds for egg laying birds (Fig. 1). Numerous wild animals and birds visit these plantations and nurseries and some of them have also been found to cause damage to poplar and agricultural crops. This paper is based on our experience of the damage caused to poplar plantations and nurseries by the selected wild animals (blue bull, monkey rabbits), rodents (rats) and birds (parrots, crows, etc.).

Blue Bull

Blue bull or neelgai (*Boselaphatus tragocamlus*) is one of the widely distributed wild animals throughout the poplar growing region in the states of Uttar Pradesh, Uttarakhand, Haryana and Punjab. It causes significant damage to the field planted saplings and nursery plants every year (Dhiman, 2004) and is therefore one of the main cause of man-animal conflict in poplar agro forests. The incidence of its damage is high in Uttar Pradesh (Behraich, Lakhimpur, Shahajhanpur, Hardoi, Badaun, Rampur, Moradabad, Bulandshahar, Aligarh, Muzafar Nagar, and Saharanpur districts); in Haryana (Karnal, Kaithal, and Kurukshetra districts); in Uttarakhand (Udham Singh Nagar, Haridwar and Dehradun districts); and in some isolated places in Punjab. The damage of the animal is more near the forests because of their easy movement to the agricultural fields and vice-versa.

The very presence of a large herd (sometime over 15 in number) of blue bulls inside nurseries causes heavy damage by trampling the young seedlings when moving or taking rest inside nursery beds during the early phase of poplar growth during Feb. to June. In one nursery of 25 acres in Rudrapur, Uttarakhand a herd of around 15 animals damaged 18% of the plants by trampling during 2004 (Dhiman, 2004). During this period, the animal also causes significant damage to the freshly field planted saplings by browsing their top shoots, breaking the saplings by pressing them inside their forelegs, rubbing their body with the main stem and by debarking even the old trees for eating their bark. Tall saplings are more prone to breakage than the young ones since the latter are more flexible for bending. On arrival of monsoon, the availability of grasses and other vegetation inside forests and that of sugarcane and paddy crops inside agriculture fields increases during which the visit of the animal to poplar nurseries and plantations and damage thereof sharply decreases. The second spell of damage to the poplar nurseries takes place during post monsoon season, (September onward) as the animals walk through the thick stocked poplar nurseries. In one 10 acre nursery in Karnal, Haryana, 8% of the total nursery saplings were heavily browsed and badly damaged by the blue bull during the post monsoon season in 2009. The damage to the nursery saplings was so heavy that they were not fit for field planting. During post monsoon growing season, good growing same year field planted saplings attain size and strength which is not easily damaged by the animal. The damage by the animal to planted poplar on either side of Yamuna river in Haryana and Uttar Pradesh has significantly increased during the last 4-5 years. In some locations and fields in Karnal District, freshly planted saplings were found to have damage up to 40% during 2009 and 2010. S7C15 clone was observed to have more damage than G48 clone in Karnal District since the stem of the former is less flexible, sturdier and get easily broken when the animal presses it under its body. In addition to trees, the animal also causes damage to the agricultural crops grown in association with poplar.

Significant damage to poplar by this animal and economical losses associated therewith have encouraged many farmers to undertake protective measures against its menace. Some farmers in Udham Singh Nagar, Uttarakhand have installed even costly electric fencing around their fields to protect their poplar and agricultural crops from the blue bull. Many poplar growers in Yamuna Nagar District in Haryana and Bijnor District in Uttar Pradesh have started a noble method of tying individual trees with coverings made from the

paddy straw (Fig-II), mustard stalk, date palm leaves, etc. to protect from animals. Many others install scarecrows inside their fields, simple barbed wire, rope, shining paper rope, and straw woven rope (Fig.III) around their fields. Some growers place offensive smell chemicals like Phorate 10 G and even spread cow dung slurry along the fields to keep the animal away from their fields. The smell of both these two materials lasts for 1-2 week's period depending on weather conditions and their application thus need frequent repeats. Most growers however, engage regular watch and ward during the critical period of high damage to poplar. The fast running animals cause serious damage and therefore their aggressive chasing inside young plantations and nurseries should be avoided.

