

Acknowledgment

This study was supported by Biotechnology and Biological Sciences Research Council, United Kingdom.

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Diclofenac Approval as a Threat to Spanish Vultures

Vultures are long-lived birds that provide essential ecosystem services and whose populations are declining worldwide (Sekercioglou et al. 2004; Ogada et al. 2011). Diclofenac, a nonsteroidal anti-inflammatory veterinary drug, is among large-scale threatening factors currently causing large declines in populations of vultures. It has been shown that diclofenac is responsible for the catastrophic decline of Asian and African vulture populations (Oaks et al. 2004; Shultz et al. 2004; Naidoo et al. 2009). Between 1990 and 2000, the hitherto large populations of avian scavengers on the Indian subcontinent (Indian White-backed Vulture [*Gyps bengalensis*], Long-billed Vulture [*Gyps indicus*], and Slender-billed Vulture [*Gyps tenuirostris*]) declined by 95%; several million birds are thought to have died (Oaks et al. 2004; Shultz et al. 2004; Green et al. 2006).

Vultures are exposed to diclofenac when they feed on the carcasses of livestock treated with this drug shortly before their deaths (Oaks et al. 2004; Green et al. 2006). The ingestion of diclofenac causes kidney failure, and dead birds exhibit extensive postmortem visceral gout (Oaks et al. 2004). This sudden decline in scavenger numbers has not only had population consequences for vulture species, but also has seriously compromised key ecosystem services (Markandya et al. 2008; Margalida & Colomer 2012; Ogada et al. 2012). Although the banning of diclofenac in 2006 seems to have halted the decline in abundance of vultures in Asia (Prakash et al. 2012), vulture abundance is now threatened in southern Europe due to approval of diclofenac use.

In March 2013, 2 products containing diclofenac (Diclovet and Dolofenac) were authorized by the Spanish Drug and Health Products Agency, which operates under the Ministry of Health, Social Services, and Equality, for use in livestock. Of the total number of vultures in Europe, 95% are in Spain: >26,000 pairs of Griffon (*Gyps fulvus*), 1600 pairs of Egyptian (*Neophron percnopterus*), 2000 pairs of Cinereous (*Aegypius monachus*), and 125 pairs of Bearded Vultures (*Gypaetus barbatus*). The impact of this product could seriously jeopardize the last remaining large populations of vultures in the EU. A demographic model showed that if 0.13–0.75% of carcasses were contaminated by diclofenac in vulture foraging areas in India, vulture populations would be extirpated (Green et al. 2004). In Spain, after an intense debate in aimed at reconciling sanitary and environmental policies (Tella 2001; Donázar et al. 2009), new regulations allow livestock carcasses to be consumed by wild scavengers in the field or at supplementary feeding stations (Margalida et al. 2012). Thus, veterinary drugs may be consumed by vultures and other carrion eaters, including threatened carnivores such as the brown bear (*Ursus arctos*) and wolf (*Canis lupus*).

Despite the differences between European agro-grazing systems and those found in Asian or African ecosystems, it is undeniable that European vulture populations could be seriously affected by the ingestion of diclofenac, and its use has become a matter of great concern for ecologists, politicians, and conservationists. In India, the solution to this problem was to replace diclofenac with meloxicam (Swarup et al. 2007; Cuthbert et al. 2011). Thus, following the precautionary principle, which was recognized as a fundamental element of environmental policy at the Rio Conference of 1992 (Kanongdate et al. 2012), we urge that a ban on the use of diclofenac for livestock be implemented immediately to avoid undesirable consequences to vulture populations and ecosystem functioning in Spain.

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