CONSERVATION STRATEGY AND SOME STUDIES ON HABITAT ECOLOGY OF MUSK DEER (*MOSCHUS MOSCHIFERUS*) - A VANISHING SPECIES

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Introduction

Musk deer (*Moschus moschiferus*), class- Mammalia, family- Cervidae has been serving mankind for various economic, aesthetic and socio-religious purposes for many centuries. During the rutting season, the buck secretes the musk (Kasturi) only as a natural measure to attract the female with its intoxicating aroma. This secretion has in a way sounded its own death knell because of its fragrance, as it is in great demand for use in indigenous medicine and in perfumes world wide. Once it was well distributed along the Himalayan region at altitudes 2700 to 4700 m running through Northern Pakistan, North-western and Northern India, Bhutan, Nepal, parts of Tibet, South-western China and Northern Burma. It is now restricted to some isolated pockets in the region. The indiscriminate killing and some other causes had contributed to their thinning numbers. According to 1983 estimate their number is only 2000 in India. Thus it has become an endangered species. IUCN (International Union for Conservation of Nature and Natural Resources) has put it under category of "Vulnerable" in Red Data Book (Desai, 1992).

Habit

Musk deer is a timid animal by nature, is considered unique as it represents an evolutionary link between the common deer and the antelope. Its characteristics are the special hooves that enables it to move with ease over the snowy and rocky terrains, large rabbit like ears, large canine teeth (in males) and bouncing gait. It has no horns like some other deer species. Its only weapons are two sharp white fangs jutting from its lower jaw which are 7 cm long. It does not make any specific call or sound except rarely, a snorting, sneezing sound, particularly when in panic. It is a lone creature, except during breeding seasons. A mature musk deer weighs up to 17 kg. Its colour changes by the season, in summer it is dark chestnut, in winter dark grey (Gupta, 1990).

Habitat

Pastures near the 2700 m to 4200 m high snowline in the Himalayas are the preferred habitat of the musk deer. But in winters they come down to 1800 m as the snowline drops. It is a den dwelling animal having brousing tendency. It browses

shruby plants. Generally in natural habitat it browses flowers, leaves, tender shoots of the species like *Carangana, Cotoneaster, Rhododendron* (shrubs), *Polygonum, Astragalus, Pedicularis, Allium, Potentilla, Saxifraga, Aster, Primula, Gentiana, Geum, Impatiens, Geranium, Rumex, Jasminum, Anemone*, Lichens, Mosses, Ferns, Mushrooms and other members of Ascomycetes (Fungi) and other plants of family Lamiaceae and Asteraceae (Sathya Kumar and Prasad, 1990).

Musk as Medicine

Reference to the curative values of musk was first noticed in the writings of 11th century Arab physicians. Tibetan and other Central Asian healers, quickly caught on. Musk is reputed as a cardiac and general stimulant and is used to support the active functioning of the heart. It improves the circulation and raises the arterial tension. The practitioners of Indian system of medicine use musk as a cardiac and general stimulant, aphrodisiac and antispasmodic and in chronic cough and urogenital disorders. It is used in nearly 150 Ayurvedic and 50 Unani preparations.

Musk (Kasturi) is the dried secretion from the preputial follicles of male musk deer during the breeding season. The deer secretes the musk, a dark, resinous substance in its abdominal sac every six months. Older ones secrete more. Fresh musk is semi-liquid, on being dried it becomes power which is soluble in water and alcohol.

Research has established that musk contains ammonia, olein, cholesterin, fat, wax, gelatinous matter, albuminous

Plate 1

Male Musk Deer

Plate 2

Female Musk Deer

substances and inorganic salts of sodium, potassium and calcium, besides an oil like substance called "Muscone" which gives musk its fragrance.

Adulterations

A musk like substance is also there in species of civet cat in Ethiopia and India, ox in the Arctic North America, duck in West Australia, rat in California, alligator and shrew in Central America, and shrew in India. Some plant sources have also been identified.

