

# Shadowing Civets

On the trail of Asia's most elusive small carnivores

By T. R. Shankar Raman (text) and Kalyan Varma (photos)

DEEP IN THE rainforest, the monotonous *plip-plip* of the radio receiver kept strange rhythm with the *chill-chill* calls of the stream frogs. Dawn sent gentle probing fingers of light through the dense canopy, barely lighting the leaf-strewn forest floor. Through the lifting mist we walked, the rich earthy scent of the forest in our nostrils, the morning air fresh on our faces, dew condensing on our eyelashes. For miles on all sides stretched unbroken rainforests within the Kalakad-Mundanthurai Tiger Reserve. These exquisite forests swathe the slopes at the southern end of India's Western Ghats, renowned for their biological diversity and endemic species.

Ears glued to her headphones and directional Yagi antenna held aloft, biologist Divya Mudappa worked her way through the undergrowth. We were on the trail of the first radio-collared Brown palm civet, one of Asia's most elusive and least known small carnivores. This civet species is endemic to the tropical rainforests of the Western Ghats mountain range running along India's west coast, a global biodiversity hotspot.

In a swift operation the previous night, after weeks of preparatory baiting, Mudappa and her colleagues from the Wildlife Institute of India had caught and radio-tagged a sub-adult male, labelled K70, and released him at the site of capture. The activity-sensitive collar had signalled a night of lively activity leading

to a lull as dawn broke. Our task was to locate K70 within his home range and identify the day-bed chosen by the civet.

Civets are small cat-sized mammalian carnivores, primarily active by night and known to use tree hollows and notches to rest during the daytime. Yet, when we finally located K70, we were in for a surprise. This was no hollow or tree-notch; K70 was curled up in a leafy nest of the Indian giant squirrel placed on a stout branch around 80ft up in a *Syzygium* tree.

Giant squirrels are sprightly arboreal creatures that break twigs and leaves to build nests, called dreys, in the tree canopy of Asia's moist tropical forests. Being rather timid creatures, their dreys are chosen with care on tall, large-boled trees. A single Giant squirrel may build 4-8 dreys within its home range of 2-3 acres, although it does not use them all at the same time. Within a civet's larger home range, there may be dozens of such nests, most unused. The civets appear to capitalise on the availability of these dreys, using some as day-beds. Although no direct interaction between squirrels and civets has been seen, perhaps they occasionally operate a civet-by-day and squirrel-by-night time-share with an amicable switch performed at dusk. As Mudappa's research continued and more civets were radio-tagged, she found that over a third of the day-beds used by Brown palm civets were Giant squirrel dreys, the rest being in tree hollows, vine tangles and the forks of branches.

In retrospect, it is curious that even this basic aspect of the civet's ecology was unknown when the researcher began her studies in 1998 with a WCS Research Fellowship. Yet, this was so for the Brown palm civet and remains the case for the many civet species of South and South-east Asia. Being nocturnal and cryptic, often restricted to dense forests, civets have been difficult to observe and document in the wild. For most species, even today, we know little about their distributional range, food habits, habitat requirements, social behaviour or breeding patterns in the wild: almost all aspects we need to know to understand civet ecology.

Yet, the tide is turning. Using a slew of methods from traditional spoor surveys and nocturnal spot-lighting with binoculars to modern techniques such as radio-telemetry, motion-sensitive infra-red camera traps and DNA analysis, backed up by hundreds of miles of footwork, biologists are throwing light on the darkness that has shrouded these elusive creatures. Studies from South and South-east Asian forests, particularly over the last two decades, are helping to unravel the distribution and ecology of the enigmatic civet. These are timely studies, as large parts of this region have high rates of forest loss and conversion coupled with high human populations. The handful of research surveys carried out thus far has yielded a mixed message. Civets appear resilient to habitat loss and alteration in that they

continue to occur in altered tropical habitats such as logged forests or shade-coffee plantations. Yet, their populations are reduced and their long-term survival in these rapidly transforming landscapes remains questionable. Whether civets can continue to survive in plantations if there are no remnant forest tracts in the vicinity is yet to be established.

Much useful information on the Brown palm civet was also generated in Mudappa's study of the Western Ghats. Meticulous collection and observation of the scats of these rainforest civets over three years showed that, despite being taxonomically categorised as carnivores, the animals consumed a great variety of fruit throughout the year. Around 60 species of rainforest trees and lianas provided fruits eaten by the civets, mainly pulpy drupes and berries. The Palm civets' (family Paradoxurinae) predilection for fruit has long been known, but its extent and year-round consumption had not been proven.

A little further along the trail in Sengaltheri that morning, we came across a small log that had fallen across the path. On it was a Palm civet scat with eight *Holigarna* seeds, dark due to the black, skin blister-inducing sap of this tree belonging to the mango family (Anacardiaceae). The scat also had numerous small fig seeds and the remains of a beetle exoskeleton. A significant aspect of the civet's penchant for a fruity diet is that they mostly consume only the pulp, passing the seeds virtually



Gleaming eyes or a dark shape is often all that one sees of nocturnal animals like this Brown palm civet (*Paradoxurus jerdoni*).



undamaged through their scats. The civets of Sengaltheri were thus carrying thousands of mature seeds from ripe fruit picked from the branches of rainforest trees or lianas and depositing them at various distances in the surrounding forest—an invaluable service of seed dispersal.

