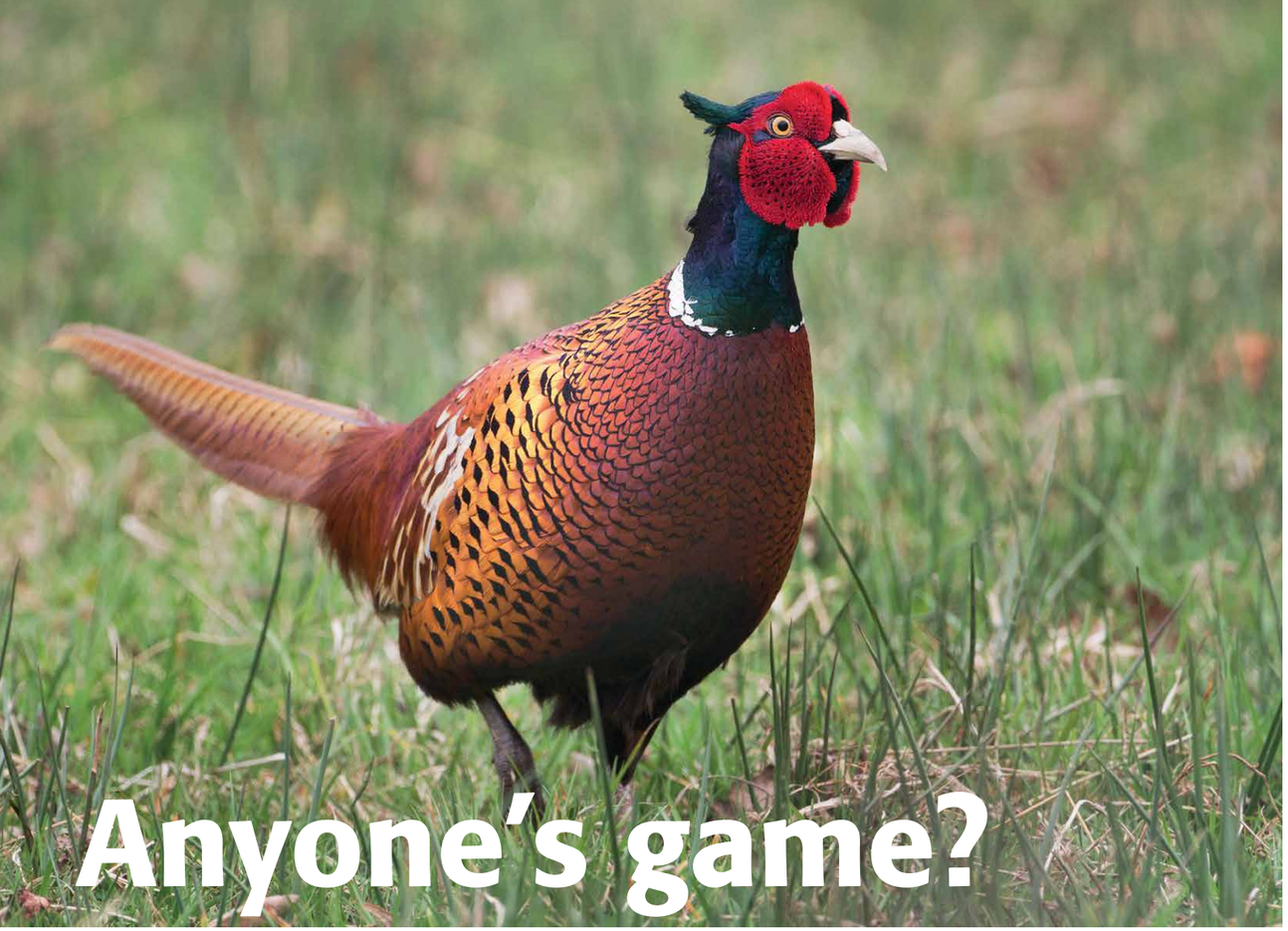


Anyone's game?

What does the annual release of tens of millions of gamebirds mean for generalist predators like Buzzards and corvids? Research Ecologist Henrietta Pringle explains BTO work exploring this question.

Every year, 40–50 million non-native gamebirds (Ring-necked Pheasant and Red-legged Partridge) are released in the UK, a combined weight of around 46,000 tonnes. Fewer than half these birds are shot, with the remaining individuals predated, scavenged or surviving to breed, or to be predated in subsequent years. This means there is potentially a large food resource available to predators and scavengers, a resource that has steadily increased as the numbers released have grown.

By potentially increasing the amount of food available to predators, could gamebird releases be sustaining predator and scavenger populations above the levels they would otherwise reach? If gamebird releases do inflate predator numbers, could this have knock-on effects for other species at risk from predation? While other aspects of game management, such as measures to enhance habitat and food availability, have been reported to have benefits for wider biodiversity, the impacts of the releases themselves are relatively understudied, despite being flagged as a critical policy-relevant question and subject to frequent discussion in the scientific literature and media.

▲ The biomass of gamebirds released each year is more than double that of all our native breeding birds combined.

