

LETTERS

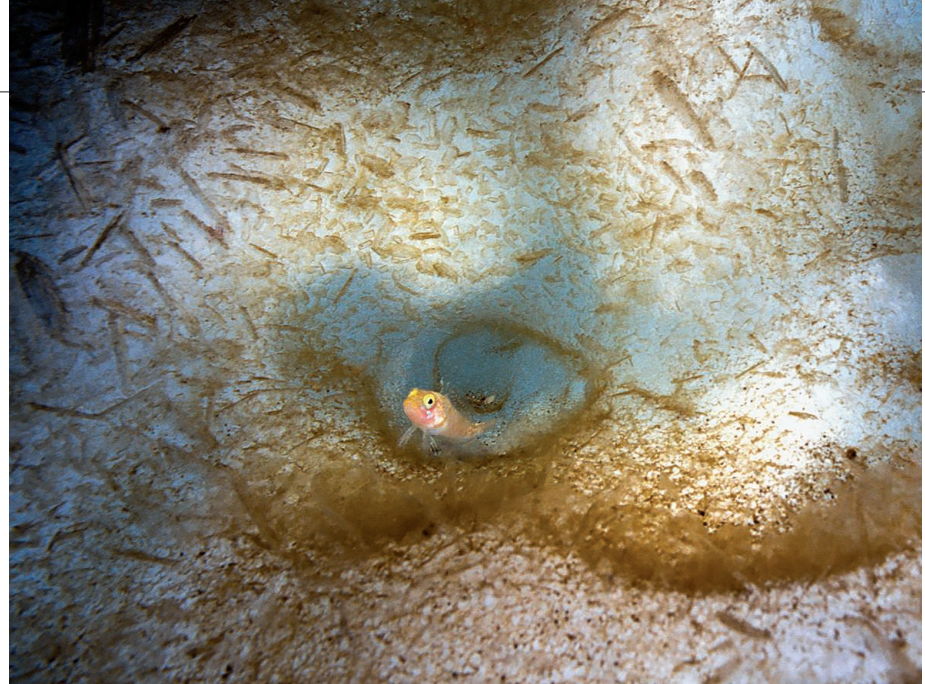
Edited by Jennifer Sills

Call for conservation: Abandoned pasture

THE STATISTICS DIVISION of the Food and Agriculture Organization (FAO) has recently released its national land distribution data for the year 2013 (1), which is currently the only annual cross-country time series on agricultural land use. According to these data, over the past 15 years, total global pasture area has declined by 62 million hectares (-2%), the first significant decrease on record. In the 65 countries where pasture has shrunk, only 15 have shown an increase in total agricultural land, and across all 65, total agricultural area declined by 109 million hectares. This implies that pasture land is not being used for different agricultural purposes, and instead suggests that an area approximately the size of South Africa may have recently been abandoned. All of this is despite a production increase from ruminants (meat, milk, hides, and wool) of 35% over the same period (1).

Where pasture has declined, most reductions have been annually persistent; a one-off methodology change is an unlikely explanation. Rather, these striking data could be due to a range of factors making grazing more intensive and less mobile, coupled with changing economic and environmental conditions. For example, in Australia, which represents a large part of the decline, 25 years of low wool prices (1) have affected stock numbers, and desertification and woody encroachment have reduced productive pasture area (2). In Iran, Mongolia, Turkmenistan, and Uzbekistan (also countries of substantial decline), land and livestock privatization, urbanization, and changing management practices have spatially concentrated production (3), reducing total land use.

If the data are accurate, we may be able to benefit from a sizeable land-sparing conservation opportunity (4) and restore vast areas of natural habitat through reforestation or reestablishment of natural grasslands. In doing so, we will confront a number of questions: Will the land become wild again naturally, meaning no action is required? Is it most productive to build relationships with landowners to facilitate conservation goals? Given that land values are likely low, is this a chance for opportunistic and targeted land acquisitions that could serve as foundations for new protected areas? Whatever the case,



Evidence indicates that the Antarctic *Pagothenia borchgrevinki* can adapt to a range of temperatures.

conservationists need to move quickly, as other actors are already laying out their ambitions for using pasture (5).

