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WHAT IS RESILIENCE AND WHY DOES IT MATTER?

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IUFRO President

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Adansonia grandidieri, **Avenue of the baobabs, Morondava. Madagascar.**
Photo: Mike Wingfield

Wordle of resilience.
Photo Source: http://greatlakesresilience.org/climate-environment/planning-climate-change

*"**Resilience:** the capacity of social, economic and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity, and structure, while also maintaining the capacity for adaptation, learning and transformation"*

Source: Climate Change 2014: Synthesis Report, IPCC

Gum Arabic, Cameroon.
Photo: Ignace Fokou Sakam, FAO

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SPECIAL ISSUE

FOREST HEALTH

THREATS AND RESILIENCE

REVIEW

Planted forest health: The need for a global strategy

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Several key tree genera are used in planted forests worldwide, and these represent valuable global resources. Planted forests are increasingly threatened by insects and microbial pathogens, which are introduced accidentally and/or have adapted to new host trees. Globalization has hastened tree pest emergence, despite a growing awareness of the problem, improved understanding of the costs, and an increased focus on the importance of quarantine. To protect the value and potential of planted forests, innovative solutions and a better-coordinated global approach are needed. Mitigation strategies that are effective only in wealthy countries fail to contain invasions elsewhere in the world, ultimately leading to global impacts. Solutions to forest pest problems in the future should mainly focus on integrating management approaches globally, rather than single-country strategies. A global strategy to manage pest issues is vitally important and urgently needed.

Forests and woodland ecosystems are a hugely important natural resource, easily overlooked and often undervalued (*1*–*3*). Globally, one in six people is estimated to rely on forests for food (*3*), and many more depend on forests for other critical ecosystem services, such as climate regulation, carbon storage, human health, and the genetic resources that underpin important wood and wood products–based industries. However, the health of forests, both natural and managed, is more heavily threatened at present than ever before (*4*–*6*). The most rapidly changing of these threats arise from direct and indirect anthropogenic influences on fungal pathogens and insect pests (hereafter referred to as pests), especially their distribution and patterns of interactions.

Here we focus on the importance of pests of planted forests, which are particularly vulnerable to invasive organisms yet are of growing importance as an economic resource and for various ecosystem services. Planted forests are typically of a single species. In plantations in the tropics and Southern Hemisphere, they are usually of nonnative species, such as species of *Pinus*, *Eucalyptus*, and *Acacia*. Northern Hemisphere plantations have been separated from their natural enemies. However, when plantation trees are reunited with their coevolved pests, which may be introduced accidentally, or when they encounter novel pests to which they have no resistance, substantial damage or loss can ensue (*7*). The longer these nonnative trees are planted in an area, the more threatened they become by native pests. Where the trees are of native species, they can be vulnerable to introduced pests. But the relative species uniformity of monoculture stands in intensively managed native plantation forests can make them especially susceptible to the many native pests occurring in the surrounding natural forests (*8*–*10*).

There are many opportunities to mitigate potential losses caused by pests in planted forests through exclusion (e.g., pre-export treatments and quarantine), eradication of newly established pests, and avoidance of disease through pest containment and management. Yet the lack of investment and capacity, especially in poorer countries, as well as the limited coordination of efforts at a global level, means that the impact of these tools to stem the global problem is limited. Unless this is addressed, pest problems will continue to grow and will threaten the long-term sustainability of

