landscapes of fear

RICHARD GIE

JOHN DICKENS (2)

top *Egyptian Geese on golf courses irritate players, residents and greenkeepers by being noisy and fouling the playing area.*

above *Falconry using Harris's Hawks was introduced to a golf course to manipulate the 'landscape of fear' so that the geese no longer felt safe and chose to leave the property.*

Falconry birds flown from a golf cart increased vigilance levels in geese in the presence of any golf cart, suggesting that they learned to associate carts with the threat of predation.

Predators can influence their prey directly through predation, but the mere presence of a predator also can alter the behaviour of prey. By instilling fear in their prey, the perceived risk of predation can affect individual movement patterns and ultimately influence the spatial dynamics of whole populations. Prey animals living in a landscape influenced by the risk of predation try to avoid risky areas and choose instead to feed and breed in areas where they perceive the risk of predation to be lower. This response can be used to manage problem animals.

Egyptian Geese *Alopochen aegyptiaca* are widespread and despite their name are indigenous to South Africa. During the past 30 years, their population has escalated dramatically in response to an increase in the number of farm dams, the expansion of agricultural crop-lands and the introduction of large areas of urban green space. These green spaces include golf courses, where there are relatively few natural predators and which thus present the geese with safe feeding, breeding and moulting grounds. Lush expanses of green grass provide ideal grazing lawns and open waterbodies are a safe refuge, especially for goslings. Because of this, many golf courses have become home to large numbers of Egyptian Geese. In the Western Cape in particular they have become a nuisance, irritating golfers, residents and greenkeepers by obstructing play, being noisy and fouling greens and fairways.

While investigating solutions for this problem, we found that geese on golf courses prefer particular areas, or 'hotspots', within which they feel safer. One option to reduce the desirability of these hotspots is to manipulate them through management interventions to increase the 'landscape of fear' and thus make the playing area of the course less attractive to the geese. On overseas and local golf courses, goose populations are controlled by lethal and non-lethal means. While some of these are partly effective, many are either ineffective or socially unacceptable. An effective non-lethal method of manipulating the landscape of fear so that there are fewer areas where the geese feel safe is to plant reeds or bushes around waterbodies and between fairways, thus reducing the birds' ease of access to the refuge of the water and diminishing the amount of perceived open space by obstructing their view. Another way to make the environment less safe for the geese is to introduce a predator into the system.

Falconry is used to manage populations of so-called nuisance animals on airfields, landfill sites and around commercial and residential buildings in many countries worldwide. Yet despite the widespread use of falconry for bird abatement, its efficacy to reduce bird numbers has not been tested empirically. Falconers using trained Harris's Hawks *Parabuteo unicinctus* are already deployed on some golf courses in the Western Cape and in Durban, and we investigated the impact that falconry had on geese living on a golf course.

We discovered that the presence of the falconry birds reduced the number of geese on the course by as much as 73 per cent. Although falconry is partly lethal, since a few geese are killed to reinforce the predatory motivation of the falconry birds and, importantly, to instil a real sense of fear in the geese, the number of geese killed during the five-month study was minimal; most of them left the course because of the increased fear of predation rather than through actual predation by the hawks. Our research therefore confirms that falconry is an effective way of creating an environment where the geese no longer feel safe and thus choose to leave the property and find safer areas elsewhere.

To test whether this increased fear of being attacked was the ultimate reason why the geese left the golf course, we also studied the behaviour of the geese. We measured their vigilance levels (the amount of time they spend scanning their surroundings for potential predators) to assess how threatened they felt. We found that when the threat of predation was low, the geese spent on average 20 per cent of their time scanning for potential threats. However, their vigilance levels almost doubled when they were exposed to a falconry hawk once a week, confirming that the decrease in abundance of geese was largely a result of their fear of being preyed upon.

Furthermore, because the hawks were flown from a golf cart, vigilance levels increased most in the presence of a golf cart, even when no falconry took place. This suggests that the geese learned to associate the carts with the threat of predation, providing further evidence that sustained learning could be an additional inducible response. Therefore this increased level of risk on the golf course is maintained even when the falconers are not present, since golf carts are in constant use and thus enhance the non-lethal aspect of the control programme. This is also an important consideration for the sustained efficacy of dealing with the nuisance geese. We are confident that falconry is an effective, minimally lethal management tool for reducing the impact of geese on golf courses, which is good news for golfers, course managers and conservationists alike.

ALEX ATKINS, ROB LITTLE & ARJUN AMAR

For more information, contact
The Director, Percy FitzPatrick Institute of African Ornithology, University of Cape Town, Rondebosch, South Africa 7701.
E-mail *fitz@uct.ac.za*,
tel. +27 (0)21 650 3291 or
visit *www.fitzpatrick.uct.ac.za*