Winter scavenging rates under power lines in the Karoo, South Africa

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Bird mortality from collisions with power lines, wind turbines and other infrastructure is a global conservation problem (Drewitt & Langston, 2008; Jenkins, Smallie & Diamond, 2010). Millions of birds are thought to die annually this way, but calculating accurate fatality figures is extremely difficult (Drewitt & Langston, 2008). Fatality rates are normally estimated from periodic carcass searches, e.g. under representative sections of power line, but alone these can give misleading underestimates of true rates (Smallwood, 2007; Ponce, Alonso, Argandoña, Fernández & Carrassco, 2010). Several bias factors should be taken into account to allow for carcasses missed through removal by scavengers or decomposition (scavenger bias), varying levels of observer efficiency/different habitat types (search bias) and injured birds that die away from the search area (crippling bias; Bevanger, 1999).

In South Africa, the power grid is extensive and expanding (www.eskom.co.za), and there is expected to be a proliferation of wind turbines in coming years (Jenkins, 2010). Power lines already pose a threat to several threatened bird species e.g. Blue Cranes, Anthropoides paradiseus (Shaw, Jenkins, Smallie & Ryan, 2010), Ludwig’s Bustards, Neotis ludwigii (Jenkins et al., 2011) and Cape Vultures, Gyps coprotheres (Boshoff, Minnie, Tambling & Michael, 2011). However, to really understand the impacts of such mortality, survey biases for large birds in the South African environment need to be assessed. In preliminary search and scavenger bias experiments conducted in the Hantam Karoo in summer 2011 (Schutgens, Shaw & Ryan, 2014), only 16% of experimental carcasses were removed (although most were scavenged in situ). However, scavenger bias may vary seasonally (Prosser, Nattrass & Prosser, 2008; Flint, Lance, Sowl & Donnelly, 2010). In this study, we repeat the experiment at the same locality in winter. We use camera traps to identify the scavenger guild, as they have been successfully used to monitor carcass removal experiments elsewhere (e.g. Bumann & Stauffer, 2002; Smallwood, Bell, Snyder & Didonato, 2010).

METHODS

We conducted scavenger removal trials on the sheep (Ovis aries) farm Tierhoek (31°28’S, 19°40’E), approximately 10 km west of Calvinia. The arid landscape is characterized by dwarf shrub vegetation, with the main land use extensive livestock farming (Mucina & Rutherford, 2006). While predator control is minimal on Tierhoek, it is widely practiced in the region (Schutgens et al., 2014).

Wild Egyptian Geese (Alopochen aegyptiaca) were used for these trials as their size (1.8–2.4 kg; Hockey, Dean & Ryan, 2005) makes them good surrogates for a variety of bustard, goose and gamebird species, and they were free from odours associated with farmed birds (Smallwood, 2007; Prosser et al., 2008). The geese, which had been shot as agricultural pests, were frozen shortly after culling and defrosted 24 hours before deployment under the 66 kV power line also used by Schutgens et al. (2014). Five geese were deployed at a time, with each monitored by a motion-activated camera trap (Bushnell Trophy Cameras, model 119436). The cameras were attached approximately 0.4 m off the ground to pylons or nearby fence posts, and operated both day and night. When triggered, the cameras were set to take two photos every 10 seconds on a medium sensitivity setting.

The geese were deployed regularly spaced over approximately 8 km of power line, with three trials run consecutively from 3–7 July, 8–12 July and 12–14 July 2012. Different pylons were used in each trial, and the densities of geese were 1.20, 1.44 and 0.68 per km in the three trials. Scavenger swamping can occur when the number of carcasses exceeds the capacity of scavengers to process them (Smallwood, 2007), but we did not consider these densities to be excessive, being in the range of observed Karoo collision rates (Jenkins et al., 2011). Trials were started in the afternoon, with camera batteries and memory cards changed daily for 3–5 days. These regular visits were not...