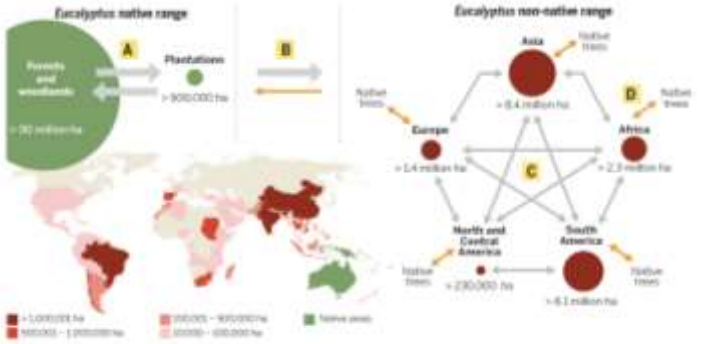


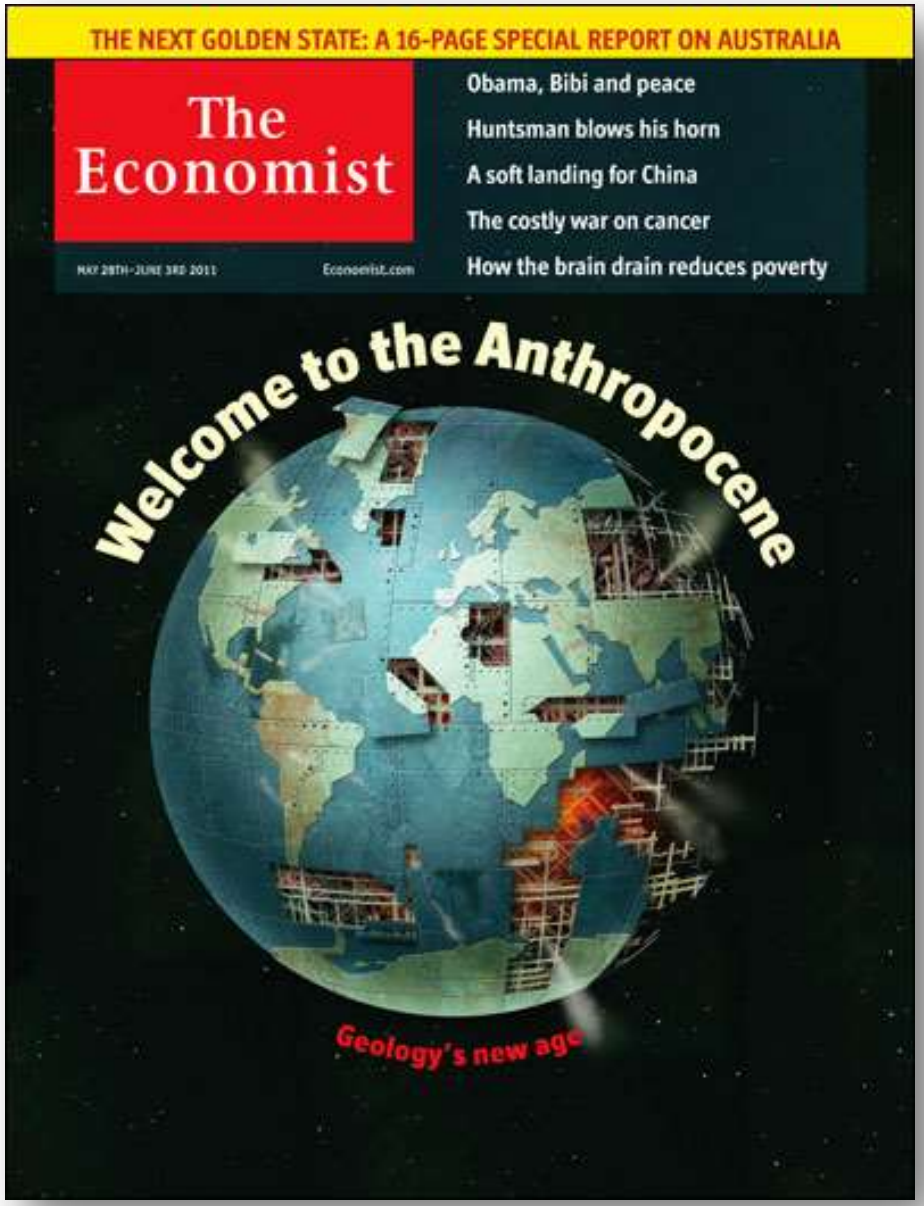
Fig. 1. Eucalyptus as a model to illustrate the origin and spread of planted forest pests.

Notholithocarpus densiflorus **(Tan Oak), Big Sur, California. Photo: David Rizzo**

One million ha's killed by Mountain Pine Beetle. Grand Teton National Park, USA. Photo source: www.ecoflight.org

Coffee break at the XXIV IUFRO World Congress in 2014, Salt Lake City, USA Photo: Janelle Bianca C. Fernandez

Participants of community forestry meeting discussing the main causes of forest degradation Photo: Ernest Foli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