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Googling forest pests -Use of Google as a monitoring tool for delimiting the distributional range of forest pests

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Evaluating North American endophytic fungi for biological control of a coadapted pathogen *Dothistroma* needle blight in *Pinus* sp. Ridout, M., Newcombe, G. (*University of Idaho, USA; mridout@uidaho.edu; georgen@uidaho.edu*).

Red-banded needle blight of pines caused by the North American pathogens *Dothistroma* spp. has been devastating to radiata pine plantations in the Southern Hemisphere. However, the same pathogens are relatively benign in their North American ranges, where they infect a number of North American pines. This divergent response might indicate that some biotic or abiotic factor within the environment checks severity of infection across the native range of both the pines and their pathogens. In classical applications of biological control methods, the best source of biocontrol agents might be found within the natural range of the pathogen. Co-occurring communities of endophytic fungi found in pines within the native range of the pathogen provide a reservoir of potential biocontrol organisms. Seven single-endophyte treatments were applied to emerging needles of 7-year-old trees of *Pinus ponderosa* infected with red-banded needle blight. *Penicillium goetzii* isolated as an endophyte from root tissues of *Pinus ponderosa* reduced lesion extent by 7% on inoculated needles compared to untreated needles on *Dothistroma*-infected needles of *P. ponderosa*. Results from this study indicate that co-occurring endophytes present a potentially valuable tool for classical biocontrol of *Dothistroma* needle blight in intensive exotic pine plantations in the Southern Hemisphere and beyond.

Natural enemy recruitment to the Asian chestnut gall wasp, *Dryocosmus kuriphilus*, a highly invasive pest of chestnut, *Castanea* spp., worldwide. Rieske-Kinney, L. (*University of Kentucky, USA; lrieske@uky.edu*).

The globally invasive Asian chestnut gall wasp, *Dryocosmus kuriphilus*, continues to expand its range, affecting *Castanea* resources throughout invaded areas. Natural enemy recruitment to this globally invasive pest is being evaluated in the context of evolving trophic interactions (parasite – gall wasp and parasite – parasite), and applied biological control. In North America numerous adult parasitoids reared from galls collected throughout infested areas have been identified, but the presence of adult parasitoids is not necessarily indicative of parasitization. In order to determine which species are affecting gall wasp populations, identification of larval parasitoids dissected directly out of developing galls is necessary. But morphological identification of larval parasitoids is difficult. In this research a molecular approach is being used to definitively determine which parasitoids are affecting gall wasp populations. The ITS2 region of parasitoid larvae dissected from developing galls is being compared to adult insects identified morphologically. In this way specific parasitization activity and rates can be directly attributed to specific parasitoid species, opening the door for additional manipulations for biological control.

Colonization dynamics of mountain pine beetle in eastern and western pines: implications to range expansion. Rosenberger, D. (*University of Minnesota, USA; rose0675@umn.edu*), Venette, R. (*U.S. Forest Service, USA; rvenette@fs.fed.us*), Aukema, B. (*University of Minnesota, USA; bhaukema@umn.edu*).

The mountain pine beetle (*Dendroctonus ponderosae* Hopkins) is a disturbance agent native to western North America that intermittently undergoes large-scale outbreaks in *Pinus contorta* and *P. ponderosae*. This insect threatens eastern forests due to recent eastward spread from *P. contorta* forests of British Columbia into the *P. banksiana* forests of northwestern Alberta, and through transport of green pine logs from western states with populations of mountain pine beetle. Here the authors explore the colonization dynamics of this insect in naïve eastern hosts. Logs from two species of native hosts (*P. ponderosae* and *P. contorta*) and four naïve eastern pine species (*P. strobus, P. resinosa, P. banksiana,* and *P. sylvestris*) were harvested and transported to the Black Hills of South Dakota (USA), an area with epidemic populations of mountain pine beetle. There the authors investigated attraction of conspecifics in the field by tunneling beetles and host acceptance. Results indicate that eastern pine species may be susceptible to mountain pine beetle colonization. Differences in attraction among eastern pines and in host entry among regions may cause us to rethink our understanding of colonization dynamics from what is currently known in western forests. Implications to ongoing eastern range expansion of this eruptive herbivore are discussed.

Googling forest pests -Use of Google as a monitoring tool for delimiting the distributional range of forest pests. Rousselet, J., Robinet, C., Rossi, J. (*National Institute for Agricultural Research* (*INRA), France; jerome.rousselet@orleans.inra.fr; christelle.robinet@orleans.inra.fr; rossi@supagro.inra.fr*).

During the last decade, geospatial data have become increasingly accessible with the advent of new mapping technologies such as Google Earth™, Google Street View™, or Google Trends™. These technologies offer satellite imagery and aerial photos of most of Earth's land surface as well as real-time data documenting different types of outbreaks. The authors investigated how Google Street View could help in assessing the geographical distribution of species and how Google Trends could provide insight for real-time surveillance of pests. The authors worked with the pine processionary moth, the most important pine defoliator in southern Europe. They conclude that Googling forest pests is a promising tool although the approach is still in its infancy; more investigations are required to properly define its range of application and its limitations.

Trees outside forest strongly affect habitat connectivity for forest insects. Rousselet, J., Rossi, J. (*National Institute for Agricultural Research* (*INRA) France; jerome.rousselet@orleans.inra.fr; rossi@supagro.inra.fr*).

Some forest tree species are commonly used for ornamental purposes and therefore occur frequently in non-forest ecosystems. This paper presents the results of a modeling survey focused on the spatial distribution of trees outside forest (TOF) at the landscape scale. The authors deal with the tree species that host the pine processionary moth (PPM), a major pest for pine species in Europe. They modeled the spatial distribution of TOF by means of an inhomogeneous Poisson process and performed simulations across various landscapes. Results show the TOF constitute a major component of landscape connectivity with regards to PPM dispersal. In particular, large-scale ornamental tree distribution allows pest dispersal across non-forest habitat such as open-field agricultural landscapes.

Population structure and local adaptation of the pine cone weevil *Pissodes validirostris* (Coleoptera, Curculionidae): disentangling the role of the host plant from geography. Roux, G., Bertheau, C., Roques, A. (*National Institute for Agricultural Research* (*INRA), France; geraldine.roux@orleans.inra.frcoralie.bertheau@gmail.com; alain.roques@orleans.inra.fr*).