



Impact of Mammals on Crops While Ensuring the Conservation of Wildlife and Biodiversity

(*Om Prakash Meena and Meetha Lal Meena)

Raja Balwant Singh College, Bichpuri, Agra-283105 (U.P.)

*Corresponding Author's email: omprakashmeena5799@gmail.com

The increase in human population, the expansion of agriculture, animal husbandry and the shared nature of habitats force large mammals to come into conflict with humans. Human-wildlife conflict also leads to hostile relations between local communities, wildlife managers and conservationists, further exacerbating the problem of biodiversity conservation. Attacks on humans, looting of crops and livestock, and damage to property pose significant threats to human livelihoods and security. Periodic losses reduce the social tolerance of local communities and lead to retaliatory killings, leading to local extinctions with effects on the overall ecosystem. Elephants are a symbol of large mammal conservation programs and are regarded as landscape engineers in Asia and Africa. They are spread over large areas for dietary, breeding needs and forage on a variety of grasses, shrubs, tree leaves, roots and fruits. Home territory size varies depending on the abundance and distribution of resources, ranging from 100–1,000 km² for Asian elephants and 11–500 km² for herds of African elephants. With increasing anthropogenic impacts on natural ecosystems, humans and elephants are very close to each other, increasing the potential for conflict. Human-elephant conflicts (HEC) are not uniform due to the dynamic nature of ecological and anthropological factors that influence such events. Therefore, it is important to improve our understanding of HEC to match the dynamic nature of such events.

Mammals

- 1. Monkeys:** Monkeys are found all over India, macaques living in villages near temples, often in towns also; langurs (*Semnopithecus*) in forests or rocky cliffs sometimes coming to human habitations. Both live in troupes. Macaques feed on human food, fruits and insects while langurs are strictly vegetarians feeding on leaves, fruits and young shoots. Macaques are mischievous and a nuisance destroying fruits in orchard, entering houses, damaging clothes and biting. Monkeys could be rabid and so their bites should not be ignored. For fear of public reaction, monkeys are not shot. They are usually trapped and supplied to laboratories within the country and abroad for research purposes. Male chemo sterilization and castration are also suggested to keep their numbers down.
- 2. Hares and Rabbits:** Distributed all over India, they do not burrow but hide under bushes preferring open bushy plains or cultivated fields, and are nocturnal in habit. They destroy crops like sorghum, millets, sesame and bark of young trees. They could be brought about by strychnine treated carrots, apples, grains or green hays.
- 3. Flying Fox:** These are found in tropical India roosting during the day on big trees like banyan, peepal and tamarind. Nocturnal in habit, they feed and damage all kinds of fruits, even young coconut, except citrus. Explosives are strung on the tree roosts to kill or stun them (but this can be done in non-residential areas), noise repellents are used extensively

and trapping with prickly bushes held on long poles to disturb the animals is also possible.

4. **Jackals, Wolves and Wild Dogs:** Jackals are found in hilly and mountainous regions but are quite common in plains near towns and villages. They live in holes, on ground, in unused buildings and dense grasses, and are nocturnal feeding on carcasses, sugarcane, maize cobs, melons, fallen ber (*Zizyphus*) fruits, etc. Wolves live in mountains and rock caves or burrow sand-dunes of desert. They hunt deer, rodents, wild sheep, antelopes and even domesticated animals and man. Hunting is carried out both during the night and day Wild dogs themselves like deer, buffalo, bear and tiger. Domesticated animals that stray into are confined to forests living in caves and hunting animals even larger than Jungles strychnine, wolves can be dealt with the help of dogs of Gaddi breed and all the three are also attacked. Jackals could be poison-baited with meat treated with could be controlled by shooting.
5. **Nilgai:** They occur from the Himalayas to Karnataka except Bengal, Assam and Malabar coast. They avoid dense forests and roam about in the hills or in the plains covered with grass or shrubs with few trees around. They live in herds and feed on grasses carrot, mahua flowers, leaves/fruits like ber (*Zizyphus*), crops of sorghum, millets sesame and wheat, Shooting during the day is the most effective method but their numbers have already dwindled due to indiscriminate killing.
6. **Wild Boar:** Found all over India, it lives in scant jungles or grasses in herds. It is omnivorous feeding on crops, tuberous roots, carrions, and insects. Its habit of uprooting the trees does considerable damage to crops and plantations. It is, however, very intelligent and bold with acute sense of smell. Shoot at sight is the best method of control but due to their meat being a delicacy, their numbers have already greatly declined due to poaching
7. **Elephant:** *Elephas maximus (-indicus)* found in India and *Loxodonta (=Elephas) africana* occurring in Africa are the only two extant species of the huge herbivores. The animals inhabit jungles feeding on bark, tender shoots and leaves of the trees. But sometimes they also stray into the neighbouring crop fields when they destroy more than they eat. While these animals are a protected species, their numbers have been kept down by poaching carried out for their tusks.
8. **Sambhar:** Found in Assam and Kumaun and up to the peninsular India, it lives in herds in forests and feeds on grasses, cultivated crops and fruits. It is a great destroyer of crops. Shooting, fencing (two parallel fences 3-4 m apart and 3 m high), use of metal and wooden guards around trees; exploders and fireworks are some of the other methods of controlling these animals.
9. **Antelope:** Found in the plains of India, these animals live in herds of 20-30 and feed on grasses and cereal crops which they damage by grazing and trampling. Fencing by laying thorny bushes and sharpened bamboo stakes are the best protection. Noise repellent may be of some value.
10. **Hedgehog:** These are confined to dry western and north-western parts of India. They live underneath thorny bushes, grasses or sand holes feeding from dusk to dawn on insects, worms, lizards, rats and roots of tuber crops. Fumigation with phosphine (placing 3 g tablet of AIPO, in the burrow and closing its mouth) is a good method of control.
11. **Sloth Bear:** It occurs in the forests of Himalayan base up to Sri Lanka and is recognized from black bears by its longer muzzle and white V breast mark. Omnivorous, it feeds on insects, carrions, fruits, roots, sugarcane, maize and honey combs which are its most prized food items procured by laborious climb or vigorous shaking of trees. Human voice, fire and strong light frighten it away. While passing through jungles, men move in groups

