

Citation analysis, using the Institute for Scientific Information (ISI) database, could foster such competition. As a task force of the Italian Rectors' Conference (CRUI), we analyzed the subset of the ISI database encompassing the scientific production of authors affiliated with Italian institutions (1). We ranked Italian universities according to the number of published papers in 1995–99, their citations, and the number of citations received per paper published (impact). We then devised a productivity index (the number of papers per university researcher) and a visibility index (the number of citations per university researcher). We observed that, when data were adjusted for the number of academic researchers actually working in an institution, there were differences in rankings compared with unadjusted data (e.g., smaller universities could become higher in ranking compared with larger universities). This suggests that for comparison of scientific performance of different universities, one should also take into account the human resources available (productivity and visibility indexes). We believe that citation analysis, if endorsed at both national and local levels, may provide good opportunities for stimulating the growth of science in academic systems that are willing to increase the value of merit and genuine scientific interest.

G. A. FAVA,¹ E. BRENO,² V. GUARDABASSO,³
M. STEFANELLI⁴

¹Department of Psychology, University of Bologna, V.le Berti Pichat 5, 40127 Bologna, Italy. ²CRUI Foundation for Italian Universities, Piazza Rondanini, 48, 00186 Rome, Italy. ³University Hospital, University of Catania, Via S. Sofia 78, 95123 Catania, Italy. ⁴Department of Computer and Systems Sciences, University of Pavia, Via Ferrata 1, 27100 Pavia, Italy.

Reference

1. E. Breno, G. A. Fava, V. Guardabasso, M. Stefanelli, *La Ricerca Scientifica nelle Università Italiane. Una Prima Analisi delle Citazioni della Banca Dati ISI* (CRUI, Rome, 2002).

Species Biology and Conservation Funding

IN HIS POLICY FORUM "CONSERVATION priorities for Russian mammals" (16 Aug., p. 1123), L. V. Polishchuk notes that limited government financial resources are often devoted to the conservation of only a few, high-profile flagship species. He suggests that conservation resources should be divided between species on the basis of extinction risk and proposes a mathematical model using the chance of inclusion on the IUCN Red List of Threatened Species, as predicted by annual fecundity, to provide a more uniform allocation.

The implication that the amount of

funding required to conserve a species is directly related to its annual fecundity may be an oversimplification. For example, different species face different threats, from habitat loss, to overexploitation, to conflict with, and persecution by, humanity. Mitigating these different threats will incur widely differing costs (1). Moreover, some threatened species will generate resources for their own conservation, either through sustainable utilization such as tourism or hunting, or through their public image and marketability by fundraising nongovernmental organizations (2, 3). This should relieve pressure on limited government funding sources for use on species with lower commercial potential. Finally, conservation resources are often allocated to protecting areas that conserve a range of species, rather than to individual species per se, which may be a more efficient tool for biodiversity conservation (4). Prioritization for funding of individual species should therefore take into account the relative costs of their conservation, the existence of alternative funding sources, and the extent to which extinction risk is averted by funding multispecies protected area networks.

The search for unifying theories and models in conservation biology to direct policy is intensifying (5). The model proposed by Polishchuk may be a useful tool where species face similar environmental and human pressures or where other relevant data are lacking. However, such models mask the complexity inherent in conservation, which may limit their real-world applicability (6).

M. J. WALPOLE, R. J. SMITH, N. LEADER-WILLIAMS
Durrell Institute of Conservation and Ecology, University of Kent, Canterbury, Kent CT2 7NS, UK.

References

1. J. K. Miller *et al.*, *Bioscience* **52**, 163 (2002).
2. M. J. Walpole, N. Leader-Williams, *Biodiv. Conserv.* **11**, 543 (2002).
3. N. Leader-Williams, R. J. Smith, M. J. Walpole, *Science* **293**, 2203 (2001).
4. D. Simberloff, *Biol. Conserv.* **83**, 247 (1998).
5. G. Caughley, *J. Anim. Ecol.* **63**, 215 (1994).
6. T. Whitten, D. Holmes, K. MacKinnon, *Conserv. Biol.* **15**, 1 (2001).

Response

I AGREE WITH WALPOLE, SMITH, AND LEADER-WILLIAMS that species biology is by no means the only criterion for allocation of conservation resources among species. It is equally true that allocation decisions should not ignore the species' biology and conservation status. The golden mean be-

tween underrating and overrating biology in conservation policy is yet to be developed, however.

An applied aspect of my study is that conservation resources could be divided among species in proportion to their probability of extinction. Because this quantity is known for only a handful of species, I



Russian mammals at risk include the Siberian tiger.

suggest, as a first approximation, allocating resources in accordance with species' chance of being on the IUCN Red List of Threatened Species, which is determined on the basis of annual fecundity.

In fact, the points discussed by Walpole *et al.* do not undermine this proposal. It is true that "different species face different threats," and, to make the situation even worse, those having similar fecundity may well differ in other biological traits. The fact, however, is that despite these effects, which tend to blur the relationship between fecundity and chance of listing, the latter holds up well and would probably be even stronger if confounding factors were equalized. Hence, this relationship ought to be taken into account when working out a conservation strategy.

Furthermore, it's true that "some threatened species will generate resources for their own conservation." But the point is that, regardless of the source of money, be it a visitor to a national park or the state budget, it is the sum total that is allocated according to chance of listing. I realize that fundraising nongovernmental organizations cannot often follow this strategy, because the marketability of the Siberian tiger does not compare with that of the Russian desman, but a governmental agency can. Finally, it's true that "conservation resources are often allocated to protecting areas that conserve a range of species." But the question is how to divide resources among species within a protected area. Species having a higher chance of listing would require, for example, a higher frequency of monitoring, making it possible to catch the first signs of trouble. Account-

CREDIT: CORBIS

ing for considerations made by Walpole *et al.* will thus help to elucidate the mode of application of the chance-of-listing approach, rather than limit its scope.

