STUDIES ON HABITS, HABITAT AND DAMAGE OF PORCUPINES, *HYSTRIX INDICA*, RODENTIA, MAMMALIA

by

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Abstract. *Porcupine, Hystrix indica lives in burrows which are long and deep in loamy soil but short and shallow in stony land. Porcupine food consists of roots and bark of succulent plants, agricultural crops and perennial grasses. Trees are debarked, young plants and shisham stumps are uprooted. They breed twice a year and usually give birth to two young ones who live initially on mother's milk switching to tender barks 2-3 months later.*

Introduction. Porcupine is one of the noxious wild animals, common through out the world, damaging forest and agriculture and horticulture crops. The Indian porcupine (*Hystrix indica*) is abundant all over Pakistan causing considerable damage to forest and agriculture crops. It feeds on bark resulting in the girdling of trees. Partially injured and debarked trees becom susceptible to diseases and insect attack and eventually die.

Review of literature. Porcupine is an old problem for the forester. Buckland (1952) reported extensive damage to conifers by porcupines in British Columbia. The Okanagan county (washington) Porcupine Control Committee estimated in 1956 that a single porcupine destroyed timber worth £ 6000 in its life time. Krefting et al. (1962) reported that 534000 acres of hemlock and red, white and jack pines suffered heavy porcupine damage in the Lake State. Van Deusen et al. (1962) reported 2% damage to Ponderosa pine in the Black Hills. Spencer (1964) worked out procupine population fluctuation in the past century by dendrochronology and pointed out four population eruptions in Pinyon and yellow pine forests in the Mesa Verda area (Colorado), numbers reaching peaks in 1845, 1885, 1905 and 1935. Storm et al. (1967) studied the effect of porcupine injury on radial growth of Ponderosa pine. Chaudhry (1970) reported considerable damage by this pest to agricultural crops and forest trees in Pakistan. Hooven (1971) described porcupine as a serious pest of *Pinus ponderosa* in whole of Oregon.

Rudolf (1949) reported large vigorous trees of *Pinus sylvestris* as the preferred food of porcupines. Curtis and Wilson (1953) collected data from pole stage Ponderosa pine stands and indicated preference by porcupines for feeding on trees of 8-10 inch diameter and in dense rather than sparse stands. Gill and Cordes (1972) reported that the pest took refuge in winter in disjunct stands of low altitude *Pinus flexilis* and caused extensive injury by debarking. Brander (1973) observed that in Michigan, summer feeding of porcupines was restricted to foliage of deciduous trees but after leaf fall, the inner bark of 5 species was eaten particularly that of *Tsuga candensis*.

Methods. Porcupine habits and its habitat were studied in the irrigated plantations of Mianwali, Shorkot, Jhang, Khanewal, Chichawatni and scrub forests in Jhelum and agricultural fields surrounding the forest areas. Tunnelling patterns of porcupines in soil

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were studied by digging and exposing their burrows. Measurements of the tunnels and chambers were taken.

Porcupine damage was assessed by physical counting of dead and partially damaged trees of various plant species in 8 compartments of different stocking. Damaged saplings in 10 lots of 1000 plants each were counted in nurseries.

Observations on porcupine burrowing damage to main canal in Kundian were recorded. Information on such losses was also collected from the Executive Engineer, Irrigation, Mianwali.

Results and discussion. Habits and habitat: Porcupine is a rodent pest of forestry and agricultural crops living in burrows making mounds of excavated earth. Porcupine dens usually have one opening and two or more outlets is a rarity. Porcupine burrows are long and deep in loamy soil of Mianwali and short and shallow in stony soil of the scrub forests. The observations on burrowing pattern of porcupines showed that in stony soil burrow opening of 30-35 cm diameter leads to a short tunnel (60-80 cm) which opens into a main chamber of 50 to 100 cm dia. Dependent on porcupine population two to four tunnels originate from the main chamber. The central burrow is about 4-5 m long and the others shorter (1.75 to 2.25 m) all ending in small chambers.

In loamy soil, tunnelling pattern is quite different. There is a long tunnel sloping downward turning twice or thrice at sharp angles, making 3 or 4 straight slanting tunnels of 2.5 to 5 m long each. At each turning point there is a small chamber, the deepest being 7-8 metres from ground level.

Normally one porcupine couple inhabits one burrow but minimum of one animal per burrow and maximum of 8 have been recorded. Porcupine comes out of its den usually at dusk and retires before dawn.

Porcupine food consists mainly of roots and barks of succulent plants, agricultural crops and perennial grasses. Mulberry appeared to be the tree most relished in the irrigated plantations followed by bakain and shisham. Among nurseries and young crops, shisham and semul are preferred over others. In Islamabad plantation *Cedrella toona*, *Terminalia arjuna* and *Acacia modesta* in plain area and *Pinus roxburghii* in Margala Hills are damaged the most. In scrub forest Agave was completely wiped out several times soon after planting but *Acacia modesta* trees were quite safe from its damage.

Porcupine breeds twice a year, in March and September and usually two young ones are produced in the main chamber of the burrow. Porcupine off-springs live on mothers milk initially but soon start feeding on tender bark. Three months old porcupines collected from Mianwali and caged in laboratory at Peshawar fed on small branches of mulberry and shisham.

Nature and extent of damage: The porcupines cut bark of succulent trees near ground level with incisor teeth and feed on it by small bites peeling the stem upto a height of a

meter. The cambiun layer and in some cases the sapwood is also eaten by scraping and biting. The feeding marks and the peeled off bark flakes particularly in case of bakain are visible from a distance. The damaged trees become weak and are exposed to diseases and insect attack. At Shorkot, mulberry trees debarked by porcupine were found attacked by *Peria paradoxa* (Sehrad. ex Fr.) Donk. Trees completely girdled dry up soon. Young plants and nursery seedlings are cut near gtound level. Agave is uprooted and the roots are eaten leaving the entire plant on the ground. Several efforts of Agave planting have completely failed due to porcupine damage in the scrub forests Newly planted shisham stumps are usually pulled out.

Extensive burrowing by porcupines causes severe damage to tree roots in the plantations while burrowing near water courses and canals causes breaches of banks requiring heavy annual expenditure on repairs and loss of valuableir rigation water.

Observations recorded at Mianwali on porcupine damage to mulberry showed that 42% trees were damaged partially and 34% completely girdled and killed. At Shorkot 9% mulberry trees were completely killed and the rest were heavily damaged leaving only 6% uninfested.

At Mianwali, 2% Bakain trees were found killed while 12% were permanently damaged. Shisham trees were found superficially damaged by porcupines and their extent of infestation was 3% at Mianwali, 8% at Shorkot, 5% at Jhang and 11% at Chichawatni. No shisham tree killed by porcupines was observed at any of these places. In a 4 hectare six months old shisham nursery at Kundian, only 25% plants escaped mortality while the rest were found cut and thrown on the ground. Porcupine damage has become a limiting factor in raising shisham and semul nurseries in Jhang where only 11% living plants could be found in a mixed nursery of shisham and semul.

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