New guano mining guidelines drafted

Alison Gillespie

Because bat guano makes a rich fertilizer that is prized by farmers, quiet caves with unique and fragile ecosystems often become targets for those willing to wield shovels in the pursuit of quick cash. Biologists have observed that the bright lights and loud equipment used in guano excavation can cause residing bats to drop their pups or even abandon the cave altogether. Now, a team of conservation biologists has drafted a set of working guidelines that they hope could eventually be used to improve the sustainability of guano mining in many locations by reducing its negative impacts.

Officials estimate that millions of bats have been lost worldwide as a result of guano mining, although accurate data are lacking. "We're receiving many reports of declines in cave bat populations", says Nina Ingle (Davao City, Philippines), who has worked as a bat biologist for 20 years. "There's an urgent need for further research on their status as well as for cost-effective methods to monitor bats and the impacts of guano harvesting."

R Richards

Guardhouse at the entrance to a Cambodian bat cave.

That need was also recognized by several environmental organizations, which collaborated to sponsor the Emerging Wildlife Conservation Leaders Bat Group (EWCLBG), a team that was formed to examine guano mining issues. Some members of the EWCLBG accompanied Cambodian researchers in the field as they tested methods for improving sustainability during the guano harvest at several locations last year, and in January a working draft of mining guidelines was released to the public.

According to Ryan Richards, a member of the EWCLBG and a fellow at the Smithsonian Institution (Washington, DC), the challenges associated with guano mining can vary widely from region to region. In some areas, the miners are well-known, well-organized, and deeply protective of their caves – at one site in Cambodia, for example, a local man had built a guardhouse at the entrance to a cave to defend his interests; this made it easy to know whom to talk to about the needs of the bats. At other locations, however, the identity of the miners is unknown. "It's very context dependent", Richards explains.

In addition to the guidelines, a series of informative posters about the topic of bats and mining was developed for use in a wide variety of communities. Such initiatives are just the beginning, however; as David Waldien (Bat Conservation International, Austin, TX) cautions, "This is a process that's going to take years". ■

Dung beetles navigate by the galaxy

Adrian Burton

Researchers report that African dung beetles (*Scarabaeus satyrus*) use the Milky Way to help them speedily steer their hard-won manure balls out of competitors' reach (*Curr Biol* 2013; doi:10.1016/j.cub.2012.12.034). This is the first evidence of such a navigation system being used by any animal.

Dung beetles eat – and lay their eggs in – other animals' droppings, and competition around the nighttime manure pile can be fierce. "Rolling a ball in a straight path away from the pile makes for the shortest journey time to a safe mating area", explains Eric Warrant (Lund University, Lund, Sweden). "During the day, these animals orient themselves by using cues like the Sun, and at night we know they can use the Moon. But they can also roll a ball straight when there is no visible Moon; so we asked whether they were using the starry sky."

M Byrne

Starstruck beetles navigate using the Milky Way.

On a star-filled, moonless South African night, the researchers placed beetles with dung balls in a circular arena, and measured the tracks they followed as they tried to steer their prizes to the arena's edge 120 cm away. Those prevented from seeing the heavens by a cardboard cap placed over their dorsal eyes made tracks twice as long as those wearing no caps (477 ± 75 cm versus 208 ± 33 cm).

In a second, larger arena with a 1-m-high wall designed to ensure the beetles could see no land cues (eg treetops), the researchers timed how long they took to roll their balls to the edge. Those wearing the caps took significantly longer (124 ± 30 s versus 40 ± 15 s), their lines of progression much more meandering.

The night sky was therefore providing orientation information, but what feature(s) was/were responsible? In planetarium experiments, the researchers showed the beetles to take the same time to leave the arena whether the full sky or just the strip of the Milky Way was projected. "In a nutshell, they use the line of light provided by the galaxy as their guide", explains Warrant.

Julián Santiago-Moreno (National Institute of Agricultural Research, Madrid, Spain) commented: "There must be some mightily confused beetles on overcast nights!" ■