The starlight hunter

The grey fox evolved when deciduous forests covered North America – and, as **ALEXANDER BADYAEV** reveals, in the Sonoran Desert this arboreal canid still uses its ancient adaptations.

Photos by ALEXANDER V BADYAEV

In the last moments of a glorious winter sunset in the Sonoran Desert – the 'Magic Hour', as it's dubbed by locals in Southern Arizona – a gilded woodpecker calls persistently, announcing a rare find: an unoccupied cavity. Excavated in the spiny trunk of a giant saguaro cactus, towering 14m above the rim of a canyon and overlooking a sheer drop, the hole seems the safest place on Earth in which to roost. Usually, long battles are fought over such prized accommodation, and the bird does not quite settle in until total darkness, fearing eviction. This cavity, though, is vacant.

Shortly after midnight, under the faintly flickering stars of the desert night, a long, blue shadow – the size of a large house cat – trots along the cliff edge, jumping from boulder to boulder until it reaches the roots of the saguaro. It pauses for a moment, then effortlessly and silently scales the trunk of an adjacent ironwood tree, gripping with its forelegs and using its hind limbs to power the ascent, its proportionately enormous tail maintaining balance.

It pauses at the level of the junction between cactus arm and trunk, about 10m up; for a moment it listens to the sounds of the desert, then, in two quick leaps, delves into the cavity. A few seconds of muffled struggle ensue before it emerges with the unfortunate, still-flapping tenant and hops back to the ironwood tree, settling on the uppermost branch where, after a lengthy plucking session, dinner is served – with probably the best view of the Milky Way anywhere on the planet.

Strong, sharp claws give the grey fox purchase on smooth branches and tree trunks – but, though this canid climbs rapidly, it usually descends in a series of jumps or slowly backwards, like a cat.

Breeding pairs stay together for much of the year. The mating season is January–March, with the female producing a litter of four cubs on average.

PILGRIMS, GUNS AND FOXES

In the early 17th century, the Pilgrim Fathers wrote about a little fox that, on being spooked, had a habit of climbing the nearest tree, then staring down at the cause of alarm. It would also raid orchards to stuff itself with apples, as well as pilfering corn and grapes.

In addition to guns, against which the grey's escape strategy was entirely useless, the settlers brought with them the European red fox – a larger, more aggressive species, adept at living near humans. While settlers made a new sport of shooting grey foxes off their trees (by 1650 establishing a dedicated competition in New England), on the ground the proliferating red foxes offered fierce competition. In less than a century, grey foxes were extirpated from the region.

Subsequent dramatic urbanisation of the Eastern Seaboard and the disappearance of large tracts of old-growth deciduous forests meant that it was over 300 years before the grey fox began to reclaim its historical range in New England and the mid-Atlantic states, where it is still a rare species.

In late summer and autumn, as much as 70 per cent of the grey fox's diet comprises fruit and insects, so a collared peccary piglet was unlucky to end up as a meal for this individual.

My own view, watching the proceedings on my camera screen while perched on a cliff ledge some distance away, is by no means bad, either – though I am much more nervous about losing my balance in total darkness, high above the cactus-peppered desert floor. The cavity and my observation platform both lie within the territory of that now-sated grey fox – one of the world's most mysterious and unusual canids. It evolved at least five million years ago, when much of North America – including this desert – was blanketed with lush deciduous forests, making it the oldest and most anatomically distinct species of foxes, loaded with quite un-fox-like adaptations for life high in the canopy.

COMPOSITE ANATOMY

The grey fox's anatomy is notable for features seemingly borrowed from across various mammalian orders. Like primates, it has rotating wrists that enable it to grip the sides of trees to climb branchless trunks. Its long, curved claws and large, spreadable paws resemble those of cats – again, useful for gaining traction on essentially vertical surfaces. A huge, flattened tail, aiding balance during jumps, could have been stolen from a tree squirrel. It hauls itself up branches with short, powerful forearms that would not be out of place on a miniature badger. And all packaged in the otherwise standard form of a small, large-eared, big-eyed desert fox typical of both Old and New World arid lands.

