

Investigating ecological responses to changing environments, and implications for management in Guanacaste, Costa Rica

Aim:

To use indicator species to increase understanding of the wider ecological effects of environmental change on Costa Rican ecosystems, in order to inform future management practices.

The effects of different habitat types on dung beetle (Coleoptera: Scarabaeidae) biodiversity.

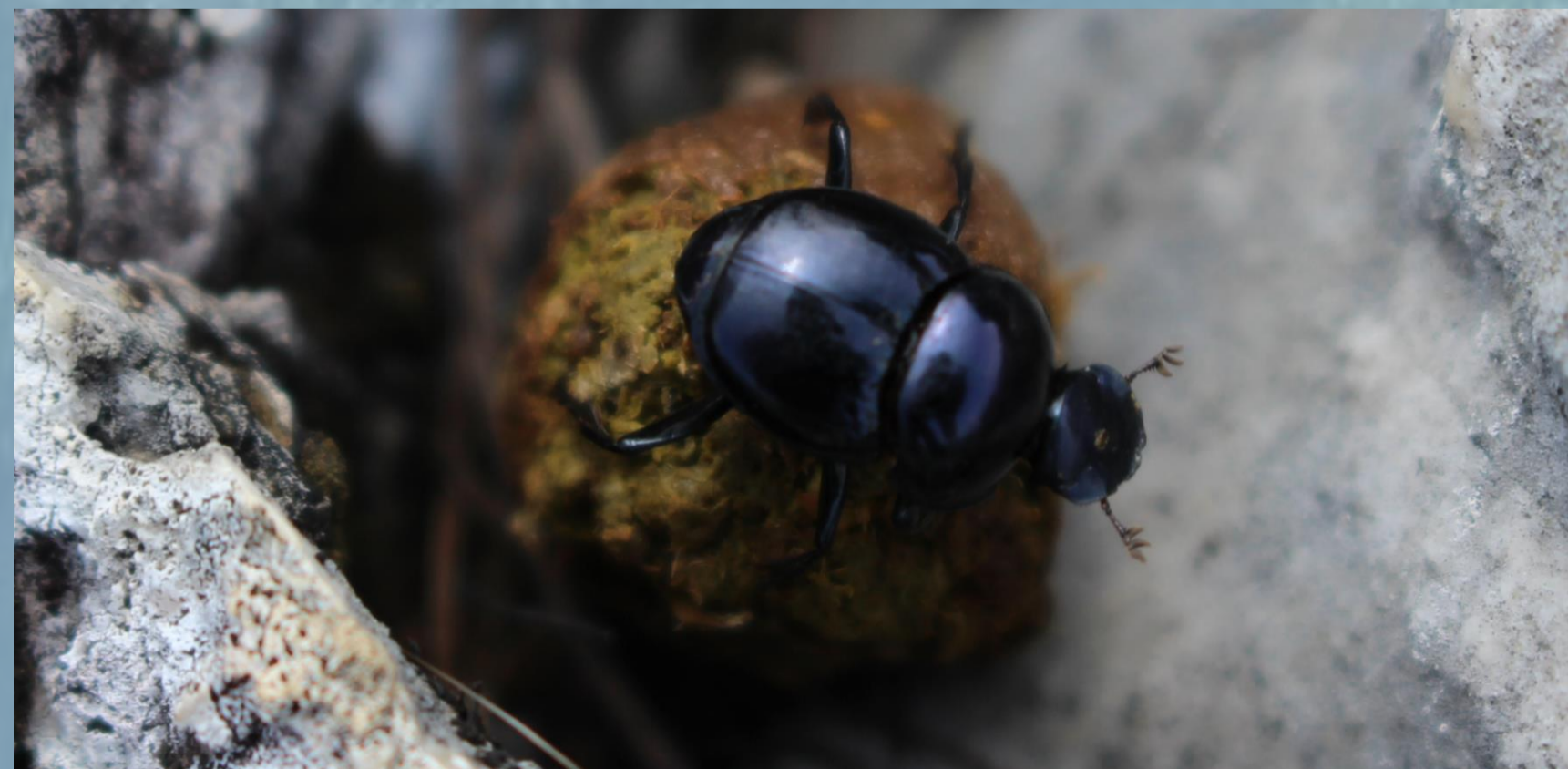
Lead researcher: Yannick Thompson
Supervisor: Dr Darren Evans

In the last 20 years Costa Rica has invested much into restoring its landscapes ravaged by an intensification of agricultural practices and livestock farming in the 1960s (Powers 2004).

Recent research has shown that dung beetles play an important role in the restoration and maintenance of tropical forests as secondary seed dispersers. In effect, adult scarabaeinae relocate dung and often bury it beneath the soil surface. This behavior increases soil fertilization (Mittal, 1993), nutrient cycling (Nealis, 1977) and seed dispersal. Although secondary dispersion is less studied, evidence shows that it plays an important role in habitat maintenance and regeneration (Levey & Byrne 1993).

Methodology

- 2 x 300m transects in 3 habitats (mango grove, secondary forest and meadow)
- 10 baited pitfall traps per transect (traps baited with horse dung)
- Specimens identified to species or genus level
- Canopy cover, ground vegetation cover and meteorological data also recorded



Factors affecting chronic stress in the American crocodile (Crocodylus acutus)

Lead researcher: Max Henderson
Supervisor: Dr Richard Bevan

American crocodiles play an integral role as an apex predator, indicator for ecological change, and sentinel species for anthropogenic influence. Recent evidence suggests that the population is under threat due to factors such as regional warming and sex ratio imbalance (Murray et al. 2016). Few studies have been published surrounding physiological effects of crocodile aestivation, and thus potential warming effects are yet unknown (Christian et al. 1996). Chronic stress may also influence behaviours such as dispersal, territoriality, and attacks on humans, meaning that research is vital for efficient management of the population. Heterophil:Lymphocyte ratios are commonly used as a metric for chronic stress in reptiles.

Methodology

- A sample of 58 crocodiles were captured by hand, snare pole, or top-jaw rope (depending on size), during terrestrial and aquatic night surveys
- 1ml blood samples were taken via spinal venous sinus.
- Sex (by cloacal examination of the genitalia) and standard morphometrics including weight were recorded where possible prior to release
- Using microscopic analysis of stained blood smears, leukocyte profiles could be established for each individual



chytrid fungus prevalence between species in differing neotropical habitat types

Lead researcher: Alexander Liddington
Supervisor: Dr Marion Pfeiffer

Chytrid fungus, Batrachochytridium dendrobatidis, is a fungal disease that is destroying global amphibian populations. None more so than those of Costa Rica. The most high-profile extinction of all amphibians occurred here, the golden toad Incilius peringles, thought to have come about at the mercy of chytrid fungus. Little is known about the spread of the fungus and what causes it to occur, seemingly inert in some species, but completely wipe out others. Palo Verde, containing a vast array of habitats was the ideal location to test out why and how this disease affects certain frog species.

The aim is to discover the drivers into how this fungus affects different species, and different populations within a species.

Methodology

- Frogs were swabbed *in situ* in different habitats, from sun baked seasonal wetlands to cool water holes.
- Using laboratory analysis techniques, each sample can then be tested for the fungus

