

Coconut (*Cocos nucifera*) damage by wild pig (*Sus scrofa*) and Indian crested porcupine (*Hystrix indica*) in Central Kerala, India

Crop damage by wild animals is a serious concern faced by marginal farmers in Kerala¹. As the farmers cultivate a variety of cash crops namely coconut (*Cocos nucifera*), arecanut (*Areca catechu*) and rubber (*Hevea brasiliensis*) in the immediate fringe areas of the forest, damage and consumption of the fallen coconuts by wild pig (*Sus scrofa*) and Indian crested porcupine (*Hystrix indica*) is a serious issue^{1,2}. Both the species are distributed in all the forest types in India³ and reported as frequent crop raiders in Kerala⁴. Mode of feeding on coconuts by wild pig and Indian crested porcupine was not reported in the previous studies^{1,2}. Wild pig damaged a variety of crops in India^{5,6}, China⁷ and Bhutan⁸. In European countries, crop raiding was seasonal based on the type of crops cultivated⁹. Schley and Roper¹⁰ reported that wild pigs prefer agricultural crops due to their nutritive value. Indian crested porcupine damaged different crops in north India¹¹ and Pakistan¹². Chakravarthy *et al.*¹³ reported that degradation and fragmentation of the forest habitat compelled Indian crested porcupines to move to human habitations and cause damage to the crops. The study was carried out in Thrissur district (10°46'–10°7'N and 75°57'–76°55'E), central Kerala, India, as a part of a study on human–wildlife conflict from April 2009 to March 2012. The objectives of the study were to quantify the damage and consumption of fallen coconuts, with special reference to their mode of feeding and to identify the species involved in damage from the indirect evidences based on the shape and length of the discarded coconut husk.

For quantifying the damage to fallen coconuts, four quadrats of 10 m × 10 m were laid systematically in the coconut plantations up to 200 m away from the reserve forest in each forest range⁴. Ten coconut trees were marked from these plots in the Wadakkancherry, Pattikkad and Peechi forest ranges. Twenty trees in Machad forest range, 11 trees in Charpa forest range, 9 trees each in Vellikulangara and Pariyaram forest ranges and 6 trees in Palapilly forest range were marked from the plots. The presence of wild pig and Indian crested porcupine in

the quadrats was recorded in each month ($n = 36$) based on the indirect evidences left by these species such as scats, droppings, diggings, feeding signs and scratching marks. The coconuts consumed/tree were also recorded during each visit. Percentage occurrence of the two species based on indirect evidences was calculated by dividing the number of occurrence of these species in the quadrats in each month by total months observed ($n = 36$) and multiplying this by 100. The shape and length of the removed mesocarp (coconut husk) was measured using vernier calipers ($n = 40$).

Wild pig was recorded from all the forest ranges in the district. Highest occurrence was recorded from Wadakkancherry forest range and the feeding on coconuts was maximum in Palapilly

forest range (Figures 1 and 2). Mean coconut consumed per tree was 0.12 ± 0.15 coconut/tree/month ($n = 8$). The mode of consumption was by removing the mesocarp (husk) and endocarp and consuming the endosperm. The removed mesocarp (husk) had an irregular shape at the tip with a size of 15.01 ± 1.65 cm in length and 3.09 ± 0.73 cm in breadth ($n = 20$) (Figure 3). Coconuts were dragged to the forest before consuming them ($n = 19$). Indian crested porcupine was recorded from all the forest ranges, except Charpa forest range. The highest occurrence and damage to coconuts were recorded from Vellikulangara forest range (Figures 1 and 2). Mean coconut consumed per tree was 0.06 ± 0.09 coconut/tree/month ($n = 8$). Like the wild pig, the coconuts were damaged and

