Ecology and conservation of spotted hyena (Crocuta crocuta Erxleben 1777)in human dominated landscapes in Northern Ethiopia

Yirga Abay, G.

Curriculum vitae

Gidey Yirga was born on the 24th of May 1983 in Tigray, Ethiopia. He studied Biology in 2001 at Mekelle University in Mekelle, Ethiopia. After graduating with a Bachelor of Science degree in Biology in 2005, he was recruited at Mekelle University as a Graduate Assistant. In 2006, he was admitted to graduate school at Mekelle University and studied and graduated with a master degree in dry land agronomy in 2008.

During his master's study, he participated in a CSS-Rodent Project that investigated rodent ecology in the highlands of northern Ethiopia. His master's research studied rodent abundance and diversity in the highlands of northern Ethiopia.

Since 2009, he has conducted field research on hyenas in human-dominated landscapes in northern Ethiopia along with Dr. Hans Bauer, who is his local supervisor. Prof. Dr. H. Leirs, Prof. Dr. ir. H.H. de Iongh and Prof. Dr. G.R. de Snoo are his promoters and his research has led to this thesis.

Yirga currently works as Associate Professor at the Mekelle University department of Biology in Ethiopia. He was awarded a research grant from the institutional collaboration fund between the Norwegian University of Life Sciences and Mekelle University in 2010 to fund his PhD research.

Selected publications

Yirga, G., Ersino, W., De Iongh, H.H., Leirs, H., Gebrehiwot, K., Deckers, J. & Bauer, H. (2013). Spotted hyena (*Crocuta crocuta*) coexisting at high density with people in Wukro district northern Ethiopia. Mammalian Biology 78, 193-197.

Yirga, G., De Iongh, H.H., Leirs, H., Gebrehiwot, K., Berhe, G., Asmelash, T., Gebrehiwot, H. & Bauer, H. (2012). The Ecology of large carnivores

in the highlands of northern ethiopia. African Journal of Ecology **51**, 78-86.

Yirga, G., De Iongh, H.H., Leirs, H., Gebrehiwot, K., Deckers, J. & Bauer, H. (2012). Adaptability of large carnivores to changing anthropogenic food sources: diet change of spotted hyena (*Crocuta crocuta*) during Christian fasting period in northern Ethiopia. Journal of Animal Ecology **81**, 1052–1055.

Yirga, G., Bauer, H., Gebrehiwot, K. & Deckers, J. (2011). Peri-urban spotted hyena (*Crocuta crocuta*) in Northern Ethiopia: diet, economic impact, and abundance. European Journal of Wildlife Research **57**, 759-765.

Yirga, G., Bauer, H., Worasi, Y. & Asmelash, S. (2011). Farmers' perspectives of leopard (*Panthera purdus*) conservation in a human dominated landscape in the northern Ethiopia highlands. International Journal of Biodiversity and Conservation **3**, 160-166.

Yirga, G. & Bauer, H. (2010). Diet of the spotted hyena (*Crocuta crocuta*) in southern Tigray, northern Ethiopia. World Journal of Science, Technology and Sustainable Development **7**, 391-397.

Yirga, G. & Bauer, H. (2010). Livestock depredation of the spotted hyena *(Crocuta crocuta)* in southern Tigray, northern Ethiopia. International Journal of Ecology and Environmental Sciences **36**, 67–73.

Yirga, G. & Bauer, H. (2010). Prey of Peri-urban Spotted Hyena (*Crocuta crocuta*) in Southeastern Tigray, Northern Ethiopia. Asian Journal of Agricultural Sciences **2**, 124-127.

Yirga, G., De Iongh, H.H., Leirs, H., Gebrihiwot, K., Deckers, J., Asfaw, A., Acha, A. & Bauer, H. (in reviw). Predator adaptability to prey depleted and human dominated landscapes: Spotted hyenas (*Crocuta crocuta*) depend on anthropogenic food in Ethiopia.

Yirga, G., Imam, E., De Iongh, H.H., Leirs, H., Kiros, S., G/ Yohannes, T. Teferi, M. & Bauer, H. (in reviw). Habitat preference of spotted hyenas (*Crocuta crocuta*) for human dominated landscapes in northern Ethiopia.

Yirga, G., De Iongh, H.H., Leirs, H., Gebrihiwot, K., Deckers, J. & Bauer, H. (in review). Spotted **hyena** (*Crocuta crocuta*) concentrate around urban garbage dumps in northern Ethiopia.

Yirga, G., Gebresenbet, F., Deckers, J. & Bauer, H. (in reviw). Status of lions (*Panthera leo*) and spotted hyenas (*Crocuta crocuta*) in Nechisar National Park, Ethiopia.

Research needs

This first long term study of the spotted hyena in Ethiopia has provided baseline information about diet, abundance and distribution, economic valuation of livestock losses and has contributed to a better knowledge of the species ecology. However, in order to better understand the ecology of the species in Ethiopia several aspects still need to be investigated. To support viable hyena population in the future study on home range, movements, activity patterns, habitat use, local hyena social structure and effect of moon phase on livestock depredation by hyenas should be investigated with telemetry. This would help to understand adaptability of the species to anthropogenic environment and anthropogenic pressure on the species. Research on kinship relations and inbreeding depression through analysis of mitochondrial DNA would be important to understand preference of inbreeding and overall inbreeding strategy of spotted hyenas and to conserve viable hyena population in the future.

I also suggest research on parasites of spotted hyenas, disease, disease resistance, immune function, genetic diversity and genetic structure in spotted hyena populations. This would help to understand how spotted hyenas survive feeding on waste infected with pathogens. Study on how much spotted hyenas get their food from depredation and how much from scavenging would also be important. Socio-economic research on the role of hyenas in religion and religion in hyena persistence will also be important to understand fully human hyena interrelations in the region.