



LETTERS

edited by Jennifer Sills

Baits, Budget Cuts: A Deadly Mix

THE ILLEGAL USE OF POISON BAITS IS THE MOST IMPORTANT NON-natural factor in the the extinction of several European vertebrate megafauna over the previous two centuries. Yet the practice continues unabated today. Poison baits represent a serious threat to public health and a serious conservation problem for sustaining biodiversity at both European and global scales (1).



Bearded vulture with GPS transmitter.

Spain is home to important populations of several threatened vertebrate species. More than 8000 cases of illegal poisoning were reported in the period between 1990 and 2010, with victims including 53 bearded vultures (*Gypaetus barbatus*), 366 Egyptian vultures (*Neophron percnopterus*), 759 cinereous vultures (*Aegypius monachus*), 117 Spanish imperial eagles (*Aquila adalberti*), 2877 Eurasian griffon vultures (*Gyps fulvus*), 1981 red kites (*Milvus milvus*), 961 black kites (*Milvus migrans*), and 9 brown bears (*Ursus arctos*) (2–5). Several of these species are classified as endangered within the European Union (there remain only 170 pairs of bearded vultures, 323

Spanish imperial eagles, 1889 cinereous vultures, and 1900 Egyptian vultures). Moreover, Spain is home to more than 95% of all European avian scavengers and the world's entire Spanish imperial eagle population. Given this context, the damage to the conservation of European biodiversity caused by poisoning is considerable.

In light of the current economic crisis, the Spanish government has cut funding for research and development, and its Ministry of Agriculture, Food, and Environment has reduced investment by 31% with respect to 2011. As a result, research and conservation programs that can minimize the impact of illegal poisoning are at risk. Without the funds to monitor threatened species with satellite transmitters, to analyze animal carcasses found through this and other monitoring methods, and to continue with environmental education programs and research trap selectivity methods, illegal poisoning looms even larger. All the human and economic efforts of the past two decades could turn out to be futile and biodiversity be put at risk if research and conservation programs are paralyzed.

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Saving Vietnam's Wildlife Through Social Media

ALTHOUGH VIETNAM IS A GLOBALLY RECOGNIZED biodiversity hotspot with 59 new species discovered in 2010 alone (1), the state of wildlife conservation therein is a matter of serious international concern. Vietnam is a major consumer and exporter of wildlife, as well as a source and conduit for the illegal trade from Laos, Cambodia, and Myanmar to China (2). Over a 10-year period, Vietnamese authorities have confiscated over 180,000 wild animals destined for trade. It is estimated that this represented only 5 to 10% of the actual amount illegally traded (3), about half of which is consumed in the domestic

market (2). In fact, consuming wildlife has become the norm among Vietnamese. Half of Hanoi residents have used wild animal products (4), and almost a third of all Vietnamese have used bear bile to treat illness (5).

In a recent report, the World Wildlife Fund ranked Vietnam last of 23 countries in implementing its commitments to prevent the illegal trade of elephant, rhino, and tiger products through the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) (6). A large share of the responsibility for the dire state of conservation can be attributed to Vietnamese society, which both drives wildlife consumption and behaves passively toward conservation-related scandals. This passivity is illustrated by the seeming acceptance of the

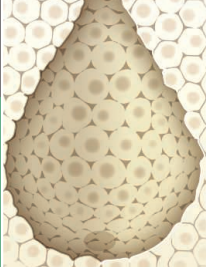
public toward incidents such as the purchase of rhino horn by a diplomat from the Vietnamese Embassy in South Africa (7) and the official—yet illegal—auctioning of confiscated tiger bone glue with approval from the Provincial People's Committee (8).

