APNR Ground-Hornbill Project

April Quarterly Report 2023

Nest checks

The breeding season began with fifteen southern ground-hornbill groups attempting to breed. Camera traps were set up at each nest site (fig.1), to record provisioning rates, and iButtons (temperature loggers) were installed in each nest to record hourly nest temperatures. These data will be important to determine the effects of high nest temperatures versus provisioning rates on chick growth throughout the season.

The harvesting of redundant second-hatched chicks that would otherwise perish from dehydration in the nest, was successful. We were able to remove four newly hatched chicks and transport them to the rearing facility, run by the Mabula Ground Hornbill Project. All four chicks survived and fledged and will form part of the reintroduction programme, where they will be released back into areas where the species historically occurred, but no longer do.

Through the use of camera traps, we were able to identify new groups, made up of young dispersal birds, through the use of unique rings that were placed on the legs of birds as chicks. We also recorded nest abandonments in two cases, which we believe may be due to female inexperience.

The breeding season ended with 9 chicks fledging from nests in the study area (fig.2). Additionally, we made an exciting discovery in a nearby reserve where we found a new natural nest. This is only the third natural ground-hornbill nest we have found in the past six years in the area, so it was a great moment. With the help of information from residents and management regarding the birds' frequent whereabouts on the reserve, we were able to locate the nest. Subsequently, we learned that the chick successfully fledged and has been seen with its parents. The area experienced heavy rains at the end of the season, which made traversing the area very difficult. However, the rain was very welcome after a very dry start to the summer.



Fig 1. Setting up camera traps. Fig 2. Moment of fledging, caught on camera trap.

Chick growth and physiology

The nine chicks were successfully weighed and measured a total of six times during their nestling period (90 days). These data will be important in creating the first wild growth curve (fig.3) for the species, as well as identifying important environmental factors that play a role in their growth.

Blood was drawn from chicks at two stages (early and late in nestling period) to investigate the physiological effects of high temperatures. This is measured through telomere analyses since telomere dynamics are widely accepted as a robust indicator of physiological stress.