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Recognizing thermal plasticity in fish

IN THEIR REVIEW "Climate change and marine vertebrates" (13 November 2015, p. 772), W. J. Sydeman *et al.* acknowledge but understate the significance of phenotypic plasticity in modulating population responses to climate change and in mitigating the direct effects of increasing temperature. Indeed, a meta-analysis of thermal phenotypic plasticity found that some species of fish possess a substantial capacity to compensate for increases in temperature, potentially making them more resilient to global warming (1). Thus, prognostications for the future of certain fish species may not be as dire.

For example, stenothermal polar fishes such as the Antarctic *Pagothenia borchgrevinki* can thermally compensate, producing a new phenotype that functions well at 4°C (2, 3), much warmer than

their usual -1.8°C. Similarly, the Arctic cod (*Boreogadus saida*), a key prey species in the Arctic food web (1) that spends most of the year under ice, grows better at 5°C and 9°C than at 0°C (4) and maintains a rhythmic heartbeat up to 10°C (5). Native Pacific northwest rainbow trout (*Oncorhynchus mykiss*) have been introduced in every continent except Antarctica, have been selectively bred to physiologically tolerate temperature extremes in Western Australia (6), and have a subspecies (redband trout, *O. mykiss gairdnerii*) naturally adapted to the thermal extremes of a desert environment (7). Populations of northwest Pacific adult sockeye salmon (*O. nerka*) show a range of thermal reaction norms (8, 9). That said, not all sockeye populations would flourish in warmer temperatures; one population's once-in-a-lifetime river migration has already been largely prevented by an unusually warm temperature event (10).

Reducing model uncertainty is an urgent matter (11), but it will require a better understanding of phenotypic plasticity and genotypic diversity within a species, as well as the key mechanistic features that enable certain individuals to perform better at warmer temperatures and be subjected to natural selection.

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HIV/AIDS epidemic: The whole truth

THE NEWS FEATURE “What does a disease deserve?” (J. Kaiser, 20 November 2015, p. 900) asserts that “AIDS death rates began dropping dramatically” about 2 decades ago. This is only part of the truth. According to the Centers for Disease Control and Prevention (CDC) (1), the number of people living with HIV has been rapidly increasing. The number of new infections has been steady in the United States (~45,000 annually) for at least 20 years, and the afflicted populations are underpowered and marginalized. For a country with our

resources, this is a national disgrace. The leadership of the CDC has made a similar case (2).

Many of us seem to have forgotten that—in contrast to many noncommunicable diseases—HIV is an infectious disease that can be controlled by reducing transmission. So what’s needed? Even absent an AIDS vaccine, we have the tools needed to reduce transmission and control this epidemic. To do so, the Office of AIDS Research and the National Institutes of Health must make a major investment in implementation science (with the participation of social, political, and economics experts) and coordinate these initiatives with the CDC. This is no time to turn our back on the research required to end the epidemic of HIV/AIDS in the United States.

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ERRATA

Erratum for the Report “Polariton superfluids reveal quantum hydrodynamic solitons” by A. Amo *et al.*, *Science* **350, aad9363 (2015).** Published online 11 December 2015; 10.1126/science.aad9363

Erratum for the Report “14-Step synthesis of (+)-ingenol from (+)-3-carene” by L. Jørgensen *et al.*, *Science* **350, aad8935 (2015).** Published online 27 November 2015; 10.1126/science.aad8935

Erratum for the Report “Genomic correlates of response to CTLA-4 blockade in metastatic melanoma” by E. M. Van Allen *et al.*, *Science* **350, aad8366 (2015).** Published online 13 November 2015; 10.1126/science.aad8366

Erratum for the Report “Base triplet stepping by the Rad51/RecA family of recombinases” by J. Y. Lee *et al.*, *Science* **350, aad6940 (2015).** Published online 30 October 2015; 10.1126/science.aad6940

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