Social media offer a major tactical opportunity to hold public officials and citizens accountable, by galvanizing public opinion, applying public pressure, and therefore incentivizing improved conservation behavior. For example, in July, photos of a pregnant endangered douc (*Pygathrix cinerea*) being tortured and slaughtered in the presence of Vietnamese soldiers were posted on Facebook. The story grabbed the attention of readers and generated substantial public outcry (9). Such mass criticism over mistreatment of endangered



Less biomass below
the ocean floor

204



Cilia sense
the flow

206

animals had not been previously experienced in Vietnam. Under this public pressure, the government dismissed the three soldiers in an unprecedented military ruling (10).

This example demonstrates the potential power of social media to influence an immediate government response to a conservation crisis. Social media are also being used for longer-term objectives, such as curbing the consumption of shark fin in China (11) and pressuring retailers to stop selling shark fin products (12). Scientists and conservationists need to embrace the full potential of social media, as have other sectors of society, such as intelligence communities that use social media to predict riots or war outbreaks (13), or organizations striving to improve political self-expression and voter turnout (14). The social media can thus represent, combined with education, a very powerful tool for conservation.

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Making Science Education Relevant

FOR AS LONG AS I CAN REMEMBER, I HAVE been worried about our failure as a nation to grasp and apply basic scientific principles. I believe that the vast majority of attempts to teach science and engineering to the average student are doomed to failure for one simple reason: Unlike our educators, our students are not convinced that science and engineering are important. I think we need to shift our focus from "important science" to "science that's important to the public." To do so, we must rethink what material should be covered and how to best present it in our writing, publications, and courses.

I tried out this approach at the University of Virginia. I offered a course called Responsible Citizenship in a Technological Democracy for undergraduates with no science, math, or engineering background. I presented a series of public policy issues (especially ones for which the conventional wisdom is wrong) and introduced the science and engineering concepts needed to understand each one. Then the students used these concepts to analyze the issues. Topics included electric cars, the hydrogen economy, and paper cups, and scientific subjects such as statistics, risk, and precision versus accuracy (1). I found that students cared about getting public policy right. When confronted with evidence that conventional wisdom is wrong, they were motivated to understand the science and engineering concepts. Suddenly, they too considered science important.

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CORRECTIONS AND CLARIFICATIONS

Perspectives: "Real fish attack simulated plankton" by W. L. Romey (7 September, p. 1181). The first sentence of paragraph five should have stated that the predatory fish studied by Ioannou *et al.* preferentially attack smaller, not larger, groups of simulated prey. Also, paragraphs four and five incorrectly stated that members of simulated groups of zooplankton in Ioannou *et al.*'s model always follow similar rules. Instead, each member of a group may have different movement rules due to evolution within the simulation.

TECHNICAL COMMENT ABSTRACTS

Comment on "Climatic Niche Shifts Are Rare Among Terrestrial Plant Invaders"

Bruce L. Webber, David C. Le Maitre, Darren J. Kriticos

Petitpierre *et al.* (Reports, 16 March 2012, p. 1344) conclude that niche shifts are rare for terrestrial plant invaders and that this justifies the use of correlative modeling to project species geographic ranges for biological invasions and climate change. We draw attention to the limitations of their conceptual assumptions and the importance of niche shifts excluded from their analyses.

Full text at <http://dx.doi.org/10.1126/science.1225980>

Response to Comment on "Climatic Niche Shifts Are Rare Among Terrestrial Plant Invaders"

Antoine Guisan, Blaise Petitpierre, Olivier Broennimann, Christoph Kueffer, Christophe Randin, Curtis Daehler

Webber *et al.* take a critical view of our findings that niche expansions are rare in plant invaders, arguing mainly that we did not include nonanalog climates in our analyses. Yet, their concerns include misunderstandings and go beyond the scope of our study, which was purposely restricted to analog climates. We further explain why our results remain robust to other factors of niche dynamics in the native range. We conclude that the implications of our findings remain valid for projections of niche models in analog climates and that projections in nonanalog climates should be undertaken with care.

Full text at <http://dx.doi.org/10.1126/science.1226051>

Letters to the Editor

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