

White-nosed coati *Nasua narica* (Carnivora: Procyonidae) as a potential pollinator of *Ochroma pyramidale* (Bombacaceae)

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Biotic pollination predominates in tropical forests (Hartshorn 1983). Although bats play an important role as pollinators, it has been suggested that no plant species depends entirely on eutherophily (Vaughan 1986). Typically terrestrial mammals act as dispersors of seeds either ingested or attached to external body parts. This includes the White-nosed Coati, *Nasua narica* (Kauffmann 1962, 1983, Sáenz 1994).

Non-flying mammals may be important pollinators where airborne eutheres, such as flower-bats, are rare or absent in time or space (Sussman & Raven 1978). Several terrestrial mammals are known to be pollinating agents (Cunningham 1991, Goldingay *et al.* 1991, Turner 1982, Wiens *et al.* 1983, duToit 1990, Carthew 1993, Whelan 1994). However, our knowledge of their interactions in the new tropics is poor (Buchmann & Nabhan 1996).

In this study, visitation of fresh, nectar-laden flowers of *Ochroma pyramidale* (Cav. ex Lam.) Urban (Bombacaceae) by the White-nosed Coati *Nasua narica* (Carnivora, Procyonidae) is reported for the first time from Costa Rica and, to our knowledge, for the entire geographical range of the coati. This visitation resulted in no damage to floral structures and

pollen uptake on facial fur, suggesting a potential role of the coati as pollinator.

Observations were made at a lowland (100 m.a.s.l.) site along the coastal highway, 19.8 km south of the Carara Biological Reserve, Province of Puntarenas, Costa Rica, during the second half of December, 1995. Sightings and recording of the activities took place between 15:00 -18:00 hours. Observation was aided by binoculars (10 X 40), at close range allowed a close view of the manipulation of the flowers by the coatis, insertion and exsersion of the snout into the fitting corollas, and the dusting of pollen grains on facial hair.

Two adults from a troop of 10 foraging White-nosed Coati had climbed a Balsa tree and were exploring flowers, probably in search of insects (bees and beetles were seen) and nectar. The coatis would move along a branch towards clumps of flowers, smell them and delicately turn the flower to its face and insert its snout for several seconds. This behavior was repeated to explore all open flowers, seven flowers for one individual and eight flowers for the other one. However, we approached too close to the coatis which subsequently left the tree and moved towards the rest of their group. We noted a load of pollen grains on their faces.

The Balsa tree (*Ochroma pyramidale*) is considered a pioneer species and reaches heights of 30 m. It is sparsely branched but may be quite dense leafy and has a smooth bark and boles up to 100 cm DBH. *Ochroma* species are found from southern Mexico to Bolivia. The geographical distribution of both *Ochroma pyramidale* and *Nasua narica* make the species sympatric throughout most of their range.

The balsa flowers are typical for the family Bombacaceae, solitary, sessile in fasciculate inflorescences, hermaphroditic, 4-11 cm long, erect, with five whitish petals and five fleshy sepals (Withmore 1983). The flowers exhibit all the features required for pollination by mammals, such as a tough perianth fused into a shallow cup of an average length of 11.5 cm (Opler 1983) and long, exerted stamens (Janson *et al.* 1981). Nectar is copiously secreted; approximately 9,400 microliters in flowers monitored by Opler (1983) who observed and reports bats to be the pollinators. Janson *et al.* (1981) report long-term visitation to flowers of *Ochroma pyramidale* in Peru by *Bassaricyon alleni* (Procyonidae) as well as other non-flying mammals as visitors to flowers of *Quararibea* spp. (Bombacaceae). In the flowers checked by us for nectar production 42 (84%) had nectar and pollen during the day while 38 (76%) had them during the night. It is possible that whatever scent is produced by these flowers have diurnal fluctuations in the amount, volatility and dispersability of their molecules.

In the energetic balance of this potential relationship, the coatis would benefit by the plant's output of nectar, especially in seasonal forest formations where water and nutrients may reach critical lows. The sympatric range of both species, the morphological aspects of the flower and the phenology of balsa trees, as well as the behavior observed in the White-nosed Coati, open an interesting line of inquiry of the little known syndrome of eutherophily in the neotropics.

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