

story and photos by Brad Collis



## wild things

The road to Camelot is a red track scratched across a sun-bleached palette of pinks, browns and occasional smudges of bleached green. For hour after hour, an endless canvas of fire-scarred scrub, swathes of yellow spinifex, and lonely, purple hills unroll from the shimmering horizon.

There's no sign of life, no sign that man has been here at all, except for the red road that stops finally at a crude wooden sign. It points further into the desert and to a most extraordinary outpost – Camelot.

Camelot is a bush camp on the edge of the Tanami Desert in central Australia where for 12 years two German biologists, Dr Birgit Döriges and Dr Jurgen Heucke, have been undertaking the first scientific study of wild camels. The nearest settlement, an Aboriginal community, is 100 km away and the nearest towns are Alice Springs, 300 km to the south-east, and Halls Creek, 1000 km north-west.

Thousands of years of domesticity in Africa and the Middle East has suppressed the dromedary's natural instincts and behaviour. Australia's camels, introduced last century for transport through the arid interior, were popular among inland explorers, but eventually were abandoned to the wilds after the arrival of steam trains and automobiles. Since then they have

reverted to their wild state, and have become the only naturally-living camel herds in the world.

An estimated 250 000 wild camels roam through the vast unpopulated and unfenced centre of the continent. Herd sizes can double in size every seven to 10 years, so it is time to discover how the camel lives and whether it poses an environmental hazard.

Döriges and Heucke are graduates of the University of Braunschweig in northern Germany. Heucke did his masters degree on frogs and Döriges' specialty was water insects. In the 1980s they undertook ecological studies in an arid area of southern France before Heucke went to East Africa to study zebras.

Camels, however, had long been an abiding interest and in 1984 the couple came to Australia to assess the feasibility of a major study. In 1986 they visited Newhaven cattle station, the western-most pastoral lease before the Tanami Desert where camels roam freely. The following year, lease-holder Alex Coppock set aside a 200 square kilometre research paddock on the vast 2600 km<sup>2</sup> cattle run and Camelot was founded.

The research at Camelot aims to add to the general bank of scientific knowledge, to help the Australian environment, and to offer an alternative enterprise for past-

oralists. It is divided into four key projects: a physiological study, a behavioural study, a co-grazing study to see how well camels and cattle cohabit pastoral land, and an environmental impact study.

A major part of the physiological research involves measuring and understanding the rapid changes in a camel's body temperature, one of the key mechanisms that allow it to preserve body moisture even on the hottest days.

'We've found that camel body temperature fluctuates considerably,' Döriges says. 'Mean body temperature is 36-38°C, with a 1°C fluctuation under normal conditions. But under severe dehydration the body temperature falls and rises dramatically. At night it will fall to 35°C, then as the day heats the body temperature also rises, but the animal won't start sweating until its temperature reaches 41°C.'

'That's a huge change for an animal weighing 500-600 kilograms, but it means it is conserving 20-25 litres of water a day that it would otherwise lose to sweat.'

Döriges says a camel can lose about 30% of its bodyweight through dehydration, so a 600 kg camel could lose up to 200 kg of body fluid if there is no water available for a long period of time in the hot season.

'A human, by contrast, need only lose less than 10% of his or her body weight in



Above: Camels fitted with radio collars. There are four species of cameleids (soft-footed animals): the dromedary (one-hump camel), the bactrian (two-hump camel), the vicunja and the guanaco. Birgit Döriges says the dromedary are different from all other ungulates (hoofed animals). 'Their wild ancestors are extinct and the only other dromedaries in Africa are domesticated, so here is the only place to study them in their natural state.'

Left: The Camelot campsite is dominated by an old furniture van which provides dust-free and snake-free living quarters. A caravan serves as an office/laboratory and a shipping container is the bedroom when it rains . . . which is rare. Outside, Birgit Döriges and Jurgen Heucke have established a permanent water hole and they nightly watch the desert birds and animals drink at sunset. 'It's our television,' they say. 'And it's never boring.'



Below: Birgit Döriges checks the weather station at Camelot. Measurements of wind, rain and solar radiation are important for the body temperature research.

Below middle: The bathroom at Camelot.

Bottom: Grazier Alex Coppock with Döriges and Heucke, examining camel body temperature data. The biologists plan to continue their research at Camelot until at least 2001.



moisture to die,' she says. 'This is because we humans use water from the blood to transpire and cool. A camel's moisture for transpiration comes mostly from other body fluids and less from its blood.'