Monkeys

Monkeys and apes (langurs) live in groups and whenever they move inside nurseries and plantations cause damage to poplar. Their damage has been so far recorded in Bareilly and Shaharanpur districts in Uttar Pradesh and Udham Singh Nagar District in Uttarakhand. Heavy damage to fresh field planted poplar from monkeys is regularly being recorded from Clutterbuckganj locality in Bareilly District. The locality is in the vicinity of the city where monkeys get shelter in company's nurseries and plantations. The animals jump on the saplings and swings on them leading to their breakage or bending. Monkeys repeated jumping on saplings cause permanent bending and damage to their leading shoots. Such affected saplings remain stunted without clear terminal leader for a couple of years and lose valuable wood growth. In later years, the damage to the top leading shoots of trees is not serious; however, some damage to the lower branches is still recorded whenever the monkeys pass through the plantations. In nursery, the major damage is recorded when the plants are very young during the beginning of the growth or towards the end of growth when they are totally free from leaves and monkeys are able to get firm hold on the stem. Regular watch and ward at least till a stage when plants/saplings are free from serious damage is the only method being employed to tackle the monkey and ape menace.

Rats

Rat and mice damage has been recorded on the freshly planted saplings in some locations in Punjab, Uttar Pradesh, and Uttarakhand especially during the maturity of the wheat crop which is planted with poplar and for which irrigation is avoided during the maturity of the crop. These animals make extensive furrows inside agricultural fields and along irrigation channels for

storing grains and other food material. Some crops like wheat, rice, gram, maize, sugarcane etc., which are also grown with poplar, are their favoured food. Freshly filled pits surrounding the planted saplings are preferred locations for making furrows by rats due to softness of the soil. A major damage to freshly planted 10 acres plantation made in wheat field was recorded during 1995 when more than 60% of the planted saplings were dried up after sprouting in Rajpura Block, Pavan Poplar Limited, Kichha, Rudtrapur. There was a delay of irrigation by around 3 weeks in April when wheat was near maturity and rats caused heavy damage to the root system of the saplings. This plantation was replanted with poly bag maintained plants during the same year late in May-June. A farmer on Chandigarh-Hind road around 25 km from Chandigarh had planted around 1000 poplar ETPs during January, 2007 and was having almost 100% survival and good pick up of growth. He planted poplar in wheat fields. Just after wheat harvest in the middle of April 2007, rats started chewing the bark of the trees at their collar portion and 20 saplings dried in a short span. Some damage by rats was also observed in Muttanpura and Machhiwara villages of Ludhiana District in which the bark of the main stem of the same year planted saplings was eaten away by the rats and the affected saplings dried soon. Another damage was recorded during 2008-09 near Chunni village in Fatehgarh Sahib District in which the same year plantation made in wheat fields was attacked in which rats had eaten away the roots of number of saplings which died instantly.

One of the recommendations of Wimco to the poplar growers has been not to grow wheat in fields where poplar is freshly planted. During the last few years, very less winter rains in the major part of poplar growing region has been creating dry conditions which are favourable for multiplication of rat population. Poplar requires good irrigation immediately after planting, whereas, wheat does not require irrigation nearing its maturity which creates favorable environment for rat damage. Damage to poplar, grown with other crops like sugarcane, mentha, maize etc which require frequent irrigation during the post winter dry spell, has hardly been observed so far. The damage of the rats to the freshly planted poplar is so sporadic and uncertain that the growers do not plan and undertake effective steps for its control in advance.

Rabbits

Rabbit damage in poplar nurseries has so far been observed from Uttar Pradesh especially from Muzaffar Nagar, Shaharanpur, Hardoi and Rampur districts. The damage by the animal is sporadic and is in the form of cutting down the main shoots of the young plants when

these are thin and small in size especially during the beginning of the nursery growth. In most cases, fresh shoots arising from the stool left after the damage fail to compete with the surrounding plants and do not attain the size required for field planting. It also affects the uniformity of the nursery stock. Many a times, nursery growers provide additional inputs to boost their growth but these are culled during Oct./Nov. when they are not able to achieve the palatable size. Such damage thus results in direct economic loss. Two years back around 1000 plants were nibbled by rabbits in the Muzaffar Nagar nursery.

