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Wild animals depend on obtaining sufficient food to ensure their survival and reproduction

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Abstract :

- The crucial role of food acquisition for wild animals cannot be understated, particularly when considering the recent spotlight on a previously underemphasized issue: vertebrate pests damaging the crops of marginal farmers. Wild animals depend on obtaining sufficient food to ensure their survival and reproduction, requiring a diverse array of nutrients for various bodily functions. Their feeding patterns are influenced by factors such as age, sex, and habitat.
- In recent times, there has been a notable shift in how farmers perceive vertebrate pests—animals with backbones like blue bulls, wild boars, rhesus monkeys, small mammals, and birds. This change in perception is significant for marginal farmers, who often operate on a small scale and have limited resources. The impact of these vertebrate pests on their crops can be profound, affecting both their yields and their livelihoods.
- Given the increasing damage caused by these pests, it is imperative to address this issue more thoroughly. The effects on marginal farmers' crops and their agricultural success warrant a heightened focus to develop effective strategies for managing and mitigating the challenges posed by vertebrate pests.
- **Wildlife Sanctuaries & National Parks:** While crop damage by vertebrates is common near protected areas, the problem extends beyond that.
- **Urban and Rural Areas:** Vertebrate pests are also causing damage to crops, vegetables, and orchards in and around villages, towns, and cities.
- **Man-Animal Conflict:** This conflict arises due to several human activities that disturb the natural habitat of these animals.
- **Habitat Loss:** Forest conversion, monoculture plantations, overgrazing, and deforestation all reduce the natural food and space available to wild animals.

- **Development and Encroachment:** Infrastructure projects like roads and dams, along with encroachment into animal habitats, further push them towards cultivated fields.
- **Pesticides:** Pesticides is the emerging threat for the vertebrate pest and human well-being which cannot be neglected. Pesticides used in the fields are transferred to the vertebrate pests and impose a problem for their survival as pesticides are reported to be capable of removing whole species from the planet.

These factors essentially force wild animals to seek food sources in human landscape, leading to increased damage to crops. This creates a complex situation where both farmers and wildlife are negatively affected and Man-Animal Conflict comes into picture which is neither good for the man nor for faunal diversity of Sariska National Park.

Introduction

In general, survival and reproduction of wild animals depend on their ability to locate and harvest sufficient food to meet their nutritional needs. Timings and selection of food plants are synchronized to meet the requirements of proteins, carbohydrates, fats, vitamins, water, minerals, trace elements, etc. All animals have the same general need to acquire energy. The specific patterns of resource utilization may however vary according to species, age-sex classes, group, population and habitat. All the species interact with a variety of food distributed in their home range, which is within their reach.Until recently, there has been little attention given to vertebrate pests that damage crops, particularly of marginal farmers. Crop raid by different vertebrates' mammals and birds, like Elephant (*Elephas maximus*), Gaur (*Ros gaurus*), Blue bull (*Boselaphus tragocamelus*), Barking dear (*Munliacua muntak*), Black buck (*Antilope cervicapra*), Chinkara (*Gazella bennetti*), Wild boar (*Sus scrofa*), Hanuman langur (*Semnopithecus entellus*), Rhesus Macaque- (*Macaca mulatta*), Porcupine (*Hystix indica*) and birds like peacock, parakeet, partridges, sparrows has been widely reported from all over the country (Prater, 1971; Lakra et. al., 1979; Toor, 1982; Schultz, 1986; Sukumar, 1990; Bohra et.al. 1992, Balasubramanian et. al. 1993; Chhangani, 1994; Chhangani and Mohnot, 1997; Chhangani, 2000; Chhangani *et. al*., 2002).In India crop damage by vertebrates is very common along the immediate periphery of wildlife sanctuaries and national parks. But there are several areas, where they live in and around human habitations on the out skirts of village, towns and cities and do considerable damage to crops, vegetable fields and orchards. This man-animal conflict is mainly due to conversation of forests into large-scale monoculture plantation, shifting cultivation, overgrazing, forest cutting,

unwanted developmental activities like roads, dams and encroachment in the home range of animals, which reduces the availability of natural food and space for wild animals and force them to cultivated fields.

Diversity of cultivated plants exposed to different vertebrate pests, their population, crop raids and crop loss, make wildlife and people coexist peacefully with a healthy relationship etc are the aims of this paper and to (1) list the total species of crops, vegetables, fruits and flowers consumed by different vertebrates (2) status and type of the vertebrate species depredating crops (3) estimation of economic loss and threats to livelihood of farmers living in and around Sariska National Park, in the Aravalli Hills (4) Different management strategies employed by the people (5) management strategies and recommendation to control the vertebrates pest in the Sariska National Park.

Material & Methods

Study Site: Sariska Tiger Reserve is a tiger reserve in Alwar district, Rajasthan, India. It stretches over an area of 881 km2 (340 sq mi) comprising scrub-thorn arid forests, dry deciduous forests, grasslands, and rocky hills. This area was a hunting preserve of the Alwar state and was declared a wildlife sanctuary in 1958. It was given the status of a tiger reserve making it a part of India's Project Tiger in 1978. The wildlife sanctuary was declared a national park in 1982, with a total area of about 273.8 km2 (105.7 sq mi).