Trade

Available data put the value of global musk trade at $ 8 millions to $ 10 millions a year, with musk selling at 3-5 lakhs a kilogram. The estimated annual demand is around 200 kg annually for medicines, Europe is second, with 20 to 40 kg for use in cosmetics. Natural musk in cosmetics has to a great extent been replaced by cheaper synthetics, but the Indigenous systems of medicine continue to rely on it and their annual demand is estimated at 10-15 kg. Normally about 150 deer are required to be killed for one kilogram of musk (Doval, 1989).

Traditionally used poaching practices

Poaching is highly organised. In the Garhwal and Kumaun region the poachers operate in groups. Each hunting trip into deep jungles lasts over a week and 10 to 15 animals are killed from which three or four musk pods are obtained. The poachers operate round the year, frequently the remote higher areas in summer and the lower slopes in winter. The villagers in the area generally connive with them for monetary gains, giving information on the movement of the animal and the presence of forest officials. The most discriminate method of picking the male is shooting. This method is not much favoured by hunters because of the risk of detection by forest guards alerted by loud report. Besides fire arms, snares, poisoned spears and tracking dogs are used by poachers. Poachers first chase the animal from the forest to the scrub land. They usually unleash trained dogs to run the exhausted deer to standstill, then they shoot it. They also use plant poisoned spears at strategic points and then set ablaze the alpine pastures. The panic stricken deer run into the spears.

Causes of depletion

1. Large scale killing of deer for musk which has profit in trade.

2. In winter the snow line drops. This is also the time of breeding when musk secretion and poaching period is at its peak. The male secretes the musk. But as hunters at a distance can not distinguish between the male and the female, they kill both. A large percentage of the animals killed are either females or fawns that yield no musk.

3. Fawns are born during June to July, occasionally in August, when weather conditions are wet and chilly, seemingly the worst possible for survival of young ones.

4. Destruction of habitat due to indiscriminate felling of trees and cutting of shrubs for fuel and fodder.

Observation on captive breeding

There are at present a sanctuary at Kedarnath (U.P.) and the other at Dachigam in Jammu and Kashmir and three other centres in India for conserving

and breeding musk deer. Kufri Musk Deer Farm near Shimla (H.P.), Kanchula Kharak Musk Deer Farm near Chamoli (U.P.) are under the Forest Departments of the respective States. The third centre at Mahroori (Dharamgarh-Kotmanya) in Almora district (U.P.) is managed by Central Council for Research in Ayurveda and Siddha (C.C.R.A.S) with the object of extracting musk from the deer without killing the animals or painless extraction of musk. Some studies have been made about the animal behaviour in captivity. Mating may take place from November to January which is the time of maximum snow cover in the Himalayan habitat of the musk deer. Fawns are born during June to July and occasionally in August. The musk deer often give birth to twins in captivity. The fawns are grow very fast, attaining the size of the mother by the age of six months. The mother however abandons her young ones when they are 160 days old and they soon learn to fend for themselves. By 18 months the young musk deer attains breeding age. The gestation period takes times from 192 to 240 days. The animals do not feel comfortable beyond 26°C and less than 9°C, in captivity. The females like lone living during pregnancy. The musk can be collected from adult males twice during a year. The amount secreted, increases with age and peaks at certain times of the years. Some portion of the diet has been substituted with food grains and some studies have also been carried out regarding fodder preference in the captivity. The frequent human activity in farm disturbs the timid animal, but the impact is yet to be studied (Walker, 1990 and 1991; Bhadauria, 1990).

Technique of extraction of musk

Musk can be extracted without harming the animal. This is done by immobilising the animal either by tranquillisation or physical restraint scooping out the sticky musk through the opening in the pouch or "pod" on the abdomen. The traditional misconception is that musk can be procured only after killing the deer. In fact the deer can be milked for the musk twice a year, after temporarily anaesthetising the animal. The Chinese had done it as early as in 1958.

