HM333: Integrating Sampling Methodologies to Investigate Large Mammal Community Composition in Cusuco National Park

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Scientists and Volunteers from Operation Wallacea have been collecting data on large mammal distribution and abundance in Cusuco National Park since 2004.

Large mammals are notoriously difficult to observe in the wild; and in instances where encounters with target species are rare, it is important to be able to record their presence using other methods, either remote or indirect. Several methods exist for monitoring large mammal populations that negate the requirement of directly observing the target species (Long and Mackay 2008).

Until now, data on large mammals in Cusuco National Park have been collected through the use of transect surveys, with all encounters with spoor (such as tracks, evidence of foraging and faeces) being recorded as an encounter, where the species in question can be positively identified. This method has proven to be extremely useful in providing a standardised method of recording the distribution and relative abundance of large mammal species across the Park.

It must be noted that different survey methods display differential rates of success depending upon the species involved (Gompper *et al*. 2006).

In 2011 a camera trap programme was piloted to investigate the efficacy of using camera traps for the large mammal biodiversity monitoring programme in tandem with transect surveys. Camera traps have proven to be extremely effective in recording rare and illusive rainforest species (Tobler *et al.* 2008) and can reveal aspects of community composition that would otherwise go unrecorded. With sufficient coverage, camera traps may be used to accurately estimate population numbers of certain target species using Capture Mark Recapture principles (Silver *et al*. 2004).

The use of hair traps in large mammal monitoring has become increasingly common in recent years (Long and Mackay 2008). Generating reliable population estimates from hair trapping remains a contentious issue due to the high probability of heterogenous sampling effort (Ebert *et al*. 2010), but hair trapping remains a viable option for the identification of species.

In Cusuco National Park in 2012, the large mammal team will trial the use of all three monitoring techniques. This will enable a more detailed look at the composition of large mammal communities in different regions of the Park, will allow for a more thorough method of recording all of the species of large mammal in the Park, and will allow a detailed comparison of the relative efficacy of different monitoring techniques.

Methods

Study Site

Students choosing this dissertation topic will be working across several camps in Cusuco National Park. Cusuco National Park (PNC) was established 1959 and is a part of the Meso-American Biodiversity Hotspot (Conservation International 2006). Operation Wallacea have been working in PNC since 2004, and this work has highlighted the importance of the Park as a refuge for endangered species in a range of taxa.

Cusuco is a very important stronghold for Baird's tapir and is also home to many other species of large mammal, all of which are at risk from rapidly increasing encroachment on the Park and by illegal hunting, which threatens to extirpate Baird's tapir from the Park entirely.

Students will work with experienced scientists and local guides in tracking large mammals along transects at each camp, and in setting up camera traps and hair traps in a grid including more remote areas of the park.

Data collection

Evidence of large mammal spoor will be recorded by walking transects in the morning and afternoon. The GPS location of all spoor encounters will be recorded and mapped onto detailed GIS of the Park. Students will be instructed in the identification and ageing of spoor, and in the collection of opportunistically-encountered genetic samples such as faeces or shed hair.

Hair and camera traps will be positioned at the start of the season. Traps will be checked only once during the season, to minimise human disturbance in those areas, and will be collected at the end of the season.

Species will be identified from camera trap photographs with the aid of a reference guide (Emmons 1997). Hair samples will be identified using a light microscope where possible, though a more detailed analysis may be required in an institutional laboratory.

Students will be instructed in the extraction and amplification of DNA from hair and faecal samples in order to identify species and individuals (Foran *et al*. 1997).

References

Ebert, C., Huckschlag, D., Schulz, H. K., and Hohmann, U., 2010. Can hair traps sample wild boar (*Sus scrofa*) randomly for the purpose of non-invasive population estimation? European Journal of Wildlife Research 56 (4): 583 – 590

Emmons, L. H., 1997. Neotropical rainforest mammals: a field guide. University of Chicago Press

Foran, D. R., Crooks, K. R., and Minta, S. C., 1997. Species identification from scat: an unambiguous genetic method. Wildlife Society Bulletin 25 (4) 835 - 839

Gompper, M. E., Kays, R. W., Ray, J. C., et al. 2006. A comparison of non-invasive techniques to survey carnivore communities in Northeastern North America. Wildlife Society Bulletin 34 (4): 1142 - 1151

Long, R. A., and Mackay, P., 2008. Noninvasive survey methods for carnivores. Island Press

Silver, S. C., Ostro, L. E. T., Marsh, L. K., Maffei, L. 2004. The use of camera traps for estimating jaguar *Panthera onca* abundance and density using capture/recapture analysis. Oryx 38 (2): 148 - 154

Tobler, M. W., Carillo-Percastegui, S. E., Leite Pitman, R., Mares, R., Powell, G., 2008. An evaluation of camera traps for inventorying large- and medium-sized terrestrial rainforest mammals. Animal Conservation 11 (3): 169 - 178