carrying torches and talking loudly. Shooting, of course, is the best method of controlling it.

- 12. Chital:** Also found in the forests at the foot of Himalayas up to Sri Lanka (absent in north-west deserts), it lives in large herds eating grasses, fruits, barks and crop. Its number has already greatly declined by indiscriminate killing for its beautiful hide. However, its control method is similar to that of sambhar

Birds

It is interesting to note that only 25 of about 1200 species of birds found in India (ie. only 2.1%) have been reported to inflict damage to crops and fruits. Certain pestiferous bird species have shown a tremendous increase in their populations. It would appear that, in general, grain ivories birds became abundant with the increase in area under grain crops and the subsequent storage of grains in godown or bulk storage.

- 1. Crow:** Found up to a height of 1200 m, this bird is a great parasite of man. It builds its nests on trees and telephone poles and is famous for its stupidity of bringing up the young ones of cuckoo. It feeds on anything and everything, i.e. eggs, crops (groundnut, maize, sorghum, any grain), fruits and flesh (carrion). Slow poisoning with thallium sulphate is useful since quick death with strong poisons makes them abandon the area. Trapping and acetylene exploders are other methods.
- 2. Parrot:** Found up to 1200 m, this bird is a great destroyer of fruits and crops (peas, gram, maize, grains), wasting more than eating. Its holes in the trees can be fumigated with phosphine. Bird catchers catch it with 'lassa' (a strong glue) rubbed on the tip of a long pole and orchard keepers try to protect their fruits by sounding empty tins and cannisters.
- 3. House Sparrow:** Occuring up to a height of. 200 m, this bird is also a great parasite of man living in homes. Principally grainivorous, it can also feed on insects and kitchen scraps and a great destroyer of grain crop. Poison-baiting is a good method of its control. Spray of thiurum (0.6%) on crops at milk-seed stage acts as a repellent to this bird.
- 4. Baya:** Occurring in the plains, this bird is famous for its meat and nests which it build with woven grass in the form of retorts hanging from trees by the hundreds. It l in huge colonies and feeds on seeds as adults and insects as nestlings. It damage crops like paddy, sorghum and millets, the damage becoming serious because of the sheer numbers. The reed beds near water stretches where they prefer to build the nests should be destroyed or treated with a strong contact insecticide.
- 5. Myna:** This bird can be found up to 2,700 m height. It builds its nests in tree holes with feather, twigs, rags and rubbish. The bird is known for its sharp chattering calls the are annoying to the ears. Being omnivorous, it feeds on insects, earthworms, fruits kitchen scraps and crops like maize and wheat when their grains are about to mature It could be poison-baited with bread crumbs or trapped.
- 6. Pigeon:** It has been recorded up to 4000 m in the Himalayas. It makes its rather crude nests with coarse twigs on rocks but prefers tall buildings like churches, temples uninhabited historical buildings, minarets, power houses, stations, etc., where it becomes a nuisance by its droppings and noise. Individually or in large groups, it destroys gas crops like wheat, bajra, sorghum, maize, etc. It can be killed by offering poisoned graina Wire-netting around strategic places could prevent their entry into buildings. Its mee being tasteful, it is generally hunted.
- 7. Peacock:** It is found up to 1500 m and makes its nests in shallow scrape on the ground in a dense thicket, in boundary walls or on thatched roof-tops. It is a national biri of India, is also considered sacred and, therefore, not killed. But it does considerable damage to grains, vegetables (pepper, brinjal, tomato) and other crops. It also feeds on isnects and

reptiles. It is illegal to kill this bird, trapping is done for its beautiful feathers, Chemical repellents can be tried on sown seeds and acoustal repellent in the fields.

