Service ran afoul of Greenberg’s Law: Don’t ask the barber if you need a haircut (5).

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References
1. First Solar (www.firstsolar.com).

An Unorthodox Approach to Forest Restoration
IN THEIR POLICY FORUM “RESTORATION SEED banks—A matter of scale” (22 April, p. 424), D. J. Merritt and K. W. Dixon highlight the importance of ecological restoration in meeting global conservation goals, and the urgency to scale up seed supplies from seed banks to achieve such endeavors. We support their call, but emphasize that seed banks will only facilitate the restoration of ecosystems dominated by species whose seeds can tolerate drying and long-term storage.

Seeds fall into two storage categories: orthodox seeds and recalcitrant (or unorthodox) seeds. Orthodox seeds tolerate desiccation without losing viability and germinate upon rehydration, making them highly amenable to storage in seed banks. Recalcitrant seeds have high moisture content and lose viability if moisture drops below a critical amount. The desiccation sensitivity of recalcitrant species means that restoration seed banks are ineffective for many plant species. Other methods, such as cryogenic storage, are unlikely to be scalable for restoration (1).

These limitations are noteworthy, given that many tropical and subtropical tree species have recalcitrant seeds (2). Many such species are ecologically and also economically important, with markets based on global tropical timber valued at nearly US$100 billion (3). For example, the data that exist on seed behavior in four of the globally most important timber families indicate that, on average, 60% are recalcitrant (4).

Restoration seed banks might contribute to the conservation and restoration of many orthodox plant species, but restoration of tropical forests and many other plant communities will require considerable additional investments in plant nurseries and seedling propagation to maintain the equally numerous, and perhaps ecologically more important, recalcitrant species (5). Expansion of seedling propagation for restoration of tropical forests will require overcoming ecological and financial, rather than technological, constraints (6).

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References

Response
KETTLE AND COLLEAGUES ARE CORRECT THAT recalcitrant seeds, many of which grow in tropical climates, cannot be stored long-
term in seed banks. However, the bulk of the world’s disturbed landscapes fall outside of tropical forest areas (1), and less than 10% of the world’s flora is estimated to produce truly recalcitrant seeds (2, 3). Restoration seed banks (4, 5) can effectively store the seeds of most of the world’s plants.

Moreover, as we discussed in our Policy Forum, restoration seed banks are more than just seed vaults, and their wider applications can address the conservation needs of recalcitrant seeds and tropical forests. They can store all kinds of seeds for use within a relatively short time frame (months rather than years) (6). They can work to create vibrant centers of integrated seed science linked through adaptive management to restoration practice. They could also extend current seed farming infrastructure and plant husbandry to incorporate nursery-based seedling production for recalcitrant species.

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References

TECHNICAL COMMENT ABSTRACTS

Comment on “The Mechanism for Activation of GTP Hydrolysis on the Ribosome”

Anders Liljas, Måns Ehrenberg, Johan Åqvist
Voorhees et al. (Reports, 5 November 2010, p. 835) determined the structure of elongation factor Tu (EF-Tu) and aminoacyl–transfer RNA bound to the ribosome with a guanosine triphosphate (GTP) analog. However, their identification of histidine-84 of EF-Tu as deprotonating the catalytic water molecule is problematic in relation to their atomic structure; the terminal phosphate of GTP is more likely to be the proper proton acceptor.

Full text at www.sciencemag.org/cgi/content/full/333/603B/37-a

Response to Comment on “The Mechanism for Activation of GTP Hydrolysis on the Ribosome”

Rebecca M. Voorhees, T. Martin Schmeing, Ann C. Kelley, V. Ramakrishnan
Our report of the crystal structure of elongation factor Tu (EF-Tu) and aminoacyl–transfer RNA bound to the ribosome with a guanosine triphosphate (GTP) analog included a proposed mechanism of GTP hydrolysis by EF-Tu involving histidine-84. Liljas et al. summarize experimental evidence against this mechanism and propose a substrate-assisted catalytic model. However, these experiments and the model are also problematic. Further study is required to definitively determine the mechanism of GTP hydrolysis by EF-Tu.

Full text at www.sciencemag.org/cgi/content/full/333/603B/37-b

Letters to the Editor

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