Crows

Crows are both friends and enemies of poplar. Presence of sizeable number of crows and their chirping voices in poplar plantations and/or nurseries, in most cases, are indicator of some larval infestation on the trees. During the peak epidemic outbreak of *Clostera* species (the main insect defoliator of poplar), which generally takes place during and after monsoon season, hundreds of crows feeding on these larvae could be noticed. In fact, crows along with egrets, peacocks etc., act as effective biological control agents for this notorious pest. Infestation of *Clostera* species on poplar occurs almost every year and its epidemic infestation only periodically. For example, it has occurred in epidemic form at least during 1982, 1995, 2002 and 2009. During other years, crows and other birds also played important role (besides some other complex factors responsible for build up of the insect population) in keeping the spread of the insect and its damage under control.

Crows have also been noticed to cause damage to poplar plantations. During 2008, the bird was noticed to cause heavy damage to the leading top shoots of field planted poplar in Amritsar District of Punjab. A farmer very near to the Pakistan border had planted 5000 saplings of WSL 22 and G48 poplar clones which were of 1.5 years when damage was noticed. WSL-22 trees were 1-2 m taller than that of G48 since the formers were growing better in that locality. The top of the most of WSL-22 trees was broken and it was observed that during dusk time a large flock of crows flying from Pakistan side takes shelter on these trees. There was hardly any damage recorded on shorter G48 trees indicating that crows prefer to take shelter on taller trees. This phenomenon was also noticed in another neighbouring village viz., Cheena Bighi Chand during dusk time where crows were noticed taking shelter on taller trees. Poplar develops multiple leaders on getting its top damaged which affect the quality and quantity of logs for which this tree is increasingly grown by the farmers. It appears

that there is hardly any natural tree vegetation around these locations and these plantations become natural shelter for the crows and other birds. The physical damage to the leading shoots in these trees appears to be the result of over crowding by these birds on tender terminal shoots which break down under their weight. The affected farmers have tried to scare the crows by beating the drum and firing the crackers during peak period of their arrival, with little success.

Parrots

The first significant damage of parrots to poplar nursery was recorded during 1996 in Nagina, Bijour (U.P.) in which approximately 30,000 saplings of G3 clone were bitten at red colour band mark that was made at 1.5 m height for clonal identification. All the red colour along with the bark was chewed by the parrots within 2-3 days of colour coding leading to girdling in many saplings making them unfit for sale. Many of them that were less damaged were treated with bordeaux paste before field planting. Damage to young plantations of 2-4 years age especially in Ludhiana and Jalandhar districts of Punjab is recent in origin. The damage is being noticed in locations where young plantations are growing near sunflower fields, which attract large flocks of birds for shelter and/or rest. The damage occurs during spring season when sunflower is nearing maturity. A farmer in Samrala, Ludhiana District planted 1200 ETPs of Udai clone in his field during 2002. The main leader or the branches of these trees near the upper portion of crown was heavily damaged (girdled) by the parrots leading to excessive shoot formation from below the damaged portion giving an appearance of umbrella like formation at the top of the tree. The farmer discouraged with the excessive damage by the parrots felled his trees in Oct., 2005 and sold them to the contractor for ₹ 5,25,000 at Lump/sum deal. During 2007-8, parrot damage was recorded in Hanada, Ratipur and Machhiwara locations of Ludhiana District. In Jalandhar District, the damage was recorded in 2nd year plantation in Chalang, Mashiana and Jogasangha villages during 2008-9. Birds girdle the smooth bark of the leading shoots which break down from the girdled portion with even low speed winds. Sometimes thick main leader or even branches up to 20 cm girth and around 5 meter in length has been found girdled and broken from parrot infected trees. Number of shoots originating below the girdled portion give multiple leaders which affects quality and quantity of poplar wood production.

During the year 2010, in one location in Ludhiana District, around 20 trees out of 1000 planted by a farmer last year, were damaged by the parrots. During 2009, a plantation at R&D Center of Wimco at Bagwala, Rudrapur was visited by a very large flock of the parrots. Thousands of leaves in a small plantation of approximately 3 dozen

trees at fifth year of growth were clipped by biting (chopping) the base of leaf blade and/or leaf petiole. There was no physical damage to the main shoot or the branches of the trees as is being noticed in Punjab. Farmers are now avoiding growing of sunflower near poplar plantations, as a result, the damage to the trees has decreased this year. Some farmers even have tried to place packets of Phorate G 10 in the crown of the trees so that parrots, smelling the chemicals, do not take shelter on their plantations.