Like other desert fox species, the grey's senses amaze, especially hearing: when my fox paused during its climb, it was probably listening for the heartbeat of the woodpecker sheltering in the saguaro cavity. In dark desert nights this creature confidently negotiates narrow, high tree branches in faint moonlight, though in total blackness it often loses its grip, especially during jumps. But when a grey fox does slip, it invariably catches itself and regains its lofty position in a remarkably primate-like fashion – clawing at the bark with widely spread digits and pulling itself up on a branch.

At first glance, the grey fox is a species most unlikely to need such acrobatic skills for high-canopy killings, not least because it is the most frugivorous of all North American canids. In early summer, when cactus flowers and fruits are abundant, these delicacies make up most of the fox's diet. Then, during the 'monsoon' months of July to early September, when the Sonoran Desert again becomes lush and green, its diet is augmented with plenty of migratory grasshoppers, crickets and large nocturnal moths ambushed around dusk-blooming flowers. And this usually nocturnal species becomes crepuscular.

Encountering a grey fox in the dusk, balancing on its hindlegs in a thicket of prickly-pear cacti, muzzle smeared with red fruit juice, it is hard to imagine this animal as the ferocious and efficient predator it will become in a couple of months. Then the fox will terrorise high-roosting birds, chase cottontail rabbits and pull them from their burrows, search for and destroy bird nests, and trail herds of collared peccaries in the hope of stealing newborn piglets. ▶

AFTER A LENGTHY PLUCKING SESSION, DINNER IS SERVED – WITH PROBABLY THE BEST VIEW OF THE MILKY WAY ANYWHERE ON THE PLANET.

THE EXPERT

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A pair of grey foxes inspect one of the 'skeleton trees' in their territory. The Asian raccoon dog is the only other canid to climb trees with such vigour, skill and frequency.

I had always assumed that the rabbit and mule deer fawn skeletons I spotted high in the canopy of ironwood trees were the work of Harris hawks or pumas, though I did wonder how such a large cat could negotiate the thin upper branches where the bones usually hang. To my surprise, infra-red video I filmed near one such 'skeleton tree' revealed it to be a social centre for a pair of local grey foxes that visit it nightly; they bring food, chase each other, nap, rearrange their macabre collection and generally make themselves at home. They are exceptionally strong, routinely dragging the remnants of coyote kills high into the canopy. These dried-out bones seem to be used mostly for marking spots and resting as, effectively, high-elevation fold-out beds.

PERILS OF PACK PREDATORS

There is a good reason why foxes go to so much trouble to carry their prey high into the canopy: they are not only preserving it from a variety of desert-floor marauders, but also protecting themselves from attack. Though their tree-climbing and high-level jumping abilities might suggest invincibility, the foxes are frequently killed by local coyotes and, occasionally, bobcats. A shocking 90 per cent of all grey fox mortalities in this desert are the work of coyotes, which routinely ambush the foxes, pin them to the ground and dispatch them with bites to their necks. Interestingly, the coyotes don't eat the foxes, but cache their carcasses – presumably killing to reduce predatory competition, much like dogs harassing cats.

With such assassins on the loose, a fox needs to know its territory like the back of its paw. Though each can cover more than 5km in one night, often trotting around in the dark for hours, a fox will rarely venture farther than a short sprint away from its favourite escape tree. When suitably large trees are available, a mother will prefer to whelp her cubs in a tree cavity. In the overwhelmingly subterranean world of foxes, the grey is a committed arboreal outlier.

A 'SKELETON TREE' IS A SOCIAL CENTRE WHERE FOXES BRING FOOD, NAP AND REARRANGE THEIR MACABRE COLLECTION.

There is, however, one time of the year when foxes eagerly risk extended journeys away from their established safe territories. During the mating season of late winter, males significantly expand their nightly ranges in search of receptive females. The journeys are often worthwhile: though foxes are socially monogamous, and pairs often share a common territory, almost every fourth cub – about one per typical brood of four – can result from extra-pair mating forays.