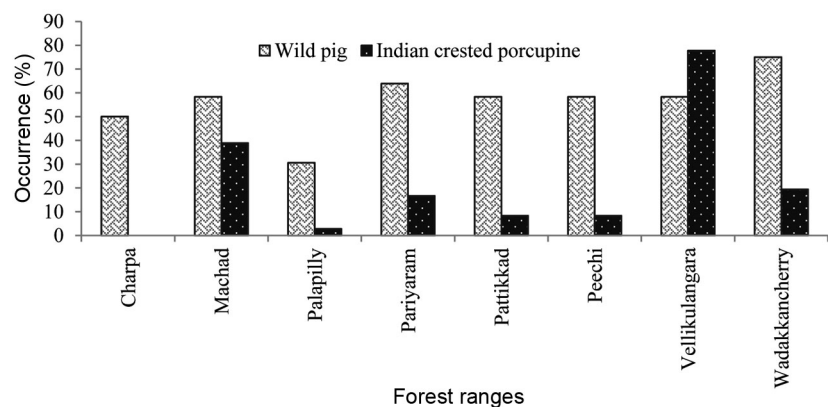


Figure 1. Percentage occurrence of wild pig and Indian crested porcupine in the fringe areas of different forest ranges (Thrissur district, Kerala) ($n = 36$).

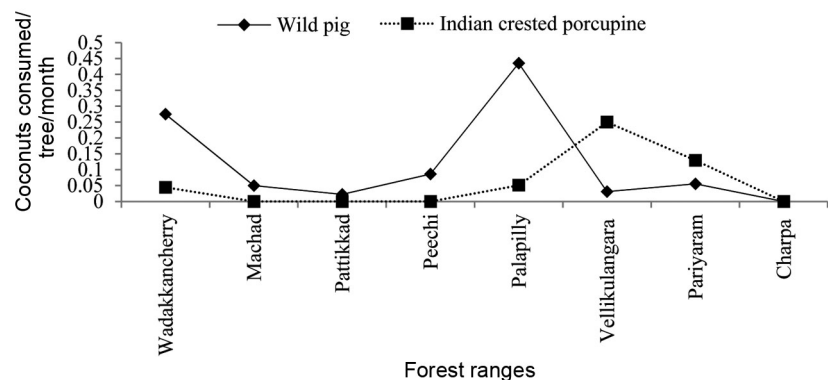


Figure 2. Number of coconuts consumed by wild pig and Indian crested porcupine in the fringe areas of different forest ranges (Thrissur district, Kerala).



Figure 3. Mesocarp removed by wild pig had an irregular shape at the tip and square cut shape in the case of Indian crested porcupine.

consumed by removing the mesocarp (husk) and endocarp and feeding on the endosperm. But the removed mesocarp had a uniform square shape at the edges with a mean length of 5.18 ± 1.84 cm and mean breadth of 3.24 ± 0.82 cm respectively ($n = 20$) (Figure 3).

Both the species are nocturnal feeders and there was no significant difference in consumption of coconuts between these two species (independent sample t -test, $t = 0.955$, $P > 0.05$). As the porcupine belongs to the order Rodentia, the removed husk had a square edge at the tip and a uniform shape, which was characteristic of the species involved (Figure 3). A significant difference in the length of removed mesocarp was observed between the species ($t = 17.785$, $P < 0.001$) and the breadth was similar ($t = -0.61$, $P > 0.05$). Damage to the coconuts by these species was influenced by the price of the coconut as well. When the price of a coconut was less than Rs 5 starting from August 2005 to August 2010 (Farm Information Bureau, Kerala), farmers did not respond to the destruction and feeding on fallen coconuts. Farmers protected the coconuts from these animals, when the market price increased to more than Rs 20 per kg in September 2010. The

study indicated that, the number of coconuts consumed/tree/month was similar in the case of wild pig and Indian crested porcupine. Square shape at the tip and length of the discarded coconut husk (15.01 ± 1.65 cm by wild pig and 5.18 ± 1.84 cm by Indian crested porcupine) can be relied on for indirectly identifying the species of animals involved in the damage and consumption of fallen coconuts.

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