



LETTERS

edited by Jennifer Sills

“Agriculture” Is Not a Dirty Word

AGRICULTURAL SCIENCE IS RIPE FOR A RENAISSANCE. FOR TOO MANY YEARS, THE AGRICULTURE sciences have been disparaged in the science and education communities, perhaps because agronomy, soil science, plant pathology, and animal science use a problem-solving approach rather than simply seeking knowledge.

When science research funds are handed out—for example, in the federal stimulus bill—agriculture often gets left off the list. I suspect this is because policy-makers and some scientists see “agriculture” as synonymous with “agribusiness,” rather than as a purely scientific discipline, and they assume private funding will take care of agriculture-related research needs. Agricultural scientists at land-grant institutions do receive some research dollars from noncompetitive sources, but not all research is funded this way.

Adding insult to injury, the major U.S. science journals don’t devote specific sections or editors to agricultural research. Some schools of agriculture have taken the word “agriculture” out of their names, presumably to attract more students in a country where only 2% of the population farms. (It hasn’t worked: Enrollment in university agricultural science majors has dropped steadily nationwide since the early 1980s.)

In short, agricultural science has an image problem. Our disciplines are not considered relevant and, more disturbing, we’re not seen as a source of solutions to many of the world’s most pressing challenges, even though many of those challenges directly relate to agricultural science.

That’s unfortunate, particularly in a world where people are starving or eating unsafe food, where climate change will affect every aspect of 21st-century life, and where new kinds of sustainable fuel are needed. The urgency of these global issues—all of them related to the agricultural sciences—amplifies the need for an applied-science approach.

Agricultural scientists can do amazing things when they combine their expertise and have access to the resources they need. Recently, scientists at an international conference in Mexico announced that they have found a wheat variety that is resistant to Ug99—a strain of stem rust that could affect up to 90% of the world’s wheat (*1*). Although the scientists have not completely eliminated the threat, it’s clearly a breakthrough with enormous implications.

Other recent signs also point to a renewed interest in and respect for agriculture. When the first lady plants a vegetable garden on the White House lawn for the first time in half a century, she’s sending a strong message: Food is important. Books about eating a sustainable, healthy diet top our best-seller lists. The National Gardening Association expects a 19% jump in the number of people growing at least some of their own food this year. Clearly, a growing number of Americans are interested in where their food comes from, even on a small scale.

The 2008 Farm Bill creates the National Institute for Food and Agriculture, which will be headed by a distinguished scientist directly appointed by the president. A small thing, perhaps, but it elevates agriculture to a level of prominence along the lines of health and other sciences. The farm bill also increases funding for competitive grants in both basic and applied agricultural research, which will provide opportunities for advanced study.

Enrollment is up 16% since 2005 among college students in the professional associations that specialize in soil and crop sciences and agronomy, which suggests that today’s students

are interested in learning more about agricultural and environmental issues. Job prospects also are good; the Bureau of Labor Statistics predicts that employment for agricultural and food scientists will be at least average overall and much higher than average in some specialties.

In the long run, does it really matter whether “agricultural scientists” are what we call the people who ensure a safe and plentiful food supply, clean water, and healthy soil? Maybe not, as long as this critical work is funded and accomplished. But as we move into a new era of shared accountability and responsibility, let’s keep in mind that agricultural sciences affect us all, and when agricultural science is thriving, our communities likely are thriving, too.

ALLEN S. LEVINE

College of Food, Agricultural, and Natural Resource Sciences, University of Minnesota, St. Paul, MN 55108–6074, USA, and Minnesota Obesity Center, Minneapolis VA Medical Center, Minneapolis, MN 55417, USA. E-mail: aslevine@umn.edu

Reference

1. J. Vidal, “Stem rust’ fungus threatens global wheat harvest,” *Guardian* (19 March 2009); www.guardian.co.uk/environment/2009/mar/19/rust-fungus-global-wheat-crops.