LEONARD V. POLISHCHUK

Department of General Ecology, Biological Faculty,
M. V. Lomonosov Moscow State University, Moscow
119899, Russia. E-mail: LV@Polishchuk.msk.ru

Where Is the Missing Generation?

IT IS AMUSING TO HEAR SENIOR INDIAN scientists complain about the lack of leadership in Indian science today ("Missing generation leaves holes in fabric of research," P. Bagla, *News Focus*, 25 Oct., p. 733). Bemoaning the loss of past glory is typical of men (please note, there are few women in the senior ranks) who have fallen behind their times. Perhaps these gentlemen also believe that India would have been better off under the British. If indeed their complaint that there is a lack of leaders in the age group of 45 to 55 years is factually correct, who is to blame? It is this class in the age group of 55 to 75 years who have ruled the roost these past few decades and have brought Indian science to its present regrettable state. The complaint about brain drain is a familiar refrain. What does it matter if a million or so Indians emigrate, when 999 million have chosen to stay? Now that these aging fossils are being slowly weeded out by the the passage of time, perhaps the ground will be broken for the emergence of the "missing generation" of scientists. But from what Bagla reports, even this seems to be in doubt.

P. VISHNU KAMATH

Department of Chemistry, Central College, Bangalore University, Bangalore 560 001, India.

A Clarification from the IEDT

ALEXANDER STONE'S ARTICLE "U.S. RESEARCH on sedatives in combat sets off alarms" (*News Focus*, 2 Aug., p. 764) misleads the reader into thinking that the Institute for Emerging Defense Technologies (IEDT) is working on the use of drugs as weapons on the battlefield in international military conflict. Nothing could be further from the truth.

In 1999, the IEDT produced a report to present the results of a literature search on calmatives. The literature search was never a part, nor ever considered a part, of any effort to create military weapons for the battlefield. Rather, it was intended to list possible humane alternatives to deadly force for crisis situations. The literature search was never directed, tasked, or funded by anyone or any organization within the Department of Defense.

Stone also inaccurately describes an investigation we are currently conducting at the request of the National Institute of Justice (NIJ) as a study that tries to gauge the effects on humans of breathing in an aerosolized mixture of calmatives (substances that depress or inhibit central nervous system function and produce tranquil or calm behavior) and pepper spray. In fact, we are conducting a 6-month feasibility study to investigate whether combining a state-of-the-art anesthetic in small, harmless doses with pepper spray might reduce the very violent reaction that often occurs when it is used in domestic law enforcement.

Stone's article also includes speculation implying that the IEDT could be being used in an effort to violate or circumvent the Chemical Weapons Convention. Neither the literature search nor the pepper spray study Stone describes is intended to be applied in a battlefield environment covered by the Convention.

The IEDT develops new, less-than-lethal approaches for homeland security and U.S. military response and also conducts assessments of existing technologies. Among its most recent successes is an inexpensive approach to equipping new or existing fences with the capability to detect, locate, and classify intruders.

A. F. MAZZARA

Institute for Emerging Defense Technologies, Applied Research Laboratory, The Pennsylvania State University, Post Office Box 30, State College, PA 16801, USA.

CORRECTIONS AND CLARIFICATIONS

NEWS OF THE WEEK: "Survey confirms coral reefs are in peril" by E. Pennisi (6 Sept., p. 1622). The caption beneath the photograph on the left on p. 1623 misidentified a fish as a Nassau grouper. The probable species is a saddleback grouper.

RANDOM SAMPLES: "Old map, new ink?" by E. Goldman, Ed. (9 Aug., p. 931). It was stated that the Council of Basel (1431–49) had convened in Belgium. Basel is a city in Switzerland, although it was an independent city-state in the 1430s, when the council took place.

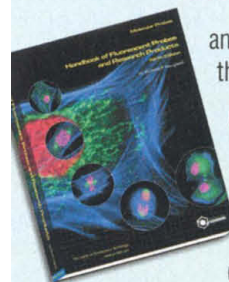
Letters to the Editor

Letters (~300 words) discuss material published in *Science* in the previous 6 months or issues of general interest. They can be submitted by e-mail (science_letters@aaas.org), the Web (www.letter2science.org), or regular mail (1200 New York Ave., NW, Washington, DC 20005, USA). Letters are not acknowledged upon receipt, nor are authors generally consulted before publication. Whether published in full or in part, letters are subject to editing for clarity and space.

Alexa Fluor® dyes: 4-COLOR MICRO- ARRAYS

- ▶ State-of-the-art fluorescent dyes with exceptional brightness and stability across the spectrum.
- ▶ Choose from 10 different dyes to find the perfect match to your scanner channels.
- ▶ Optimized labeling kits ensure consistent and reliable labeling of your microarray samples.

To learn more, please visit
**www.probes.com/
microarrays**



and check out Chapter 8 of
the all new 984-page

**Handbook of
Fluorescent Probes
and Research
Products, 9th Edition.**

Get your free copy today!

**www.probes.com/
myhandbook**



The leader in fluorescence technology.

Eugene, Oregon, USA 1-800-438-2209
Leiden, The Netherlands 31-71-5233378

4-color microarrays provided by Gerlt Schut and Mike Adams, University of Georgia.