

# Cambium killing in Norway spruce by *Armillaria* after drought 2003

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Aspect of Norway spruce stand close to Elzach/Black Forest in March 2004 after removal of bark of *Armillaria*-infested stems. The growth of the white mycelial fans must have started in late summer 2003 from roots stressed by severe drought meanwhile reaching 0,5 – 1 m.



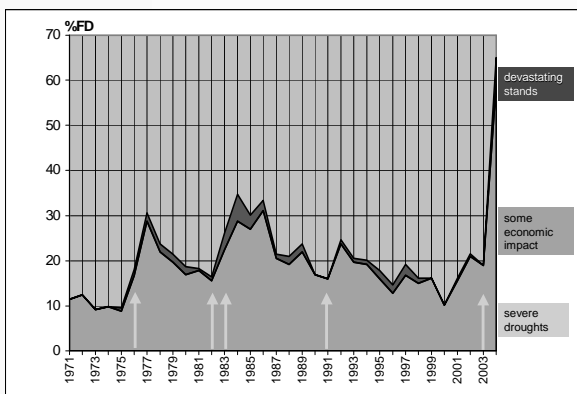
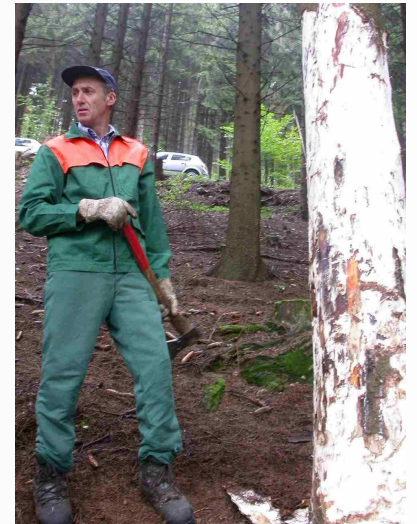
Rudimentary shoot elongation 2004 is typical for moribund trees.



Carpophores of *Armillaria* on thinning stumps indicate the presence of this fungus. Billions of spores can be dispersed from one stump.

Furthermore, stumps are sources for the fungal nutrition. Thus, rhizomorphs can spread into forest soil like roots and threat neighbouring trees.

In autumn 2004 the mortal infection of many trees became successively evident. Within one year, the mycelial fans were grown now up to 2m. In order to save the timber quality the affected trees must be felled. In some ranger districts half of the incidental fellings are due to *Armillaria*.



Annual reports from forest districts of Baden-Württemberg on *Armillaria* related damages (all tree species). There is some regularity of *Armillaria*-attacks on forest trees as a consequence of severe drought. The dry years of 1976, 1982/83, 1991, and 2003 are discernible as starting points. Preliminary data of 2004 shows a unique intensity after 2003.



Wet storage of timber affected by *Armillaria* must be avoided. Otherwise decay of sapwood can start instantly due to unique adaptations of this fungus to water saturated wood.