Norway spruce

Picea abies (L.) H. Karst. | F: Epicéa, sapin rouge | I: Abete rosso, peccio | R: Pign | E: Norway spruce

General

Accounting for 39.4 % of all stems, Norway spruce is the most common and most widespread tree species in Switzerland[1]. It grows between about 250 and 2200 m a.s.l. Its main natural range lies in the Alps, the Pre-Alps and the western Jura; the extensive stands at lower elevations are largely of human origin[1].

Flowering

Norway spruce flowers are unisexual; flowering lasts from mid-April to mid-June. The female inflorescences are initially upright and usually reddish. As they develop, the young cones bend downwards, turn green in summer and later brown (Figs. 1 and 2).

Fruits

The ripe seeds are located in the downward-hanging cones. In dry, warm weather the cones open in late winter and release the small, winged seeds (Fig. 3). These are usually dispersed by the wind over several dozen metres, and considerably further during storms. Empty cones can remain on the tree until the following autumn or longer (Fig. 1).

Masting behaviour

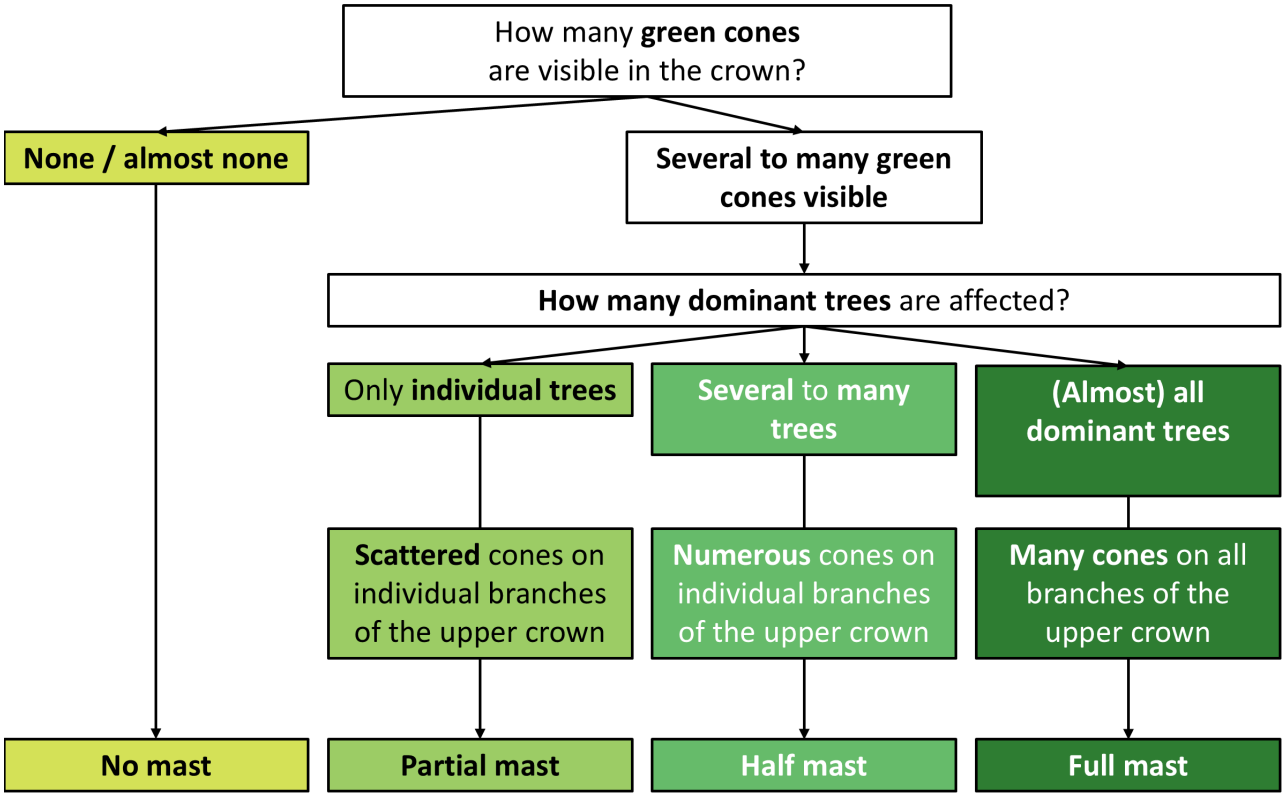
Depending on elevation and latitude, Norway spruce produces particularly large cone crops about every 2 to 8 years[2],[3]. The extent of a mast is largely determined by the number of flowers initiated. Flower initiation is favoured by mild temperatures and low precipitation in the preceding summer[4]. The amount of pollen can also have a strong influence; in pollen-rich years up to 160 kg of pollen per hectare can be produced[5]. Rain and frost during pollen release can markedly reduce fertilisation and thus subsequent cone development[4].

Mast assessment

Timing: July to the end of August, at higher elevations until mid-September.

In Norway spruce, the cone crop of the current year is most reliably assessed in summer, while the cones are still green and can be clearly distinguished from the brown cones of previous years, which often remain on the tree for a long time (Fig. 4).

Assessing the fruit load: Seed masting is a stand-level phenomenon. Wherever possible, several dominant, reproductively mature trees in a stand are assessed. The mast class describes the stand as a whole, not individual trees with particularly heavy or light fruiting. If the fruit load is uneven, choose the class that best characterises the stand as a whole. The intensity of Norway spruce mast can be estimated using the following key:



References

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[3] Selås V (1997) Cyclic population fluctuations of herbivores as an effect of cyclic seed cropping of plants: the mast depression hypothesis. Oikos 80: 257-268

[4] Tjoelker M G, Boratyński A, Bugala W (2007) Biology and ecology of Norway spruce. Springer, Dordrecht, The Netherlands

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