Mountain pine

Pinus mugo Turra | F: Pin de montagne | I: Pino montano, pino mugo | R: Tieu alpin | E: Mountain pine

General

Mountain pine is a light-demanding and very frost-hardy mountain tree species. In Switzerland, *Pinus mugo* includes both the upright, tree-shaped mountain pine (*P. mugo* subsp. *uncinata*) and the shrubby dwarf mountain pine (*P. mugo* subsp. *mugo*); intermediate forms also occur[1,2]. The upright mountain pine is particularly widespread in eastern Graubünden and grows mainly in the subalpine zone, often above 1800 m a.s.l.[1]. Mountain pines colonise extreme sites and thrive on dry, rocky soils as well as on acidic and waterlogged soils[1,2].

Flowering

Mountain pine is monoecious, bearing male and female flowers on the same individual. Depending on elevation, it flowers roughly from May to July. The male inflorescences are located at the base of young shoots; the female ones are near the shoot tips and are initially pale pink to reddish purple. As in Scots pine, the cones need more than one growing season to reach seed maturity. After pollination they remain small at first and only grow noticeably the following summer[2].

Fruits

The ovoid to conical cones are usually 2 to 7 cm long and sit singly or in small groups on the shoots. In their second summer of development they are green, turning dark brown to greyish brown as they ripen in September and October[2]. The small, winged seeds are dispersed by the wind after the cones open. Older brown cones can remain on the tree or shrub.

Masting behaviour

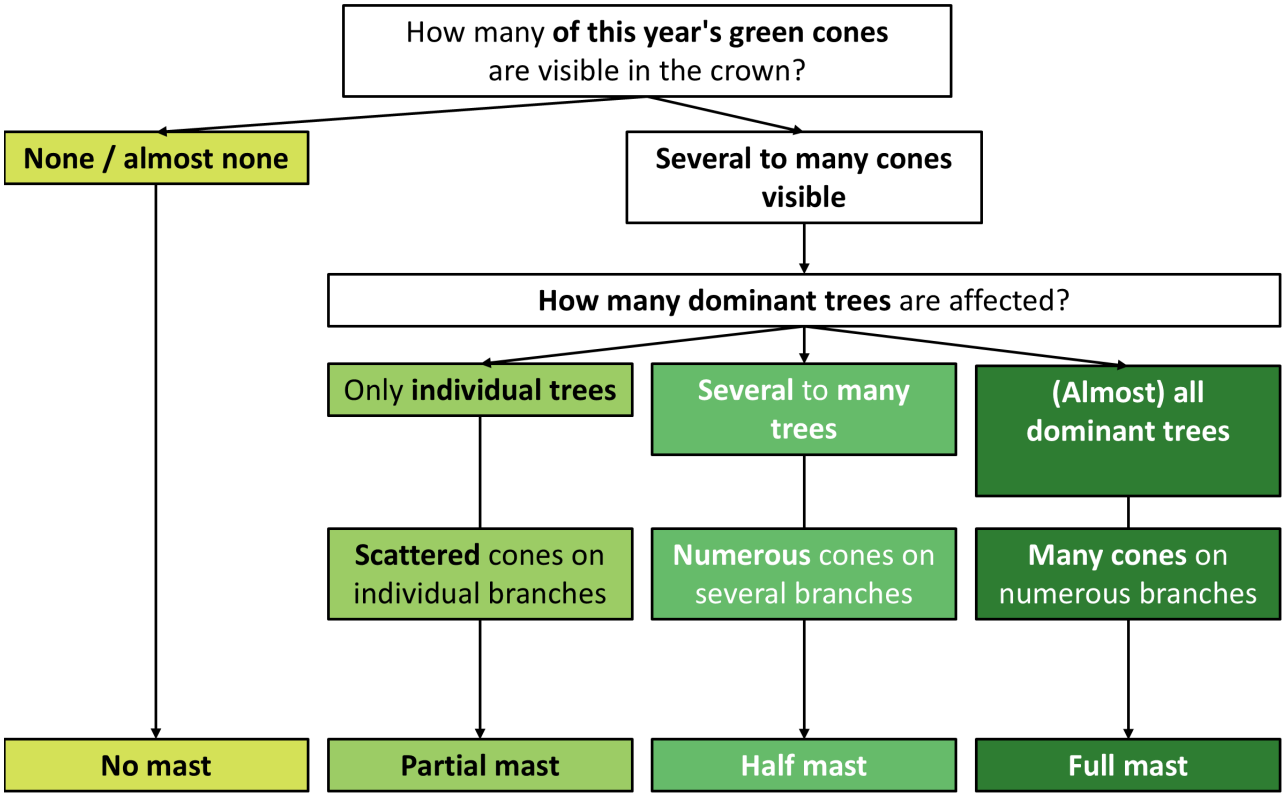
Cone and seed production in mountain pine varies considerably between years and can also differ between sites. A 30-year study of subalpine dwarf mountain pine stands found only three pronounced peaks in cone and seed production[3]. Since cone development spans two growing seasons, the weather affects several developmental phases; conditions during bud formation and in the summer before seed ripening may be particularly important[3].

Mast assessment

Timing: July to early September, at high elevations possibly until mid-September.

The assessment covers the larger green cones of the current seed crop, which ripen in the coming autumn. They originate from the previous year's flowering. The small reddish to purple cone primordia from the current year's flowering are not counted. In midsummer, the green cones are most reliably distinguished from older brown cones. Later the distinction becomes more difficult, as the current cones also turn brown.

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. For shrubby dwarf mountain pines, the “dominant trees” referred to in the key should be understood as well-developed, reproductively mature individuals. The intensity of mountain pine mast can be estimated using the following key:



References

1 WSL, Schweizerisches Landesforstinventar (LFI): Bergföhre (Pinus mugo subsp. uncinata), Verbreitung und Standort. https://www.lfi.ch/de/baumarten/18/verbreitung

2 Alexandrov AH, von Wühlisch G, Vendramin GG (2019) EUFORGEN Technical Guidelines for genetic conservation and use for mountain pine (Pinus mugo). European Forest Genetic Resources Programme (EUFORGEN), European Forest Institute. 6 S.

3 Vacek S, Hejcmanová P, Hejcman M, Vacek Z (2013) Growth, healthy status and seed production of differently aged allochtonous and autochtonous Pinus mugo stands in the Giant Mts. over 30 years. European Journal of Forest Research 132: 801–813. https://doi.org/10.1007/s10342-013-0721-2