Schools Anxiously Await NRC Program Rankings

FACULTY MEMBERS AT U.S. INSTITUTIONS usually have mixed feelings about *U.S. News and World Report’s* graduate school rankings. On one hand, we often criticize its “one size fits all” approach and the importance assigned to different categories. On the other hand, we are keenly aware that the ranking of our school can affect our ability to recruit top graduate students and even faculty. It was thus exciting to hear, in mid-2006, that the National Research Council (NRC) decided to perform its own evaluation of graduate programs, the first in more than a decade (*1*).

In January 2007, I and thousands of my colleagues completed a lengthy questionnaire sent by the NRC. Given that *U.S. News* publishes these rankings on an annual basis, the anticipated NRC release date of December 2007 seemed achievable.





Elucidating microbial consortia

1150



Symbiosis and calcification in corals

1153

Unfortunately, it was not. The release has been postponed again and again, for more than a year. Currently, they do not specify even a tentative release date. Time is an issue, because the rankings are based on attributes that may change over a period of a few years, including funding and publications. The longer the delay between data collection and release of results, the less relevant they become.

The students applying to graduate schools are most affected by this delay. Unfortunately, like fellow students from past years, they will not be able to use the new rankings to choose a school.

ZIV BAR-JOSEPH

School of Computer Science, Carnegie Mellon University, Pittsburgh, PA 15213, USA. E-mail: zivbj@cs.cmu.edu

Reference

1. Research Doctorate Programs, Board on Higher Education and Workforce, Assessment of Research Doctorate Programs (<http://sites.nationalacademies.org/pga/Resdoc/index.htm>).

Response

WE ARE IN TOTAL AGREEMENT WITH BAR-Joseph in our concern over the length of time that this study has consumed.

The principal product of the study will be the release of a great deal of data covering graduate education in the United States, much of it gathered for the first time, which will be of use to prospective students, the faculty in these programs, and the leadership of institutions of higher education throughout the United States. The data were collected from 93,626 individual faculty members, 222 institutional coordinators providing information about 5009 programs, and many independent private and public sources of information. We are extraordinarily grateful to the participating institutions for the care, time, and work that they have put into this project!

Because data verification is of the utmost importance in a study of this nature, we have taken extraordinary pains to check and to recheck the input information for accuracy and uniformity. An ever-relevant question has been "Did all respondents to a given query address the identical issue?" External checks for consistency and accuracy were

made by NRC staff, data were returned to the surveyed institutions several times for verification and correction (with changes recorded for over 400 programs), and queries to independent sources were checked repeatedly. It is of the greatest importance that the differences that we report between different programs be real and not based on either error or misunderstandings. Although the results will never be free of error, we believe that we are now at the end of this process.

The section of the report in which we outline our methodology has been submitted to the rigorous review process of the NRC and should soon be available to interested readers. The release of the full report, with the complete set of data for university graduate programs, should follow not too long thereafter and will be made available to faculty and students well before the beginning of the next academic year. We fully concur that the reported data and analysis should be as current as possible and hope that, working together with the participating universities, a mechanism can be developed to provide updates to the report on a timely and prompt basis.

JEREMIAH P. OSTRIKER^{1*} AND CHARLOTTE KUH²

¹Department of Astrophysical Sciences, Princeton University, Princeton, NJ 08544-1001, USA. ²National Academy of Sciences, Washington, DC 20001, USA.

*To whom correspondence should be addressed. E-mail: ostriker@princeton.edu

Note

1. J.P.O. is the committee chair for the study. C.K. is the study director.

White Wolves Can Stand the Heat

T. M. ANDERSON *ET AL.* REPORT THAT WOLVES of the northwestern forest in North America are dark in comparison to the wolves of the tundra ("Molecular and evolutionary history of melanism in North American gray wolves," *Reports*, 6 March, p. 1339). Anderson *et al.* suggest in passing that the dark coats might better hide preying wolves in the forest. An alternative adaptive explanation is that in the summer, a black tundra wolf could overheat.

A study by Finch and Western provides evidence of the temperature-related consequences of coat color among pastoralists' cattle in Kenya (1). Finch and Western showed experimentally that black Boran Zebu cattle in the sun became hotter than did white cattle and that across Kenya, as heat stress increased, the proportion of dark cattle in herds decreased. They also found that herders report more dark than light cattle dying during droughts at low altitude. Finch and Western related the variation in

color to the social system of the Kenyan herders. Some of them divide themselves into clans according to the preferred color of their cattle, and the preference correlates adaptively with the usual heat stress of the clans' home ranges.

