

Dry heat increases bark beetle bite

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Climate change appears to be good news for destructive bark beetles, according to a new study by Lorenzo Marini from the University of Padova in Italy, and his team. Their work, published online in Springer's *Climatic Change*, shows that there were more attacks by the spruce bark beetle on European Alpine spruce forests over a 16 year period, as temperatures rose and rainfall dropped.

Shifts in temperature, rainfall, and atmospheric gas concentrations, as well as destructive activities by pests and pathogens, are having a profound effect on forest ecosystems. The spruce bark beetle *Ips typographys* (L.) in particular, is one of the most destructive pests of the European forests, and it is expected to quickly respond to [climate change](#). Forest damage due to this bark beetle has increased markedly during the last decades throughout the whole of Europe.

The researchers analyzed the pattern and impact of outbreaks by the bark beetle, by assessing the extent of timber loss in a mountain region on the southern border of the European Alps. They described the size and distribution of the infested areas occurring along steep temperature gradients over a 16-year period (1994-2009), as well as climatic variations.

Two types of forests were identified: so-called 'on-site' forests where Norway spruce is within its limits of historical climate range, at higher altitudes where temperatures are generally cooler; and 'off-site' forests where spruce is growing outside of its natural climatic range, at lower altitudes and in a warmer climate.

Both the extent and location of timber loss were linked to [climatic variations](#). Dry summers combined with warm temperatures were significant triggers for severe outbreaks. Forest damage per hectare was on average 7-fold higher where spruce was planted in sites warmer than those within its historical climate range (off-site). Although trees planted off-site grew substantially faster, their defences against the bark beetle were probably weakened by both low rainfall and warmer temperatures. In addition, dry conditions in the previous year encouraged the bark beetle to move to higher altitudes. The low rainfall at those higher altitudes gave the beetles new opportunities to find suitable, weaker host trees which, under normal rainfall conditions, would have been less susceptible to bark beetle attacks.

The authors conclude: "Considering the increased susceptibility of spruce forests to bark beetle outbreaks, the most reliable and ecologically sound strategy to reduce outbreaks of *I. typographus* is sustainable forest management, including avoiding planting spruce outside its natural climatic range."

More information: *Climatic Change* [DOI 10.1007/s10584-012-0463-z](#)

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