Our aim in this study was to examine evidence for the first link in the chain: whether gamebird releases have any effect on numbers of avian predators and scavengers (hereafter predators), namely Buzzard, Jay, Magpie, Raven and combined numbers of Carrion/Hooded Crow. No precise data exist on where and how many gamebirds are released, so we used three different data sets as proxies (available for Britain only). A register of gamebirds held in captivity, provided by the Animal and Plant Health Agency (APHA), informs about stocks available for release but not the precise release locations, while data from *Bird Atlas 2007–11* and the Breeding Bird Survey (BBS) tells us about the abundance and distribution of 'wild' gamebirds in the countryside. These 'wild' data sets are more removed from the numbers released, as the free-roaming gamebird populations will comprise those that survive after release and some or all of the shooting season, and those that have naturalised from previous releases. They do, however, more accurately represent the resource available to predators than the APHA data do.

PREDATORS BOOSTED BY GAMEBIRDS

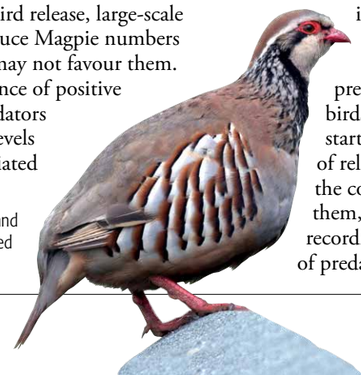
After controlling for variation in land-use and habitat quality, we found numerous positive associations between the abundance of gamebirds (whether captive or 'wild') and that of predators. In particular, Buzzard, Jay and crows were more numerous in areas of higher gamebird abundance.

Population growth rates told a similar story: year-to-year changes in abundance of Buzzard, Jay, crows and Raven were all more positive where there were more gamebirds. In other words, whatever the background change in these predator populations over time, there was an additional uplift where gamebirds were present. By examining how well the 'wild' and captive gamebird datasets matched up, we showed, perhaps unsurprisingly, that the occurrence and location of gamebirds in the wild was largely determined by gamebirds held in captivity (and therefore presumably released).

We also found a negative association between the abundance of Magpies and that of wild gamebirds, suggesting a possible interaction with game management and control activities: in areas of intense gamebird release, large-scale predator control may reduce Magpie numbers or habitat management may not favour them. However, the predominance of positive associations between predators and gamebirds suggests levels of predator control associated with game management generally do not overcome the positive effects of the extra food resource provided by gamebird releases. An alternative explanation could be that in areas of high gamebird abundance, Magpies experience higher competition and nest predation from crows, leading to the observed negative association.

NEXT STEPS

While there are many other factors shaping predator abundance, such as fine-scale habitat variation, availability of other food sources and game management activities, our results suggest that large-scale variation in avian predator populations is generally positively affected by gamebird releases. This could have implications for species vulnerable to predation, including declining breeding waders like Curlew, but such indirect effects of releases have yet to be proven. Suitable tests could include periods of regulation of releases on a trial basis, measuring the effects on predators and ground nesting birds, for example. However, as a starting point to clarify the impacts of releases on the ecosystem, and the complex interactions acting on them, we suggest that compulsory recording of releases and the number of predators killed would be valuable. ■



▶ Red-legged Partridges (right) and Pheasants (above, left) are released for shooting in late summer.

PHEASANT: EDMUND FELLOWES/BTO, RED-LEGGED PARTRIDGE: JOHN HARDING/BTO

Find out more

This work would not have been possible without the vast amounts of data collected by our volunteers. To find out more about BBS and how to participate, please visit: **www.bto.org/bbs**

Distribution and abundance maps from *Bird Atlas 2007–11* can be found at: **wwwbto.org/mapstore**

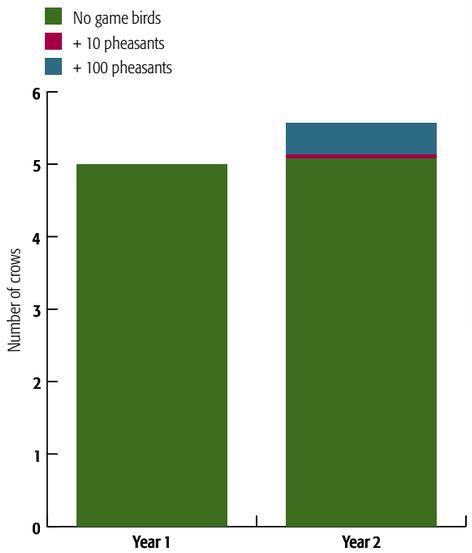
These distribution data are freely available at: **www.bto.org/open-access-atlases**

Read more about the study here: **www.bto.org/gamebird**

This work was funded by Mark Constantine.

PREDATOR POPULATION CHANGE AND GAMEBIRD NUMBERS

The predicted numbers of crows (Carrion and Hooded combined) in a 1-km square with and without the addition of different numbers of Pheasants from one year to the next, assuming a starting population of five. Similar patterns were found for Buzzard, Jay and Raven.



WILD (LEFT) AND CAPTIVE (RIGHT) GAMEBIRD DISTRIBUTIONS IN GREAT BRITAIN

Wild and captive gamebird distributions show strong similarities (top=Pheasant, bottom=Red-legged Partridge), suggesting that the occurrence and location of wild gamebirds is determined by releases.