

Scientists grapple with worms to improve co-existence with wildlife in Africa

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Credit: Katie Bull

Farming at the border of National Parks in Africa can lead to conflict with wildlife, due to the belief that wild animals bring disease, prey upon livestock, and damage crops. In an unexpected twist, research conducted by the University of Bristol and Queen's University Belfast with the charity 'Elephants for Africa' and the University of Pretoria has found

that grazing livestock with wildlife may benefit farmers by reducing parasitic disease.

Researchers monitored parasitic worm [infection](#) in goats around the Makgadikgadi Pans National Park in Botswana to find out how infection levels were related to weather and the iconic migrations of African wildlife such as wildebeest and zebra, and how the goats responded to treatment. The team also developed technology that could help farmers control disease in their animals.

Dr Josephine Walker, lead author on the study, and the team spent months working closely with farmers in villages surrounding the National Park to monitor infection levels, teaching them how to inspect their goats for signs of infection and decide which ones to treat for worms. By targeting treatment only to those animals affected, the health of the herds was improved just as well as if all animals were treated, but at only 25 per cent of the cost. This helped farmers maintain healthy herds and get the most from limited veterinary resources.

Professor Eric Morgan, Queen's University Belfast said: "With climate changing and resistance to antiparasitic drugs taking hold, more carefully targeted treatment is essential to protect livestock production. The solutions demonstrated in this work can be applied worldwide to support animal health and help provide food for growing human populations more efficiently and without adding to environmental destruction."

As wildlife migrate during and after the rainy season, there is a chance that they carry worms with them and increase infection risk for livestock. However, Dr Walker found that goats in villages that had more contact with wildlife were slightly less affected by worms, not more.

Computer simulations, developed to predict infection patterns as a result of the timing of the rains and wildlife movements, suggest that this could

be because wild animal species that are not very suitable hosts for goat worms are removing parasites from the pasture by eating contaminated grass.

Dr Hannah Vineer, University of Bristol said: "Wildlife receive a lot of bad press when it comes to disease and contact with livestock, but in the area surrounding the Makgadikgadi Pans National Park, migrating animals such as zebra and wildebeest could be providing a service to farmers by regulating parasitic [worm infections](#). This study shows that although the relationships between humans, their animals and wildlife are complex, people can benefit, in some ways, from living alongside wildlife."

Core to the project are simple tools that farmers can use to clinically evaluate the health of their goats, so that they can help themselves to manage disease. These methods were developed over many years by the University of Pretoria and are now being tested in new areas by the international team. Having shown the benefits of targeted treatment, and developed a way to predict the impact of weather on worm infections, the researchers now aim to extend the technology in Botswana and other parts of the world, including India, Malaysia and the UK.

Dr Josephine Walker, University of Bristol, added: "The risk of worm infection in goats was closely related to rainfall, but weather patterns are changing and it is hard for farmers to know when is the best time to treat. By formalising our understanding of the processes involved in a computer simulation, we can better understand how rainfall patterns match with infection levels. Access to technology, especially through mobile phones, is growing quickly across Africa, which provides us with an opportunity to deliver hi-tech solutions to remote rural communities."

The project was part of a human-wildlife co-existence project. People in the area rely heavily on their goats, with 95% of villagers deriving

income from them. However, there is often a conflict between wildlife and people living close to National Parks, as wildlife are seen as threats to their crops and animals. The work conducted by the team in Botswana will help farmers to improve their [goat](#) health, providing a buffer against any [animals](#) taken by wildlife such as leopard or hyaena, and providing farmers with much-needed food security in the event of crop failure due to drought or damage by wildlife.

Dr Kate Evans, director of Elephants for Africa, said: "The results show that by equipping farmers with the tools and knowledge to take care of their goats, we can promote healthy and peaceful co-existence with [wildlife](#), and improve livelihoods at the same time. As [human populations](#) increase in Africa, it is crucially important that we are able to do this if many of the [wild animals](#) we know and love are to survive."

More information: Josephine G. Walker et al. Prediction and attenuation of seasonal spillover of parasites between wild and domestic ungulates in an arid mixed-use system, *Journal of Applied Ecology* (2017). [DOI: 10.1111/1365-2664.13083](https://doi.org/10.1111/1365-2664.13083)

Improving sheep and goat health: community-led monitoring and targeted treatment. www.bristol.ac.uk/policybristonia/news/sheep-and-goat/

Provided by University of Bristol

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