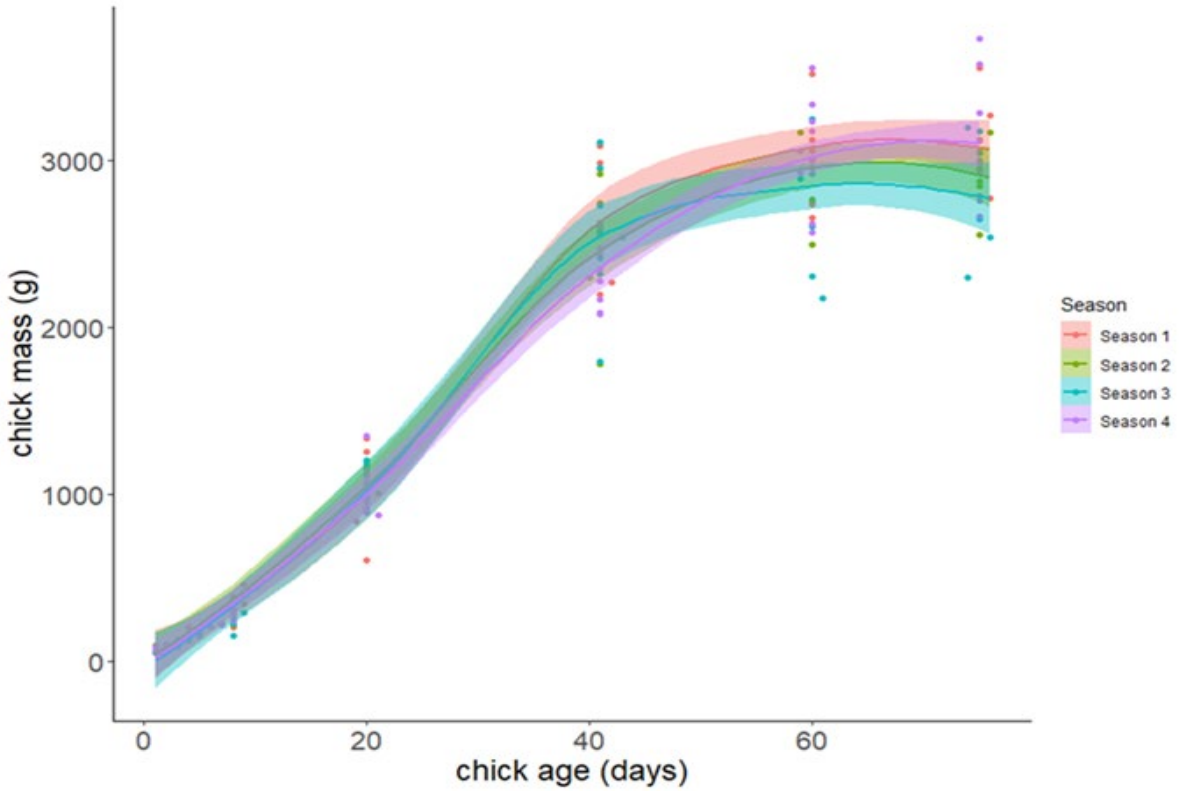

Fig 3. Growth curve modelled, showing the variation between seasons.

Citizen Science

Contributions from citizen scientists allowed us to gather more information on the behavioural responses of adult ground hornbills to high temperatures. We established several WhatsApp groups and received more than 1000 photographs and videos of the birds from guides, tourists, and locals from the study site. However, most of the contributions (80%) were from an established WhatsApp group in Kruger National Park called "The Latest Sightings". This group allows visitors to the park to share their wildlife sightings with photos, location, date, and time. Thanks to their contributions we will have a robust data set to work with and analyse, which will contribute to the understanding of ground-hornbill heat dissipation and heat avoidance behaviours.

Environmental temperatures and landscape survey

In January we installed black bulbs to measure operative temperatures, which will be used to describe the environmental temperatures experienced by ground-hornbills. The bulbs are copper spheres, painted black, with iButtons suspended in the centre. They are the size of a ground-hornbill thorax (or chest) and are designed to mimic the heat load on the birds, which considers solar and ground radiation as well as convective heat loss and gain. These were placed in microsites typically used by ground-hornbills (e.g., Ground sun, ground shade, tree sun and tree shade) and will be repeated in winter (July) to assess the differences in the landscape temperatures between the two seasons.

We also conducted a landscape survey to assess the availability of shade. This is important as we have found that the birds are heat dissipating at lower temperatures in winter than in summer, and we hypothesise that this may be because there is less shade available in winter; therefore, the landscape feels hotter for the birds, despite lower air temperatures.

Fig 4. Black bulbs installed in full sun close to the ground (left) and in the shade in a tree (right).

Communication

We published two popular articles in the Klaserie Chronicle magazine.

Research papers from Dr. Kyle-Mark Middleton's Ph.D. are currently being written.
I have begun the analysis and writing up of a paper on the implications of year-round warming for ground-hornbills.

We conducted four talks this season: to local conservation NGOs, APNR reserve management, and the FitzPatrick Institute of African Ornithology.

A South African film company joined us in the field to document our research and conservation activities. This will be aired later in the year, reaching an international audience.

Team updates

Kyle-Mark Middleton has now officially obtained the title of Dr, as he graduated from the University of Cape Town in March.

Dr. Cunningham, my Ph.D. supervisor, became the new director of the FitzPatrick Institute.
We welcomed new team members, Mpho and Phomelelo, who are both interns at the Kruger 2 Canyons Biosphere Region. They are assisting me with data capture from camera trap videos. Mpho and Phomelelo's participation in the APNR ground-hornbill project will provide them with valuable experience in data capture and analysis, as well as exposure to research methods. This opportunity will not only benefit their personal and professional growth but also promote cross-collaboration between our project and the Kruger 2 Canyons Biosphere Region, fostering a culture of shared learning and innovation.