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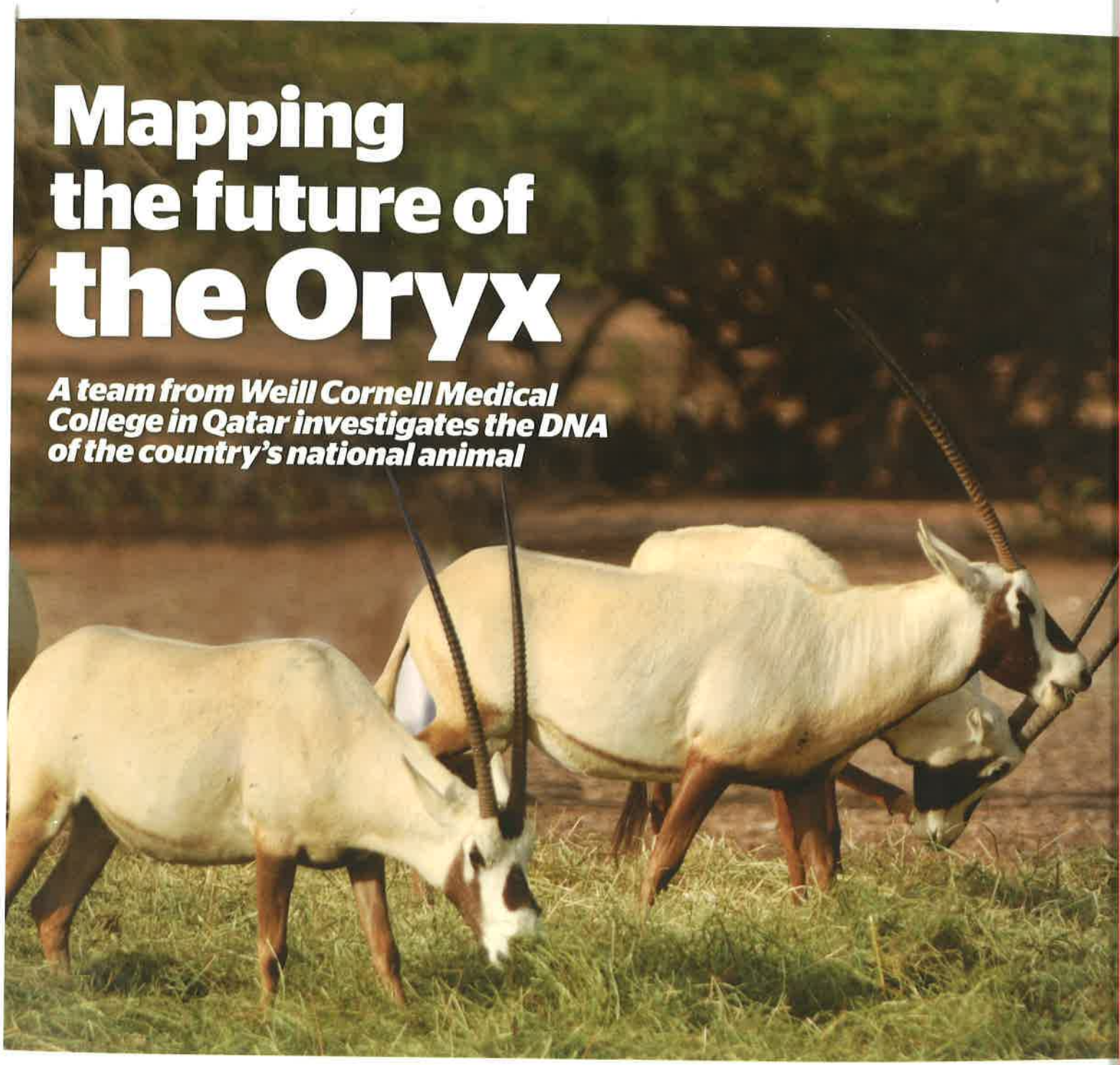

