Prunus avium

Description of model and ensemble projections

The current distribution of *Prunus avium* is modelled to cover most of the Swiss Plateau, all low elevations of the Northern and Southern Pre-Alps, as well as of the Interior Alps. The species naturally inhabits primarily the subalpine region, and is planted widely on the Plateau. It reaches upper distribution limits at ca. 1700 m a.s.l. in Switzerland and is growing almost everywhere, given that there is sufficient nutrient supply. Above altitudes of ca. 1000 m a.s.l. the species is rather only found at forest edges, and is no longer mixed in. It requires warmer conditions to compete against other species, as it is rather rarely found above 1000 m.

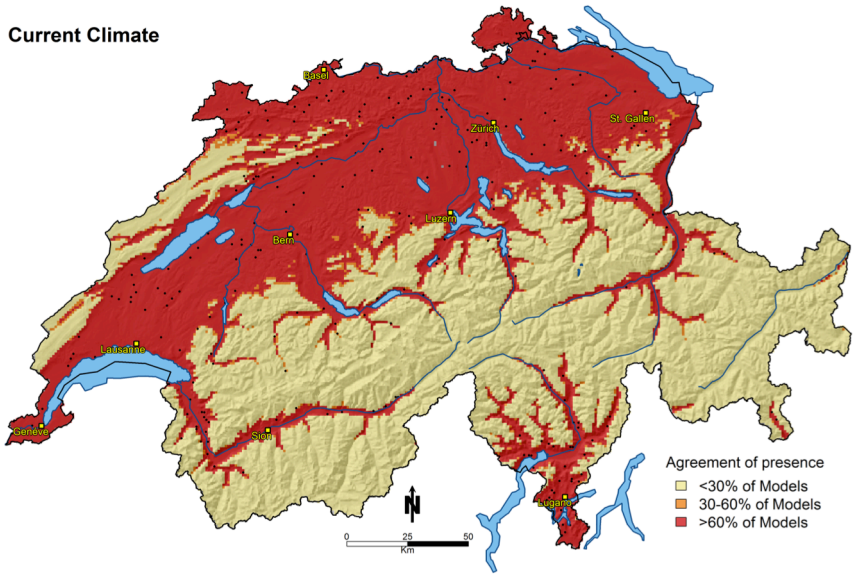


Figure 1. Current distribution (black dots) from the Swiss National Forest inventory (LFI 1) and simulated habitat suitability under current climate as calibrated from LFI forest inventory data of Switzerland.

Under expected climate change using the A1B scenario, most combinations of statistical and regional climate models predict a rapid spread of *P. avium* on the Swiss Plateau, meaning that these regions soon represent climate conditions that are suitable for the species. *P. avium* therefore spreads to higher altitudes, and covers e.g. all of the Jura, with the exception of few of the very highest peaks by the end of the 21st century.