Through germination experiments, Mudappa found that some species appeared to benefit from such civet dispersal: seeds from scats germinated better or faster than seeds from ripe fruit that had not been lucky enough to be dispersed in this way. In some trees, such as the elaeocarps that fruited copiously—with perhaps too many fruits for them all

for the Brown palm civet. Encounter and photo-capture rates were higher here than in other disturbed forests or plantation areas. The team's work also showed that individual civet home ranges here were less than 150 acres. This was considerably smaller than the home ranges—some larger than 750 acres—reported by WCS Scientist Alan Rabinowitz from studies in the seasonal dry tropical forests of Thailand and also smaller than the 250-acre ranges reported for Malay civets in Borneo, which are the only comparable studies available. Mudappa attributed this to an adequate, year-round supply of fruit and the dense, relatively undisturbed

wet evergreen forests all around. On the flip side, she surmised that in degraded habitats, due to lower plant diversity, fruit availability and fewer suitable day-bed sites, civets would occur at lower densities concurrently with the larger home ranges needed to meet their needs. This was partly confirmed when she surveyed rainforests fragmented by tea and coffee plantations in the Anamalai hills, another region in the southern Western Ghats. The number

of endemic Brown palm civets appeared to have declined, particularly compared to other more common and widely distributed small carnivores such as the small Indian civet and mongooses.

At first, researchers thought that these results did not appear to bode well for the Brown palm civet. With annual deforestation rates still over 1%, the Western Ghats forests continue to be altered and threatened due to the forces of development, urbanisation and forest conversion. In the previous decade, Brown palm civets had been reported only in a few localities in the southern half of the mountain chain and their conservation status appeared precarious. Yet, Divya

Mudappa's initial survey and later work with another field biologist, Nandini Rajamani, were encouraging. In nocturnal surveys, they noted the species in dozens of tropical rainforest localities, and even in some shade-coffee and cardamom plantations, from the southern tip of the Western Ghats northwards to Goa.

Concurrently, an offshoot of the seed germination work carried out at Sengaltheri began to yield results that seemed to point the way forward in fragmented landscapes. At the end of the germination study, it seemed only natural that the numerous rainforest tree and liana species raised could be planted in degraded rainforests. So, in 2000, a reforestation project was launched in the Anamalai Hills, a former rainforest landscape now covered by tea and coffee plantations. Within these plantations survive around 40 rainforest fragments ranging from 3 to 500 acres. Many of these fragments are degraded due to logging or invasive weeds. Research indicated that these pockets are of high conservation value because they help remnant populations of endemic species such as the endangered Lion-tailed macaques and Great and Malabar grey hornbills to survive. They also act as corridors for large wildlife such as Asian elephants and wild dogs or *dhole* that move between adjoining protected areas. A question mark hung over these wildlife populations as forest fragmentation continued.

As an initial step for the restoration program, the Nature Conservation Foundation, based in Mysore, established a nursery near Valparai in the Anamalai hills with support from local plantation companies. During the past eight years, more than 100 tree and liana species native to the mid-elevation tropical rainforests of this region have been raised from seed and nurtured in this nursery. After lobbying and gaining the support of plantation companies including Tea Estates India, Parry Agro and Tata Coffee, more than 15,000 seedlings were planted in eight degraded rainforest fragments.



**Inset left: A Brown palm civet on a wild fig tree in a rainforest in the Western Ghats.**  
**Main: The Lion-tailed macaque, a fruit-eating primate, is also endemic to this region.**  
**Inset right: A Great hornbill in flight over the rainforest canopy.**

Two-thirds of the seedlings have survived beyond two years. Coupled with natural regeneration, these protected sites are beginning to look more like rainforests. If this continues, one can visualise the re-emergence of the tall rainforest canopy with macaques, hornbills and Brown palm civets eating fruits, dispersing seeds and reviving natural cycles.

Later that night in Sengaltheri, we went radio-tracking K70 again. As darkness descended over the slopes, he emerged from the day-bed and moved swiftly through the high canopy towards a fruiting tree. If not for the radio-collar, we would have lost him in a minute. We



shadowed him to the tree but we could not see him despite receiving the signals from directly overhead.

The mewing call of a Large brown flying squirrel sounded from above and we sensed rather than saw its swooping glide from a high branch to land with a soft thud against a low tree trunk nearby. A glint of eyes in the undergrowth was a Mouse deer that offered a glimpse before melting away into the forest. The tree canopy almost closed the sky over our heads, and only a slight glimmering of starlight showed through; the moon was yet to rise. Oblivious to us, K70 moved briskly but silently away, a mere shadow in the darkness, into the rainforest of the night.