

Growth reactions of beech, Norway spruce and silver fir after summer drought: Analyses from old growth and yield data of Switzerland

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During the summer 2003 leaves of beech in the Central Plateau of Switzerland turned into autumn colours or even fell off already at the end of July or beginning of August, two months earlier than usual. The question arose on how these trees will react, whether they will survive or die. Possible answers to these questions can be obtained by analyzing data from long-term growth research plots.

90 research plots, pure even-aged beech, fir and spruce stands as well as even-aged and uneven-aged mixed stands containing these species were already observed in the years 1947 and 1949 in which occurred similar summer drought events. In all the pure beech research plots a striking decrease of basal area increment was observed. This observation led to a closer analysis of basal area increment of all research plots containing one of the mentioned species and an observation period starting before the 40ies and lasting after 1950. These growth patterns were compared with meteorological data and site characteristics. It can be shown that the increment decrease is more pronounced at lower altitudes and for beech, whereas at higher altitudes in the same period even an increment increase e.g. for spruce was observed.

In addition, we analysed the harvest recorded in the years following drought, to assess whether there was an increased amount of normal or compulsory felling. This can be an indicator of drought-induced die-back.

From a number of surviving trees stem disks were collected approximately fifty years later. Growth reaction of trees to drought year by year can be analysed only on the basis of these stem disks, because data from yield plots do not have annual resolution.

On the basis of these results conclusions are inferred on the possible consequences of the drought of 2003. However it has to be mentioned that environmental conditions may be different than those of the 40ies and therefore these conclusions have to be interpreted with caution.