Mapping the future of the Oryx

A team from Weill Cornell Medical College in Qatar investigates the DNA of the country's national animal

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Mess of a mega-city

Journalism students from NU-Q traveled to Brazil to film a fascinating documentary about the plight of garbage collectors in Rio de Janeiro

Researching reptiles

A Qatar Foundation team uncovers the secrets of the country's desert-dwelling dhub lizards by embarking on a detailed study into their behavior and distribution

A helping hand

Reach Out To Asia volunteers give up their time as well as their expertise to transform the homes of two underprivileged families in Qatar's capital

LEARNING FROM THE LIZARDS

Qatar's desert-dwelling dhub lizards are the focus for Qatar Foundation research which seeks to uncover these reptiles' behavioral secrets

IT'S EARLY MORNING IN MID-SUMMER as a group of off-road vehicles gather on the edge of a desert outcrop at Ras Laffan, north east of Doha, Qatar. The drivers aren't about to embark on some mysterious off-road rally, they are actually going to help in a scientific research project.

Qatar's desert is possibly one of the most inhospitable terrains on earth and yet the spiny-tailed agama (*Uromastyx aegyptia microlepis*), commonly known by its Arabic name of the dhub lizard makes its home here. These cold-blooded animals, specially adapted for desert living, have survived in colonies for many years and yet very little is known about them.

Now, Aurora Castilla, Senior Research Scientist at Qatar Environment and Energy Research Institute (QEERI), in collaboration with experts and scientists from other institutions in Qatar and internationally, is looking to change that situation. To do this, she has embarked on a detailed study which should uncover some of the lizards' behavioral secrets.

"When and where do the females lay their eggs? We just don't know," she said. "We know nothing about their reproductive biology."

Despite the dhub being relatively widespread throughout the country very little has been recorded regarding its distribution and behavior. Many are unfortunately killed on roads or lose their habitat as human development encroaches into the desert, although measures are now being taken to reduce that number.

The Ras Laffan team and the lizard that they excavated.

Castilla is so concerned that scientific information is being lost along with the dhubs that she and the other researchers have embarked on a social-awareness campaign. They are also collecting recently deceased lizards.

Castilla and her research team from Qatar and the Spanish National Research Council (Consejo Superior de Investigaciones Científicas – CSIC) know that lizard species communicate through the use of pheromones. What they don't know is how these chemical messengers are used, and this is what the study is seeking to discover.

The field work is as tough as the dhubs themselves and it's getting dusty as the vehicles set out, lined up in regimental fashion, to survey the ground and hopefully sight some lizards. "Look out for the metal posts" said Castilla. She previously visited the area with those responsible for Ras Laffan Environment and Security (Jackie Wessels, Ahmed Chikhi, Rizwan Dadon, and Nadeem) and their team. They have already marked the burrows, hammering in the posts and topping them with red and white tape. This helps to identify the places lizards are likely to be seen, although it's not yet known the extent of an individual dhub's territory.

"Dhubs are very quick. We need to surround the lizard slowly and then try to catch it before it disappears underground

During daylight hours, the lizards are likely to be spotted basking in the sunshine, or nestled in the vegetation they eat, close to the entrance of their burrows. One of the volunteers, Jan Fischer, is responsible for recording the site of each burrow with sensitive GPS tagging equipment. He also takes photographs of the animals and their habitat.

It isn't long before a call comes through – one team has spotted a small dhub above ground. The line of vehicles closes into a horseshoe shape before halting and those on board spread out to hopefully catch the lizard. From a distance of 20 meters it's difficult to see the animal, such is the quality of the its camouflage.

"Dhubs are very quick, we need to surround the lizard slowly and then try to catch it before it disappears underground", Castilla said.

She's correct, it's fast, sliding back into its hole before the team gets within 15 meters. Another call and Simon Jones and Upul Bandara, who both work at Qatar Foundation and have volunteered their spare time to help with the research, have seen a dhub. This time it's basking further away from its burrow. A mad dash and a lucky grab and the lizard is caught.