Altitude varies from 900 to 3200 feet metric system above a level. Sariska is characterized by distinct winter, summer and monsoon. During summer, temperature fluctuates between 30 – 35^{o}C, and reach may 48^{o}C during May and June. Mean winter temperature is 5^{o}C, and may go down to 2^{o}C during December – January. The average annual rainfall is about 825 mm; minimum 423 mm and maximum 950 mm. The forest is broadly dry deciduous or woodland type dominated by dhawa (Anogeissus pendula), 'gorya dhawa' (Anogeissus latifolia), salar (Boswellia serrata), gol (Lannea coromandelica), kherni (Wrightia tinctoria), kumbat (Acacia senegal), khair (Acacia catechu), ber (Zizyphus mauritiana), dhonk (Butea monosperma). The undergrowth mainly consists of jharber (Zizyphus nummularia), adusa (Adhatoda zeylanica), gangan (Grewia tenex), franger (Grewia flavescens), kanter (Capparis sepiaria), lantana (Lantana indicus). Some climbers and grasses are also found.

The main fauna of Sariska includes Tigers (Panthera tigris), leopard (Panthera pardus), hyaena (Hyaena hyaena), Indian Wolf (Canis lupus), Jackal (Canis aureus), Sloth bear (Melwisus ursinus), Hanuman langur (Semnopithecus entellus), Rhesus Macaque (Macaca mulatta), Porcupine (Hystix indica), Fourhorned antelope (Tetracerus quadricornis), Chinkara (Gazella g.

bennetti), Porcupine (Hystrix indica indica), Samber (Cervus unicolor), Spotted dear (Axis axis), (Bluebull (Boselaphus tragocamelus), Toddy cat (Paradoxurus hermaphroditus), Jungle cat (Felis chaus), Fox (Vulpes bengalensis), Crocodile (Crocodylus palustris) and Rock python (Python molurus).

Data was collected as and when encountered during travelling and regular field visits recorded from December 2016 to December 2018 in and around Sariska National Park. A well-planed questionnaire was prepared for generating information on type of crops, crop raid behaviour, seasonality food preference, crop protection strategies, economic loss estimation and such other issues concerning livelihood and wildlife conservation. Besides this scane sampling and ad-libitum sampling methods (Altamann, 1974) were also used to collect additional information by direct observations. For population estimation of wild animals census data of state forest department were used. Photography and videography were also done to confirm the presence of vertebrate pests in the study area.

Results

Different vertebrate pests

There are about 47 cultivated plant species were observed cultivated in and around Sariska National Park, Alwar study area, of which 13 are crops, 22 vegetables and 12 horticulture species observed depredated by 25 species of vertebrates. Which includes 14 mammalian and 11 birds species of which langurs, wild boar, blue bull, sloth bear and porcupines are main crop raider of the area (Table 1).

1. Hanuman langur:

Langurs are highly adaptive animals and feeding upon variety of food items, which includes, natural, cultivated and artificial food. Langurs eat about 121 types of foot items, which include natural and cultivated plant parts and artificial food provided by the people. Cultivated food in the form of fruits, seeds, grains, vegetables, flowers, and parts of garden bushes are commonly eaten. Langurs in and around Sariska National Parkeats 13 crops, 21 types of vegetables and 12 types of flowers and fruits grown in the fields, gardens and orchards around (Plate 1 and Table 2). Langur consumed maximum number of natural food plants in the month of June, which is about 80.75%.

Discussion

Since the primary occupation of the villagers in and around Sariska National Parkis agriculture and horticulture and the increasing population of vertebrates' pest increases the man-wildlife conflict many times in the recent past. Wildlife conservation and crop damage by vertebrate pests is obviously a management priority.

The commonly used method for the crop protection in and around Sariska National Parkis guarding the cultivated field. For successful guarding it is required that people should have been in the fields during the seasons when the crops were most vulnerable, through out the day and night. Obviously, this was not possible because people had many other works to do. It was also found that many times 4-5 farmers hire a person or persons (depend on farmers groups) to guard their crop fields, and share the cost of guarding fields. This practice is the most common amongst all crop protection strategies. It was also noticed in the last 6 years, that attitude of peoples towards the conservation of area and wildlife has changed considerably. Earlier there were few demands for gun licenses, but now this demand has increases considerably which is mainly to protect their agricultural and horticultural fields from wildlife attacks. In majority of cases, we found farmers depend on their crop/horticulture/produce for survival. Such attitude of peoples is not restricted to the study area only but in many other areas as well. This man-wildlife conflict issue related to people's attitude towards falling conservation interest of people in India, Africa and United States (Sukumar, 1985; Infield, 1988; Balasubramanian et.al, 1993; Conover and Decker, 1991; Chauhan and Sawarkar, 1989).

In most of the parts of the Sariska National Park, the heavy damage to the cultivated fields is in the area with high population of particular mammalian pest. Similarly, the over abundant population of mammals create the same problem in another studies Chauhan and Sarvarkr, 1989. A very little information is available on bird damage and its management (Swaminalhan and Verma, 2000). This is for the first time the crop loss by birds is also documented in this study along with the list of birds' pests. There seems to be no permanent method to protect the cultivated fields from rodents and birds, except by their natural potential predators. Some horticulture plant species like Papita, Anar, Amrood can be protected from the birds by method suggested by Swaminathan and Verma (2000).

There is an urgent need for better management of human-wildlife conflict and for this, if necessary, a vertebrate past species can be controlled by culling, as suggested in other studies (Dasmann, 1979; Long and Wood, 1976; Chauhan and Sarwarkar, 1989).

Conversion of forestland into cultivated fields, monoculture plantation, exotic species, unwanted developmental activities like road and dame. For which clearing of forest area forced wild animals to move towards cultivation fields. In absence of natural food, the wild animals are looking for food in the cultivated fields, which was their original habitat. This shrinking of natural habitat by man has created a civil war between wildlife and humans. The better management of this problem is responsibility of government by protecting natural habitats and restricting unwanted developments.

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