

**DEADWOOD** It depends on the quality. Although the quantity of deadwood in Swiss forests is continuing to increase, half of all wood-dwelling beetle species are threatened. There is not enough deadwood of appropriate quality.

Is deadwood, i.e. dead trees and parts of trees, really dead? Deadwood provides one of the most species-rich and important habitats in the forest. Roughly a quarter of all species living in the forest require deadwood. In Switzerland alone this means 2700 fungi, 150 lichen and 1700 beetle species, along with larger animals such as woodpeckers, dormice, bats and some reptiles. Furthermore, every second young spruce in mountain forests grows on decaying tree logs.

Almost half of the deadwood-dwelling beetle species are endangered. They are on the Federal Office of the Environment's (FOEN) Red List, which includes four of the large saproxylic families. "This shows that we have a problem," says a co-author of the Red List, Thibault Lachat, who is a visiting scientist at WSL and a professor at the School of Agricultural, Forest and Food Sciences HAFL. FOEN sees the lack of deadwood as "one of the greatest ecological deficits in the Swiss forest." The amount of deadwood in Swiss forests has, however, up to now increased continuously since the changeover to oil as a fuel – as the Swiss National Forest Inventory (NFI) performed by WSL has verified. The storms Vivian (1990) and Lothar (1999) greatly boosted the supply, as has the fact that harvesting timber in many regions is no longer profitable. According to the NFI, almost a fifth of Swiss forest stands have not been used for over 50 years (see the Infographic on p. 5). Moreover, many forest owners and managers today know that deadwood is ecologically valuable, and protect



In competition with humans: the endangered timberman beetle (*Acanthocinus aedilis*) requires dead, but still fresh, pine in warm, low-lying areas, i.e. in first-class building zones, of all places.

Photo: Beat Wermelinger, WSL

so-called habitat trees, i.e. old living trees with hollows and dead branches, and leave the remnants of timber harvesting lying in the forest.

On average, 24 m<sup>3</sup> of deadwood can be found in one hectare of Swiss forest today, which is enough to fill roughly 200 bathtubs. This is already quite close to the target values specified in the federal government's Forest Policy 2020 to promote species diversity: mountain forests should contain 25 cubic meters per hectare and forests on the Central Plateau 20 m<sup>3</sup>/ha. But these values are still far away from those in natural, not to mention, virgin forests. Natural forest reserves contain between 50 to 130 m<sup>3</sup>/ha deadwood after several years without use, whereas virgin forests have, on average, as much as 140 m<sup>3</sup>/ha. "It is a good starting point to have target values," says Beat Wermelinger, insect specialist at WSL, although he thinks they reflect more what is politically feasible than what is necessary. "These measures meet the needs of many species over large areas, although not of highly specialized species." In his new book "Insects in Forests" (in German), he devotes a chapter each to deadwood and endangered forest insects.

**Alluvial and open forests are disappearing**

Why is it then that so many deadwood species are still on the Red List? What is lacking is mainly deadwood of special quality. According to Thibault Lachat, habitat trees have become very rare, as have thick dead tree stems standing or lying in the sun, as well as wood in advanced stages of decay. In commercial forests, trees are felled well before they become 'senile'. A silver fir can live to be 500 to 600 years old, but is normally harvested when it is 90 to 130 years old.

Old trees, sunlit alluvial and broadleaf forests in the lowlands, stepped forest edges, chestnut orchards and old standard fruit trees are today rare. These are, however, just the habitats that the 118 indigenous saproxylic beetle species

For further information on deadwood, see (text in German or French): [www.totholz.ch](http://www.totholz.ch)



In Swiss forests there are on average 24 cubic meters of deadwood per hectare – which is more than it was 50 years ago, but still far removed from the amount found in natural and virgin forests.

Photo: Ulrich Waser, WSL

that have landed on the Red List require. To draw up this List, species specialists have captured 256 species of jewel, longhorn and stag beetles, as well as rose chafers, by hand with sweep nets, beating sheets or traps at a total of 240 sites in Switzerland where these rare species were expected to occur. Almost half of the species from these four large families (46 %) are considered ‘vulnerable’ on the Red List, according to the criteria of the International Union for the Conservation of Nature IUCN, and a further 47 species (18 %) as ‘near threatened’.

The most important recommendation of the Red List is, then, to promote the habitats of these specialized species. A WSL fact sheet for practitioners (Merkblatt für die Praxis) “Deadwood in forests” (“Totholz im Wald» – in German only) shows in detail how this can be done. It draws on the results of the WSL project “Dynamics of dead wood and saproxylic insects in forest reserves”, which ran from 2009 to 2014. For example, the larvae of the endangered timberman beetle (*Acanthocinus aedilis*) can only develop under the bark of dead, but still fresh pines in warm, low-lying areas. The three-toed woodpecker, in contrast, only takes up residence in places where at least 18 m<sup>3</sup> of dry standing conifers per hectare are present. The federal government has recently begun to provide financial support to promote old wood and deadwood. Those who create so-called old growth patches in commercial forest, i.e. sites where especially large diameter or old deadwood can be left, and who leave habitat trees standing until they fully decay receive money. These ‘stepping-stones’ should help to bridge the large distances between the individual forest reserves and give less mobile species a chance to spread. The WSL fact sheet for practitioners describes how this is ecologically beneficial and how it can be implemented without risk for workers and visitors in the forest.

All these efforts to support deadwood species have recently met with a strong counterforce: the boom in energy wood. Biomass is considered to be an important source of renewable energy. “Since it also uses low quality wood, the current increase in deadwood may slow down or reverse,” Beat fears. In a new study, Thibault has shown that deadwood insects like to colonize piles of energy wood left lying during the summer until they are processed. WSL is studying whether this presents a problem for the survival of beetles in forest and is compiling tips for storing energy wood. (bki)

For information on forest insect research at WSL, see: [www.wsl.ch/more/forestinsects](http://www.wsl.ch/more/forestinsects)