Data for the body temperature study comes from thermo transmitters and data loggers implanted into the abdominal cavity of 16 camels. The loggers monitor and store the animal's body temperature hourly and are kept in place for a year. The thermo transmitters are used to monitor body temperature at any time. Camels with these implants also wear radio-tracking collars.

The social behaviour of camels is also adapted to surviving in a hot, dry climate. Except for the rutting season when males are competing for females, camels form a distinctly supportive community.

'Apart from very old bulls or females before they calve, you never see a camel alone,' Döriges says. 'They spend most of the time in distinct groups, usually one male with five or six females and their young.'

'When there are new-born camels, mothers take turns to look after all the young while the other adults feed. It's like a camel kindergarten.'

Bulls that miss out on securing a 'harem' form 'bachelor' groups until the next year when they try again to acquire females. Outside the rutting season – May to September – the females also form their own groups which are sometimes joined by weaker or younger bulls.

The biologists have also been studying the camels' migration patterns, basic behaviour and diet, and have built up a substantial knowledge base for pastoralists and other land managers.

Heucke says grazing too many camels could damage the land. 'People said rabbits weren't a problem when they were first introduced, but when their numbers grew they became an environmental disaster,' he says.

'We have overstocked parts of our research area to demonstrate that even camels can eat the vegetation beyond a sustainable rate if their numbers are not controlled. We need to determine optimum populations for the pastoral industry and for the natural environment.'

Twenty-eight cattle stations belong to the Central Australian Camel Industry Association and seven have established domesticated herds. The rest are still culling wild camels.

The association is developing markets for camel meat and hide, and the rehydrating qualities of oil from the hump has attracted strong interest from the cosmetics industry.

Association chairman, Peter Seidel, says initial results from Döriges and Heucke's co-grazing research indicates camels have a promising future as a source of livestock diversification for cattle producers.

'Because camels don't compete for the same fodder (cattle graze grass and camels browse top feed) it's possible to increase



Above: The main bedroom at Camelot consists of on an old brass bed supplied by Newhaven's bemused owner, Alex Coppock. The bed sits incongruously on the red earth inside a flimsy wire enclosure to keep out dingoes. After 12 years the biologists are an established presence and have been 'adopted' by the dingo pack that now dwells in the area. Top right: Wild camels browsing at Camelot. Right: Camelot's fence is the first in 1200 km for camels migrating from the west. Empty drink cans make it more visible. Camels unused to fences previously snared themselves.



stocking densities by adding camels to an enterprise,' Seidel says.

'Far from being detrimental to the environment, this promotes even grazing of all flora and promotes a more even regrowth of all species. Cattle grazing alone can cause serious woody-weed problems.'

It's even possible that in the more arid, marginal areas, camels might one day be the main form of livestock production. Seidel says camels are eminently more suited to these areas than cattle because they have adapted to the harsh climate with minimal impact on native flora and fauna.

He says the outlook for camel production is bright, especially as an export commodity to North Africa, the Middle East and some Mediterranean countries where camel milk and meat are traditional foods. In Australia the National Heart Foundation has put

camel meat on its 'highly recommended' list. Heucke says the meat is tasty and healthy, but suspects the industry will need a sustained marketing campaign to convince Australian consumers.

Dörge and Heucke have spent \$60 000 of their own money on the camel project. Day-to-day running costs now being met by the Australian Research Council through the University of Queensland, the Rural Industry Research and Development Corporation and NT Department of Primary Industries. Support is also given by the Parks and Wildlife Commission of the Northern Territory.

The researchers are convinced camels are the ideal livestock for central Australia and hope their research will one day enable both a commercial and an environmental transition for the pastoral industry.

## A B S T R A C T

The first scientific study of wild camels is being conducted in a 200-square-kilometre paddock on the eastern edge of the Tanami Desert. Australia has the only wild camel populations in the world. Thermo transmitters and data loggers implanted into the abdominal cavity of 16 camels have revealed high fluctuations in body temperatures – a mechanism that enables water conservation. The study has also gathered information on camel behaviour and grazing impacts for pastoralists and other land managers. Co-grazing research indicates camels are a promising source of livestock diversification for cattle producers in arid areas.

**Keywords:** Camels; feral animals; animal tracking; wildlife surveys; animal physiology; animal behaviour; body temperature.