Some other unidentified birds have also been found to damage the growing tips of the nursery plants either by their weight when they take rest on the tender terminal shoots or by biting them. Some clones like St67 and evergreen (65/27) produce red colored fresh foliage during the early growth which has been found damaged by unidentified small birds. Such plants produce multiple leaders on getting the terminal shoot damaged and therefore need special tending care for making them saleable.

Poplar in North India is grown as a cash crop. Many farmers have now grown and harvested it for 4-5 rotations and have experienced its importance in their economic transformation. Good poplar growers pay more attention to poplar than agricultural crops since cumulative returns from poplar harvests are more lucrative than that from agricultural crops and they try to protect their trees from above mentioned and other damages. For example, the number of farmers using tractor mounted hydraulic sprayers to control poplar defoliating *Clostera* species is increasing in the Tarai region and Uttar Pradesh. For some animals like blue bulls, growers have started taking some effective measures as discussed above, for many others the nature and extent of damage is very uncertain and sporadic for which advance measures are hardly planned and undertaken. The information on damage of poplar plantations and nurseries given above is the one noticed by our field staff or that shared by the farmers throughout the poplar growing region. There could be many other cases of damage that could have remained unnoticed and unrecorded. In forest and wood scarce temperate cold desert locations in Himachal Pradesh (Kinnaur, Lahaul and Spiti) and J&K (Leh, Ladakh) where poplars and willows have traditionally been grown for wood related needs, farmers have been tying the newly planted saplings with prickly shrubs, gunny cloths or ropes in such a way that the wild and domestic animals are not able to debark them. The stem coverings are kept till a stage the bark becomes corky and hard when animals are not able to debark them. It is interesting to note that with increasing market value of poplar wood

Fig. 1



Poplar plantation used as breeding ground between wild and domesticated hens in China.

Fig. 2



Straw used as tree guard against blue bull in Kandhli Kalan village, Yamuna Nagar, Haryana.

Fig. 3



Rice straw woven rope used as fence against blue bull.

(presently being traded at the maximum price recorded till date at all the market places) in these recently developed agroforestry plantation in North India,

growers have started realizing the importance of control measures for saving their poplar from such damages.

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SUMMARY

Poplar plantations and nurseries mainly grown on farm land in North India create thick patches of green cover which attract wild animals, birds and rodents for hideout, shelter and food. Many of the visiting wildlife also cause serious damage to poplar both in field plantations and nurseries. The main wild animals and birds causing damage have been identified as blue bull, monkeys, rats, rabbits, crows, parrots etc. The major damage by these agents is caused during dry spell when they get attracted towards the greenery of poplar and agricultural crops grown therewith. The nature and extent of damage and the control measures being applied by the growers are discussed in the paper.

Key word: Poplar plantation, Wild animals, Birds, Blue-bull, Monkeys, shelter and food.

पोपलर (वन पिप्पल) को वन्यप्राणियों से पहुंचती हानि

आर.सी. धीमान

सारांश

पोपलर रोपवन और रोपणियाँ जिन्हें प्रधानतः उत्तर भारत की कृषि भूमियों पर उगाया जाता है उनके हरे आवरण वाले घने टुकड़े बन जाया करते हैं। जिनकी ओर जंगली जानवर पक्षी और जमीन खोदकर रहने वाले प्राणि छिपने, आश्रय और भोजन पाने के लिए आकर्षित हुआ करते हैं। यहां पहुंचने वाले वन्य प्राणी और पक्षी खेतों में या रोपवनों में लगाए वन पिप्पलो (पोपलरों) दोनों को बहुत क्षति पहुंचाते हैं जिन्हें पहचाना गया है। इनमें नीलगाए, बन्दर, चूहे, खरगोश, कौवे, तोते (शुक) आदि शामिल हैं। सबसे ज्यादा क्षति इन प्राणियों द्वारा इसे सुखे के मौसम में पहुंचती है जिस समय वे पोपलर की हरियाली की तरफ ज्यादा आकर्षित हो जाते हैं जिसके साथ खेती फसलें भी उगाई हुई रहती है। इस क्षति की प्रकृति और सीमा तथा उसे नियंत्रित करने के उपाय जो पोपलर उगाने वालों द्वारा अपनाए जा रहे हैं उन्हें इस अभिपत्र में विवेचित किया गया है।

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