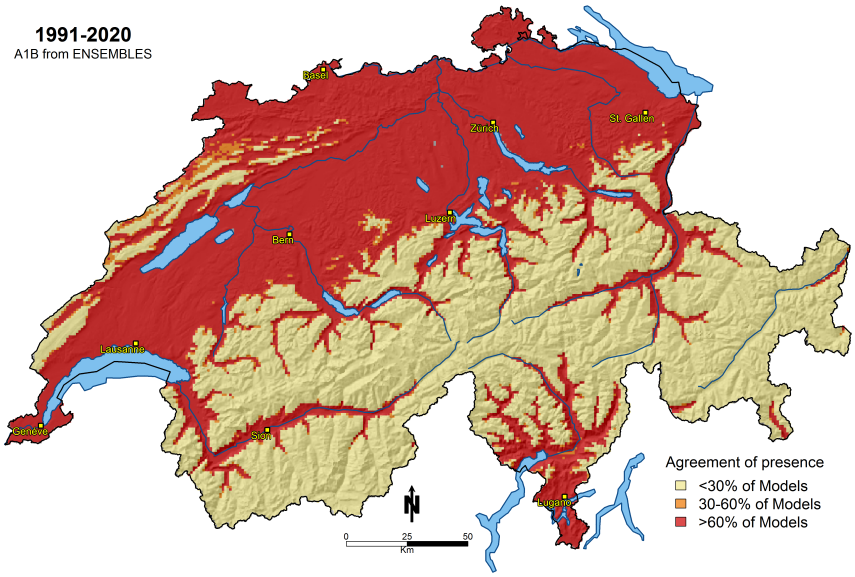
Synthesis and Conclusions

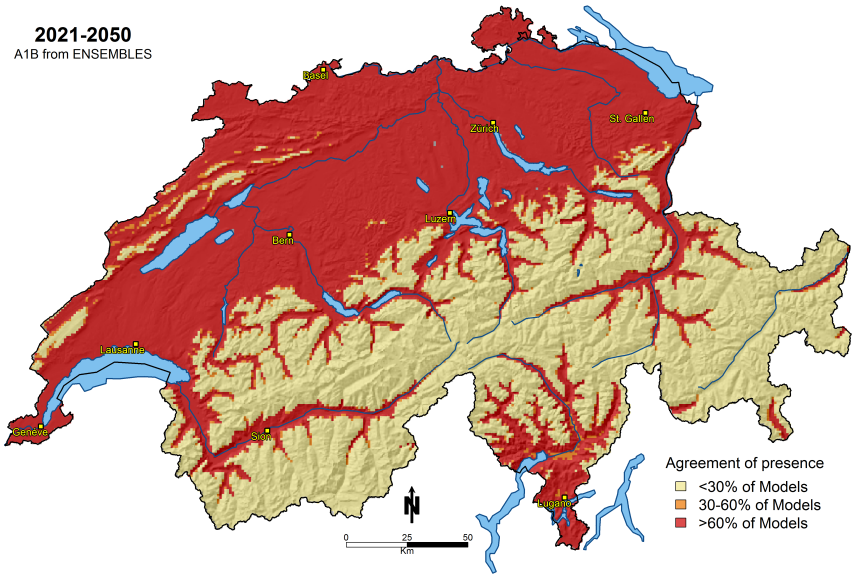
The model fits the distribution of *P. avium* well, and can be considered a credible model to project the future habitat suitability of the species. The ensemble models project almost complete overlap (99.6%) between the current and the future range in Switzerland and even still a 42% overlap in Europe. This is a sufficient overlap to assume no major threat to *P. avium* from climate change in Switzerland. This is likely due to the fact that the species does not reach its warm limit under current climate conditions. It therefore still spans to the lowest altitudes after climate warming, and it increases therefore its range in Switzerland by ca. 35%. In Europe, the species does not show the same tendency, and rather loses ca. 30% of its current range. This indicates that the drier conditions in a future Europe generally pose a certain threat to the species by the end of the Century. The species grows comparably fast and reaches ages of ca. 80-100 years. This is the main reason for its capacity to respond to climate change, as it can migrate well (from rapid seed dispersal by birds) and grows fast to maturity.

Range change statistics

	CH	Europe
Current range size [km²]	19'039	99'818
Future (2080) range size	25'638	70'058
Range Change 2080/2000 [%]	134.7%	70.2%
Overlap 2000/2080 [km²]	18'962	41'684
Overlap/current range [%]	99.6%	41.8%

The species does not have a particularly strong economic importance in Swiss forests. Rather, it is used as a precious wood for furniture such as tables, but not in large quantities, and is therefore not planted. Its cultivar form is used economically in orchards for edible cherry harvesting (with economic importance), and also the wild form represents an important food source for different bird species. The early flowering before leaf flush of beech or oaks adds to the cultural services forests with *P. avium* provide to humans.


1991-2020
A1B from ENSEMBLES
Basel
Zurich
St. Gallen
Luzern
Bern
Lausanne
Geneve
Sion
Lugano
Agreement of presence
<30% of Models
30-60% of Models
>60% of Models
0 25 50
Km


2021-2050
A1B from ENSEMBLES
Basel
Zurich
St. Gallen
Luzern
Bern
Lausanne
Geneve
Sion
Lugano
Agreement of presence
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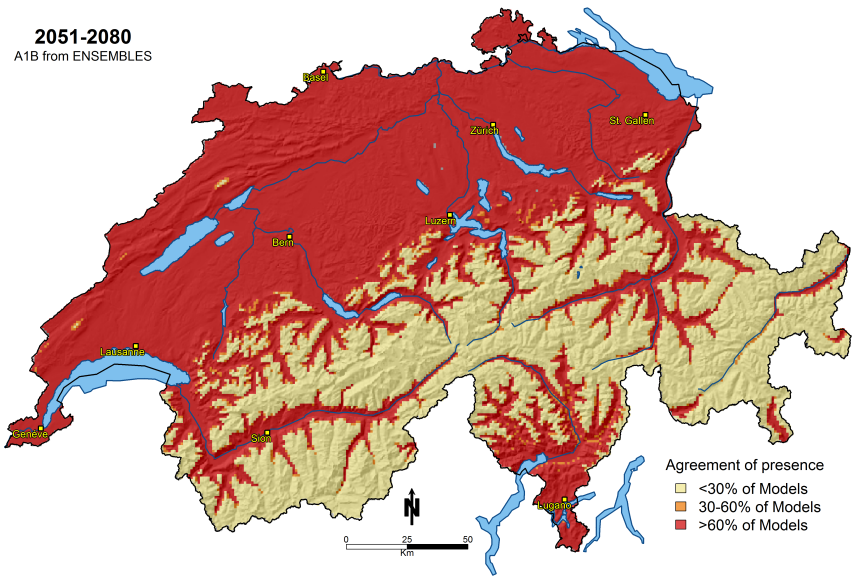
2051-2080
A1B from ENSEMBLES
Basel
Zurich
St. Gallen
Luzern
Bern
Lausanne
Geneve
Sion
Lugano
Agreement of presence
<30% of Models
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Km