LETTERS

Edited by **Jennifer Sills**

Making waves about spreading weeds

THE LIFE IN *SCIENCE* "Weeds making waves" (D. S. Johnson, 18 April, p. 255) told the story of a middle school project that made a boat out of the highly invasive reed *Phragmites australis*. The teacher lashed together the reed stems to make a boat that was "twice as long as the truck bed" and floated for at least 2 hours. Although finding creative ways to use invasive species is admirable, this particular use is ill advised because *Phragmites* is one of the world's most invasive wetland plants.

Boats or natural debris containing stems of this plant can travel 6.5 km on a single tide (*1*). They serve as efficient dispersal vessels because *Phragmites* can regenerate from green stem nodes and fragments, and bundles of reed stems can also contain viable seed and rhizomes. Water dispersal occurs naturally, but increasing opportunities via reed rafts can expedite colonization of new sites, aggregate introduced genotypes from distant locales, and promote novel genetic admixtures. This increased genetic diversity facilitates hybridization and heterosis—factors that contribute to invasions (*2*). This is especially relevant for *Phragmites*, as North America has become a genetic melting pot for this genus (*3*). Non-native genotypes and hybrids have been identified from Quebec to Florida and across the United States to California. Millions of dollars are spent annually to manage and remove *Phragmites* because it reduces plant and animal diversity and changes ecosystem functions (*4*).

Education about the negative consequences of invasive species is especially laudable in K–12 schools, and finding uses for plant invaders is a potential management strategy. However, promoting the inadvertent spread of invasive species under the guise of humor should be avoided from both educational and ecological standpoints.

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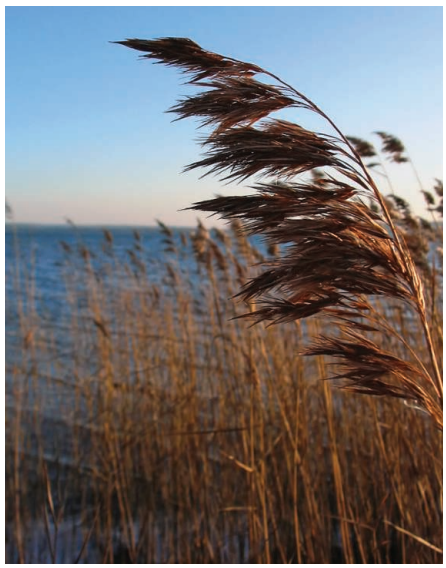
Response

I RECOGNIZE MEYERSON *et al.*'s scientific arguments, but argue that the increased risk of putting a boat made of senesced aboveground shoots of *Phragmites* without seed heads into the February waves, is small, especially given that it was launched near already towering *Phragmites* stands. Furthermore, I do not recommend nor foresee a flotilla of *Phragmites* boats hugging our coastlines.



Phragmites australis.

Humor may have clouded my scientific points. To clarify, my piece highlights the need for creativity in controlling invasive species, while conceding that *Phragmites* boats may not be an effective management strategy. Meyerson *et al.* correctly highlight that we spend $4 million annually on *Phragmites* management, citing Martin and Blossey (*1*). Those same authors question the efficacy of current *Phragmites*

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The eureka story

IN HIS 11 APRIL LETTER "Immunotherapy: It takes a village" (p. 149), D. Pardoll recognized some of the scientists and research that led to the discovery highlighted as *Science*'s 2013 Breakthrough of the Year: cancer immunotherapy. Online commenters pointed out additional factors worthy of recognition. An excerpt from those comments is below. Read the full comments at http://comments.sciencemag.org/content/10.1126/science.344.6180.149-a.

A selection of your thoughts:

THE LETTER BY D. PARDOLL pays tribute to the basic science and its primary contributors behind breakthroughs in cancer immunotherapy. A major aspect of the breakthrough is the approach of blocking co-inhibitory receptors.... Pardoll's Letter leaves one asking, when was the "eureka" moment when immunologists understood that peripheral tolerance was not simply a consequence of AgR signals, the previous paradigm, but instead due to such co-inhibitory signals? ...Nicholas R. StC. Sinclair did experiments that led him to publish in 1971 the model that B cells are made tolerant not by AgR engagement but instead co-engagement of AgR with a hypothesized receptor for the Fc portion of IgG on the B cell. The B cell FcR receptor was later discovered by others and was shown in tremendous cellular and molecular detail to be a co-inhibitory receptor.... [B]etween 1990 and 1993, Sinclair proposed that these co-inhibitory receptors underlie negative feedback regulation of T cells and not just B cells, a conceptualization driven by his quite radical view at the time that the AgR transmits positive rather than negative signals; hence the need for other signals to shut down lymphocytes. One wonders how such breakthroughs in understanding could have received so little attention. It raises broader questions of what we value in basic science. If we are to do our best to justify funding of basic science, we must ensure that the stories of such eureka moments illuminating a general principle in biology are told.

C. Anderson, U Alberta; A. Panoskaltsis-Mortari, U Minnesota

management, which yields little ecological benefit (*1*). This is precisely my point in writing that "We have tried to cut it, poison it, burn it, bury it, till it, and drown it, and yet its tufted heads still sway in the wind." Our current management strategies for *Phragmites* are simply ineffective.

Phragmites invasions can certainly have devastating consequences, but this is not universally the case. For instance, *Phragmites* in certain instances can positively influence invertebrate populations (*2*). *Phragmites* is effective in phytoremediation of metal, hydrocarbon, and nutrient pollution (*3*, *4*) and can allow for faster marsh accretion (*5*), an important factor in maintaining elevation with an ever-rising sea.

Given the lack of management efficacy and the possible positive effects of *Phragmites* in certain instances, should we be spending $4 million annually on *Phragmites* management? I do not advocate abandoning management efforts—the conversion of brackish tidelands into *Phragmites* is a serious ecological concern—nor do I advocate the spread of any invasives. I do suggest that we triage our efforts and seriously re-evaluate current approaches (*1*). Finally, I applaud any teacher who uses creativity to engage students.

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TECHNICAL COMMENT ABSTRACTS

Comment on "Specific and nonhepatotoxic degradation of nuclear hepatitis B virus cccDNA"

Francis V. Chisari, William S. Mason, Christoph Seeger

■ Lucifora *et al.* (Research Articles, 14 March 2014, p. 1221) report that the hepatitis B virus (HBV) transcriptional template, a long-lived covalently closed circular DNA (cccDNA) molecule, is degraded noncytolytically by agents that up-regulate APOBEC3A and 3B. If these results can be independently confirmed, they would represent a critical first step toward development of a cure for the 400 million patients who are chronically infected by HBV.

Full text at http://dx.doi.org/10.1126/science.1254082

Response to Comment on "Specific and nonhepatotoxic degradation of nuclear hepatitis B virus cccDNA"

Yuchen Xia, Julie Lucifora, Florian Reisinger, Mathias Heikenwalder, Ulrike Protzer

■ Chisari *et al.* challenge our central conclusion that the hepatitis B virus (HBV) persistent form, the covalently closed circular DNA (cccDNA), is degraded in a noncytotoxic and specific fashion in the nucleus of infected hepatocytes. Specificity of the assays used, exclusion of cell division or death, and activity of APOBEC3 deaminases in the nucleus, however, were addressed in the paper.

Full text at http://dx.doi.org/10.1126/science.1254083