ALEXANDER H. HARCOURT

Department of Anthropology, Graduate Group in Ecology, University of California, Davis, CA 95616, USA. E-mail: ahharcourt@ucdavis.edu

Reference

1. V. A. Finch, D. Western, *Ecology* **58**, 1384 (1977).

CORRECTIONS AND CLARIFICATIONS

Perspectives: "Tipping pointedly colder" by L. R. Kump (27 February, p. 1175). In the figure caption, the cooling trajectory was mistakenly referred to as red (it is blue) and the warming trajectory as blue (it is red). In the third paragraph, references 4 and 5 were reversed (reference 4 is to Lear *et al.*, 2008; reference 5 is to Katz *et al.*), and in the fifth paragraph, the reference to Lear *et al.* (5) should be to reference 3 (Lear *et al.*, 2000). In the ninth paragraph, the citation to references (2–4) should be to references (2–5).

Perspectives: "Harvesting ocean wave energy" by J. Scruggs and P. Jacob (27 February, p. 1176). For panel A of the figure, the photo credit should have read "Copyright 2007 New York Times Graphics" and the caption should have read "Schematic of a direct-drive point absorber developed at Oregon State University." The rated power of the Ocean Power Technologies array in Oregon is 1.5 MW, rather than 2.0 MW, and the company name for the AWS point absorber is Teamwork Technology BV.

Reports: "Spending money on others promotes happiness" by E. W. Dunn *et al.* (21 March 2008, p. 1687). We recently identified a bug in the statistical package SPSS 14.0 that we used to analyze our data. The bug causes the first line of data to overwrite the sixth line of data (see www.is.stir.ac.uk/itsupport/software/SPSS.php). This bug affected the data set for our longitudinal study ($N = 16$). Primarily because this error decreased the variance in our data set, correcting this error alters the critical statistical test such that the effect of prosocial spending on happiness is reduced from the originally reported effect of $b = 0.81$, $P < 0.02$ to $b = 0.55$, $P < 0.115$ (which falls within the 95% confidence interval for the original parameter estimate). The corrected data set is available from the first author's Web site. The other three studies reported in our paper were unaffected by this bug.

Reports: "Adaptive plasticity in female mate choice dampens sexual selection on male ornaments in the lark bunting" by A. S. Chaine and B. E. Lyon (25 January 2008, p. 459). In the lower right of Fig. 4, $N = 384$, not 87. The statistics reported are correct.

TECHNICAL COMMENT ABSTRACTS

COMMENT ON "A Large Excess in Apparent Solar Oblateness Due to Surface Magnetism"

J. R. Kuhn, M. Emilio, R. Bush

Fivian *et al.* (Reports, 24 October 2008, p. 560) analyzed data from the Reuven Ramaty High-Energy Solar Spectroscopic Imager satellite and reported that the Sun is more oblate than previous measurements have suggested. We argue that their threshold-based analysis yields a biased measure of the solar limb shape geometry.

Full text at www.sciencemag.org/cgi/content/full/324/5931/1143-b

RESPONSE TO COMMENT ON "A Large Excess in Apparent Solar Oblateness Due to Surface Magnetism"

M. D. Fivian, H. S. Hudson, R. P. Lin, H. J. Zahid

Our analysis of satellite data from the Reuven Ramaty High-Energy Spectroscopic Imager revealed a strong correlation with a magnetic proxy, leading to an anomalous increase of the solar oblateness. We modeled this effect to yield an oblateness measurement of an assumed underlying nonmagnetic Sun. Kuhn *et al.* note that this measurement could be confused with a systematic spatial brightness variation. The existing data on this are ambiguous.

Full text at www.sciencemag.org/cgi/content/full/324/5931/1143-c

Letters to the Editor

Letters (~300 words) discuss material published in *Science* in the previous 3 months or issues of general interest. They can be submitted through the Web (www.submit2science.org) or by 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.