8. **Seven Sisters:** Found everywhere in India, it lives in groups of seven and so its name. It is very destructive to germinating seeds, seedlings due to its constant habit of pecking in the soil and fruits. Being intruders in homes, they are a source of great nuisance due to their sharp and unmusical noise. It can be easily trapped and poison-baited.

Here are some common methods used for mammal control in agricultural settings

Farmers face a delicate challenge in managing the impact of mammals on crops while ensuring the conservation of wildlife and biodiversity.

Fencing: Installing sturdy and appropriate fencing around fields and orchards can be an effective way to keep large mammals like deer, wild boars, and bears out of the crop areas. Electric fences can be particularly useful as they provide an added deterrent.

Repellents: Farmers can use natural or chemical repellents to deter mammals from feeding on crops. These repellents emit odors or tastes that the animals find unpleasant, encouraging them to stay away.

Scare Devices: Various scare devices such as scarecrows, reflective tapes, noise-making devices, and motion-activated lights can startle and discourage mammals from entering the crop areas.

Crop Rotation: Implementing crop rotation can disrupt feeding patterns of mammals and reduce their attraction to specific areas.

Hunting and Trapping (Lethal Control): In some cases, when non-lethal methods fail or are impractical, regulated hunting or trapping of problem mammals may be necessary. However, this approach must be carried out with care, adhering to local laws and regulations to ensure minimal impact on the wildlife population.

Integrated Pest Management (IPM): IPM is an approach that combines multiple strategies, including natural predators, to manage pest populations effectively. Encouraging the presence of natural predators like owls and hawks can help control rodent populations.

Habitat Management: Creating alternative habitat and food sources for wildlife away from crop areas can reduce the animals' incentive to target the crops.

Public Education: Raising awareness among the public about the challenges faced by farmers and the importance of wildlife conservation can foster understanding and support for sustainable practices.

Management of Birds

(1) Cultural methods

These include deep sowing of seeds, covering the seed with soil, pre-and post-dating of sowing, growing of trap crops near the main one can use of plant varieties that are physically and gustatory unattractive to birds. It has Non-Insect Pests of Crops been observed that in some plants, morphological features such as shed layer of anthers or awns (hybrid bajra), tight spathe (maize) grain size, compact or loose earheads (pearl millet), large glumes (bracts), loose panicles and gooseneck-shaped (pendant) heads (sorghum) and gustatory features such as an extra quantity of tannins the grains (sorghum) make the crop unacceptable (resistant) to birds.

(2) Use of nylon nets

Spreading nylon net over the crops and orchards can offer protection against bird attacks.

(3) Habitat manipulation.

A preferred bird-habitat can be made preferred removing food, water and shelter.

(4) Electrified perches.

Bird perches could be electrified to disperse the birds or kill them by regulating the voltage.

(5) Use of deterrents.

(i) A conventional deterrent commonly used by farmers

'Scare crow', a human figure erected in the fields, may scare some birds like crows,

- (1) acetylene gun, a device by which loud bangs are produced by the action of water calcium carbide can offer some protection to orchards,
- (2) use of bioacoustics in which bird's stress or alarm signals are recorded and played in the fields at intervals on which should be kept changing to prevent the birds getting used to them,
- (3) use of repellents like some insecticides (lindane, malathion) or an effective avian feeding deterrent (tetra methyl thiuram disulphite, TMDT) can repel birds, and
- (4) (v) use of baits of some immobilizing agents such as alpha chloralose (1-2%) that has been found to immobilize and stupefy birds like pigeons and sparrows,

(6) Fumigation.

Fumigation of nests with phosphine tablets could be used in case of such birds only which make their nests on trees or in wall holes (like mynas, parrots).

(7) Trapping.

Various trapping devices such as flood light trap, decoy trap, nets, ages, etc. can be used to trap the birds. Bird catchers often used a very sticky glue, lassa' on the tip of a pole; the bird just cannot rid itself if it comes in contact with it.

(8) Destruction of birds.

The birds could be destroyed by shooting. But the method should be resorted to only in rare cases and with the knowledge whether or at the bird belongs to the protected list.

(9) Destruction of nests.

This has a limited use in view of their scattered distribution and often inaccessibility due to being located on heights.

(10) Poison baiting

Bajra (*Pennisetum typhoides*) seeds soaked in fenthion (2%) emulsion and dried, are placed in small cups and hung from the rafters or branches of trees to control house sparrow. A piece of chapatti dipped in methyl parathion (0.3%) or fenthion (2%) placed on top of a roof is a good bait for house crow.

Conclusion

It is crucial to strike a balance between protecting crops and preserving wildlife. Many of these mammals play vital roles in their ecosystems, and excessive control measures can disrupt ecological balance. By employing responsible and sustainable methods, farmers can mitigate crop damage while respecting the importance of biodiversity and wildlife conservation. Additionally, seeking advice from agricultural extension services or wildlife experts can provide valuable insights into the most appropriate and effective control measures for specific situations.