Conservation strategy

1. Poaching practices must be controlled.

2. Natural habitat of musk deer should be protected.

3. Musk deer areas should be earmarked and the locals, who have rights over the forest should be trained in the technique of extracting the musk. The male deer can be caught once or twice a year and after extraction should be released back into the forest. This practice is followed in China and has been advocated in India.

4. A village level co-operative musk deer farming can be introduced.

5. The musk deer farms and sanctuaries are located at different altitudes. The animals kept in farms have to feed on the vegetation inside or in the vicinity. They normally eat broad leaves, roots and lichens. During winter, as the snow thickens, they become more dependent on the lichens and members of Ascomycetes (Fungi). They also scrape the snow with their hooves for mosses and dried perennials or grass. The change in the food habit appears to have no direct bearing on the size of the pod or the quality of the musk. Therefore vegetable diet can be substituted by cereals and pulses in the farms.

6. Human activity and the flow of

tourists in and around the farms should be controlled.

7. The people should be motivated to save the animal which is on the verge of extinction.

Conclusions

Captive breeding of the musk deer has produced some encouraging results and the animal, indiscriminately hunted for its fragrant secretion that goes into perfumes and medicine, is being led back from the brink of extinction. Despite the encouraging results obtained so far in captive breeding, the conservation efforts are hampered by the fact that the animal has defied all attempts at domestication. There is also a feeling that captive management would not help to reduce poaching for trade.

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SUMMARY

The Musk Deer (*Moschus moschiferus*) was once well distributed along the Himalayan region at altitude of 2700 to 4700 m. The indiscriminate killing of the deer for musk (Kasturi), which has great demand in indigenous medicine and perfumery had threatened its extinction. The destruction of habitat, climatic changes had also been contributed to their thinning number. Captive breeding of the musk deer has produced some encouraging results by which it can be led back from the brink of extinction. But it is simply not possible to sustain a long term captive breeding programme for such specialized animal. The habitat ecology, traditionally used poaching practices, causes of depletion, extraction of musk and its conservation strategy have been discussed in this study.

कस्तूरी मृग (*मौस्कस मोस्कीफेरस*) विलुप्तप्राय: होती प्रजाति के संरक्षण की योजना एवं इसके प्राकृतिक आवास परिस्थितिकी पर कुछ अध्ययन

जी० सी० जोशी, के० सी० तिवारी, आर० एन० तिवारी व जी० पाण्डेय

सारांश

एक समय था जब कस्तूरी मृग (*मौस्कस मोस्कीफेरस*) हिमालय क्षेत्र में 2700 से 4700 मीटर तक बहुतायत से पाये जाते थे। "कस्तूरी" जिसकी स्वदेशी औषधियों एवं इत्रसाजी में अत्यधिक मांग है, के विदोहन के लिए इस जानवर की नृशंस रुप से हत्या की जाती रही है। इसके कारण यह जानवर लुप्त प्राय: हो गया है। इसके प्राकृतिक आवास का विनाश व जलवायु में परिवर्तन का भी इसके विलुप्त होने में बहुत योगदान रहा है। बन्दीकृत कस्तूरी मृग के प्रजनन के यद्यपि कुछ उत्साहवर्धक परिणाम सामने आए हैं, जिसकी वजह से इसको लुप्त होने के कगार से बचाया जा सकता है। परन्तु इस विशेष प्रकार के जानवर के लिए लम्बे समय के लिए बन्दीकृत प्रजनन योजना में पालकर रखना संभव नहीं है। इस मृग के प्राकृतिक आवास परिस्थितिकी परम्परागत रूप से मारने की विधि, लुप्त होने के कारण, कस्तूरी का निष्कर्षण एवं इस मृग के संरक्षण की योजना का प्रस्तुत अध्ययन में वर्णन किया गया है।

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