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Commentary: Colorful collar-covers and bells reduce wildlife predation by domestic cats in a continental European setting

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A Commentary on
Colorful collar-covers and bells reduce wildlife predation by domestic cats in a continental European setting

Geiger, M., Kistler, C., Mattmann, P., Jenni, L., Hegglin, D., and Bontadina, F. (2022). *Front. Ecol. Evol.* 10:850442. doi: 10.3389/fevo.2022.850442

The negative impacts of domestic and feral cats (*Felis catus*) on wildlife across the globe are well established (e.g., Loss et al., 2013; Woinarski et al., 2015); thus, reducing cat hunting is vital. Measures include keeping cats indoors, fitting collars with bells, or brightly colored collars that should alert bird and reptile prey to the cat's presence. Geiger et al. (2022) assess just how effective this last measure is, in the form of "Birdsbesafe" collar-covers (BBScc). Their study aims to quantify the efficacy of the BBScc, "… for reducing the number of prey brought home" (page 2). It is an important contribution to the literature, and we agree that BBScc reduces predation, but we disagree with (i) their assessment of the magnitude of its effectiveness, and (ii) the impression created that the results "overestimate" the number of birds taken.

Effectiveness of collars

Geiger et al. (2022) base their findings on prey returned home, acknowledging that these underestimate actual kills, given that studies using cat-borne cameras (KittyCams) show ca. >75 % of prey are never returned home (Loyd et al., 2013; Seymour et al., 2020). Although we agree that bright collars reduce predation, Geiger et al. exclude nestling birds ($n = 4$) and birds caught after dark ($n = 4$) from their total of 39 birds (Geiger et al., 2022; Table 1). A bird killed by a cat is still depredated, regardless of its age or when it was caught. As a measure of whether the collar reduced predation or not (which is the

stated aim), these birds are casualties that must be included. Their result clarifies that the collar cannot prevent predation of nestlings and or birds caught at night. Keeping cats indoors is more effective. Despite equal numbers being excluded from the control and treatment groups ($n = 4$ each in the Standard Survey), the number of birds taken with (14) and without (25) collars should be 18 and 29, respectively, when nestlings and after-dark kills are included. A "back of the envelope" calculation, employing data in Table 1A of Geiger et al. (2022), suggests a 44% ([25–14]/25) lower predation of birds with a collar, but a 38% reduction ([29–18]/29) if nestlings and birds taken after dark are included. The Bayesian model Geiger et al. use yields slightly different results (i.e., 37% reduction, not 44%), but excluding nestlings and night-predated birds inflates the efficacy of the BBScc. In addition, although Geiger et al. find the probability that the collars reduce predation is 88%, the uncertainty interval for the effect includes zero (between 72% reduction and 35% increase), suggesting that the effect of the collars compared to the control is small. These differences seem inconsequential, but the issue of domestic cats hunting wildlife is controversial.

Overestimates of bird prey?

The Abstract creates an impression that their prey returns overestimate cat predation (*"…the number of prey brought home by cats overestimates their hunting bag if scavenging is not considered…"*), but does not highlight for the bias inherent in most prey never being returned home (Loyd et al., 2013; Seymour et al., 2020).

We understand why already dead birds were excluded from the analysis of live-bird predation, but the role of scavenging may be over-emphasized: only 4 out of 15 birds assessed (from the total 39 birds returned) showed trauma consistent with serious injury or death before being brought home ("scavenged"). This subsampling can be misleading if the 15 selected for assessment by chance included only birds already injured/dead (similarly, there may have been more birds amongst those not assessed). Only one scavenged prey was ever recorded in KittyCam studies directly recording predation by 55 and 20 domestic cats over 2,090 h (Loyd et al., 2013) and 710 h (Seymour et al., 2020), respectively. This is a scavenging rate of 1 in 101 prey captures in the two studies (1%), vs. the 27% extrapolated by Geiger et al. (2022).

Not only do returns underestimate prey caught, but KittyCam studies reveal biases in the prey taxon returned: mammal prey are more likely to be returned home, while reptile prey are less likely to be so. For birds, the bias is harder to gauge as only 5 birds (Loyd et al., 2013) and 1 bird (Seymour et al., 2020) were caught on camera, and only two and zero respectively were returned (approximately 33%). This could mean that Geiger et al. (2022)'s cats caught up to 117 birds (3 × 39). Since most prey are not returned home, it seems misleading to assert in the Abstract (the only part that many will read) that the catch is an "overestimate", owing to scavenging.

Discussion

This critique has consequences for conservation and management. Future studies of the effectiveness of antipredation measures must include all prey, regardless of age or time of day. This is not least because cat advocates often seek to undermine the scientific credibility of detrimental findings through blogs and other websites (Loss et al., 2018), claiming that published research over-emphasizes numbers of prey taken annually, now known to number millions (Woinarski et al., 2017) or billions (Loss et al., 2013; Zhang et al., 2022) of individuals. We hope that our critique of Geiger et al. (2022)'s conclusion of an "overestimation" of bird prey allows a more accurate assessment of this preventative measure.

Author contributions

RES conceived the critique. RES and CLS planned, wrote, and edited the MS together. All authors contributed to the article and approved the submitted version.

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Conflict of interest

Author RES was employed by Birds & Bats Unlimited.

The remaining author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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