Returning to his territory after a night out, such a male is prone to take the most unfamiliar route home to avoid detection by and interactions with neighbours, and is often met by coyotes. The favourite strategy of a coyote pack in this situation is to form a line, preventing the fox from breaking through to the safety of rock outcrops and trees, then run their prey down on the desert floor. Out in the open, a fox's unusually short legs, perfect for climbing, are a handicap, and the chase will be over in minutes.

The grey fox is a multiple record-holder. Its giant fluffed tail – indispensable as a glider wing and parachute for long high-canopy jumps – contains the largest marking gland of any North American canid, in some males extending for more than half of the tail length and measuring up to 20cm long – nearly 10 times the size of the gland in a (much larger) coyote.

Grey foxes are champions of scent-marking, even among the marking-obsessed canids. The entire perimeter of my fox's desert territory, all travelling routes and, of course, the 'skeleton trees' themselves are thoroughly and clearly marked with scent, urine and surprisingly large piles of faeces. Both members of a pair typically contribute to such markings; there was a particularly big mound beneath that giant saguaro in which the gilded woodpecker spent his last night.

I live in a small adobe cabin in the foothills of a desert canyon. In late January, one particularly adventurous male decided to incorporate my lair into his nightly female-scouting itinerary. Elevated marking platforms are a great rarity in the desert, and my cabin's flat, low roof and wide windowsill must have been highly desirable – certainly, in a matter of days both had been methodically covered with markings.

Grey foxes snatch prey such as this gilded woodpecker from cavities in trees and cacti; they may also den in hollow trees.

The windowsill seemed to be particularly attractive – perhaps because the reflections in the window, lit from outside by a small porch light and the moon, conjured up a large displaying rival for my visiting male.

Working late for several nights on a grant proposal, I was mesmerised by the sight – on the other side of the glass – of this beautiful animal who would repeatedly jump on and off the windowsill, prowling back and forth while defiantly staring down his own reflection. No infra-red camera, no hide, no special equipment – just a comfortable chair, a desk with lamp and computer, and a gorgeous and rarely observed wild mammal only a couple of metres away. It was a surreal encounter, an extraordinary privilege, offering an intimate insight into the behaviour of one of the mostly poorly known North American species.

The proposal took forever to finish.

A few days later, realising that my remote cabin was not the place to find females, the male moved on. I haven't seen him since. But, every now and then, in the middle of the night, the mountain cliff above my cabin erupts with an explosion of quails fleeing their roosts in panicked flocks. And I know that the grey foxes are out there.

This male was keen on seeing off a 'rival' – his own reflection in Alex's window.

THE DESERT'S WEASEL

Despite the coyote's antagonism towards the grey fox, the latter isn't really much of a competitor. It typically takes a lot smaller and more agile prey, creeping up to its quarry rather than running it down, and readily switches to a diet of fruit, acorns and berries. Instead, the fox's habits of sneaking up on roosting birds and predating nests hint at a similarity to a very different predator.

Watching a grey fox nimbly negotiating dense tree canopies in single-minded pursuit of prey, I couldn't help but think of a weasel searching a hay barn for voles and mice. It seemed to me that, in the Sonoran Desert environment, the grey fox fills the same ecological niche as weasels – a genus of mammals that is not represented here.

Hence it was fascinating to come across studies from the 1950s in which researchers tried to bracket the most ecologically similar species within a large guild of local carnivores: coyotes, foxes, badgers, weasels, skunks and raccoons. The scientists systematically removed each species from the ecosystem, then recorded population changes in the remaining species. Grey foxes were most affected by the presence of weasels – when the latter were removed, the fox population exploded, and vice versa. No other species pair showed such a strong reciprocal interaction.

So the ghost of an efficient super-killer of northern latitudes is very much alive in the Sonoran Desert – a fascinating example of convergent evolution.

Beating a retreat: grey foxes scamper up trees to escape marauding coyotes.