When dhubs are captured, Castilla swings into action. Time is of the essence in taking a fat sample from inside the femoral gland of the lizard, then photographing, measuring, weighing, and releasing it.

The dhub is a female. Castilla knows the femoral glands of the female lizards are significantly smaller than in the males. To extract the oil sample is sometimes difficult or impossible, particularly in a young female. She works deftly to bottle the sample, placing it into an electric cooler immediately to preserve the chemical compounds present.

On return to the laboratory, the samples will be frozen until they can be transported to Spain for analysis. Dr Jose Martin, a member of the research team, will use the CSIC spectrophotometer to determine the concentration of each different chemical in each sample.

At 40°C the lizards show an intense yellow color

Digging work is halted for Aurora Castilla, Senior Researcher at QEERI, to map the burrow.

The juvenile females are most difficult to extract the fat samples needed for femoral profi

"You cannot age a dhub by its coloring because color shown is related to body temperature. At high body temperatures (eg 40C) they show an intense yellow color. This provides camouflage to match the soil surrounding," Castilla said. The males appear to be darker around the neck than females but both sexes can range in color from pale yellow to brown-gray or black on different parts of their bodies. "Each individual probably has a unique scale pattern – but that's a whole different study," she said.

The young female lizard is released but doesn't move. By staying still and acting impassively, she is hoping to deflect the attention of her perceived predators. This is a typical behavior of other reptiles, too.

"They aren't all like this – some of the males are very aggressive," Castilla said as she showed off some of the scratches she has picked up on her hands and wrists recently. The lizards have long claws and strong front legs for digging in the coarse desert sand.

As the dust swirls, two more dhubs are spotted. One runs but is caught under a corrugated sheet and the other heads into its burrow. The site is to be excavated the following day to construct a new security fence, so Castilla takes the decision to dig the lizard out and also learn about the size and pattern of the burrow.

After measuring the entrance depth and width, the command is given to dig and a team sets to work with a pickaxe and shovel. It's a delicate operation to collect the necessary information about the burrow and avoid injuring the dhub inside.

"One burrow here was nearly a meter in depth," Castilla said, as the hot and dusty labors progress. She keeps halting the work to sketch the direction the burrow takes as it forks out in a complex labyrinth.

Luckily the diggers follow the correct branch and find the lizard, tail up. "Now we need to stop," she said. "The dhubs are very strong, if you try to pull them out they just dig in and hang on with their front legs. We need to dig around it to lift it out." Slowly and carefully, the lizard is eased out – the first male of the day.

30
lizards needed to conduct the research

To conduct the research, a sample of 30 adults is needed – 15 males and 15 females – for gender comparison. "It's important that we have a suitable sample size and that we don't take too long collecting it," Castilla says. "If the field work takes too many months the results may be biased due to seasonal variation in the chemical compounds. The animals should also be of about the same body size since we can expect some age differences in the type of secretions produced. It's tough research to do!"

In addition, the samples should ideally be collected from dhubs of the same study area, since diet composition, microclimatic conditions, and many other factors may also affect the results. However, because capturing them is so tricky, the research team has asked the help of experts at the Ministry of the Environment in Qatar, and Mr Mohammed Al Jaidah and his team have also been helping with the field work collecting the secretions of lizards in the Al Wakra district and other zones in NW Qatar.

In Ras Laffan, as the wind blows and the sand whips around the vehicles, the study is concluded for the day. Visibility is poor, and the dhubs, evolved to respond to desert conditions, are heading underground for shelter. They aren't going to reveal any more of their secrets today.

Aurora Castilla, Senior Research Scientist at QEERI, measures a dhub lizard burrow.

FACTFILE

- The dhub is the second biggest lizard in Qatar. The largest is the monitor lizard.
- Adults are mainly herbivorous but can be insectivorous and scavengers when necessary.
- There's no current data regarding Dhub longevity.
- Activity of dhub lizards depends on environmenta temperature.
- Most scientific studies about dhubs have been conducted outside Qatar.