

Fraxinus ornus

Description of model and ensemble projections

The current distribution of *Fraxinus ornus* is modelled to cover simply the Southern part of the Ticino, the only region where the species is abundantly observed. Although the model is fitted from all data points across the Alps, the model ensemble sets the distribution limit approximately correctly, despite not matching all of the few individual observation points in the Ticino. Only some more Northern and isolated locations in the Central Ticino are not well captured by the model ensemble.

Under projected climate change using the A1B scenario, most combinations of statistical and regional climate models predict a consistent spread of *Fraxinus ornus* into more Northern regions of the Ticino, soon also into the lower portion of the Valais, and finally onto the warmest parts of the Swiss Plateau and the Jura range. Specifically, the species is also projected to colonize the Geneva region, and the Chur basin, as well as the Poschiavo valley. Uncertain, but still notable habitats are finally modelled for the Reuss valley South of the Lake of Lucerne and the lowest parts of the Glarus region.

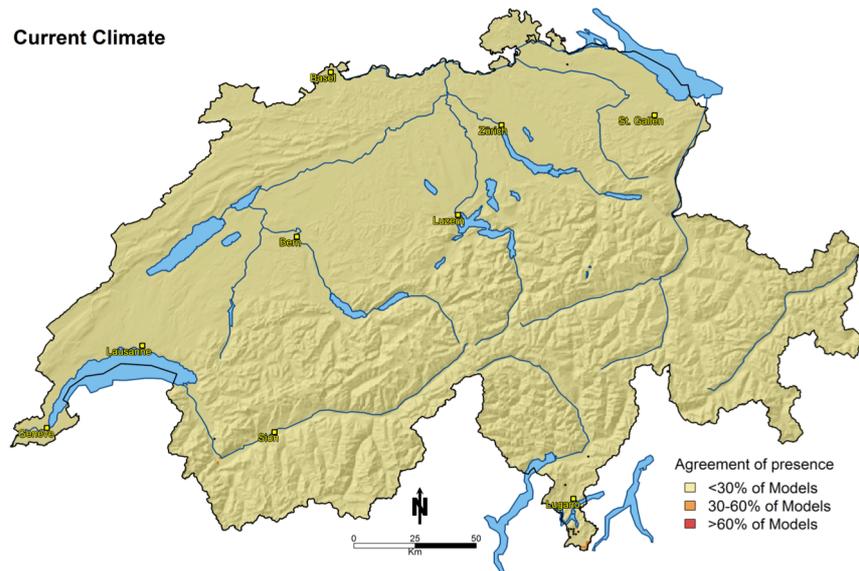


Figure 1. Current distribution (black dots) from the Swiss National Forest inventory (LFI 1) and simulated habitat suitability under current climate as calibrated from forest inventory data across the Alps (MANFRED project).

Synthesis and Conclusions

The model fits the more general distribution of *Fraxinus ornus* across the Alps (not shown) well, and can be considered a credible model to project the future habitat suitability of *F. ornus*. The ensemble models project only an 18% overlap between the current and the future range in Switzerland and a considerable overlap (78%) in Europe. Differing trends in Switzerland and Europe are also modelled regarding change in suitable habitat range between current and projected future climates. While in Switzerland the range is projected to expand more than three times the current size, the European range of suitable habitats is projected to increase only marginally (+23%).

The model does not predict the few observations of *F. ornus* in the Ticino very accurately. This is not surprising for a model that is fitted across all sites of the European Alps. Yet, it still captures the range edge of the species approximately correctly. The species has its center of distribution in the Eastern Mediterranean region, and has been widely planted for ornamental reasons throughout the Mediterranean and Sub-Mediterranean regions. In Germany it is considered an established neophyte, which spreads often into vineyards.

The species can be considered a “winner” of projected climate change. It will likely spread in warmer regions of Switzerland together with Oaks (*Quercus pubescens*, *Q. petraea*, *Q. cerris*), hop hornbeam (*Ostrya carpinifolia*) and European hornbeam (*Carpinus betulus*). It prefers well-drained, dry and warm conditions. It also grows well on ruderal sites. The species will not have difficulties to grow well and adapt under changing climate conditions, since it grows moderately fast to maturity and re-seeds well.

Range change statistics

	CH	Europe
Current range size [km²]	218	46'739
Future (2080) range size	680	57'305
Range Change 2080/2000 [%]	312%	122.6%
Overlap 2000/2080 [km²]	39	36'204
Overlap/current range [%]	17.9%	77.5%

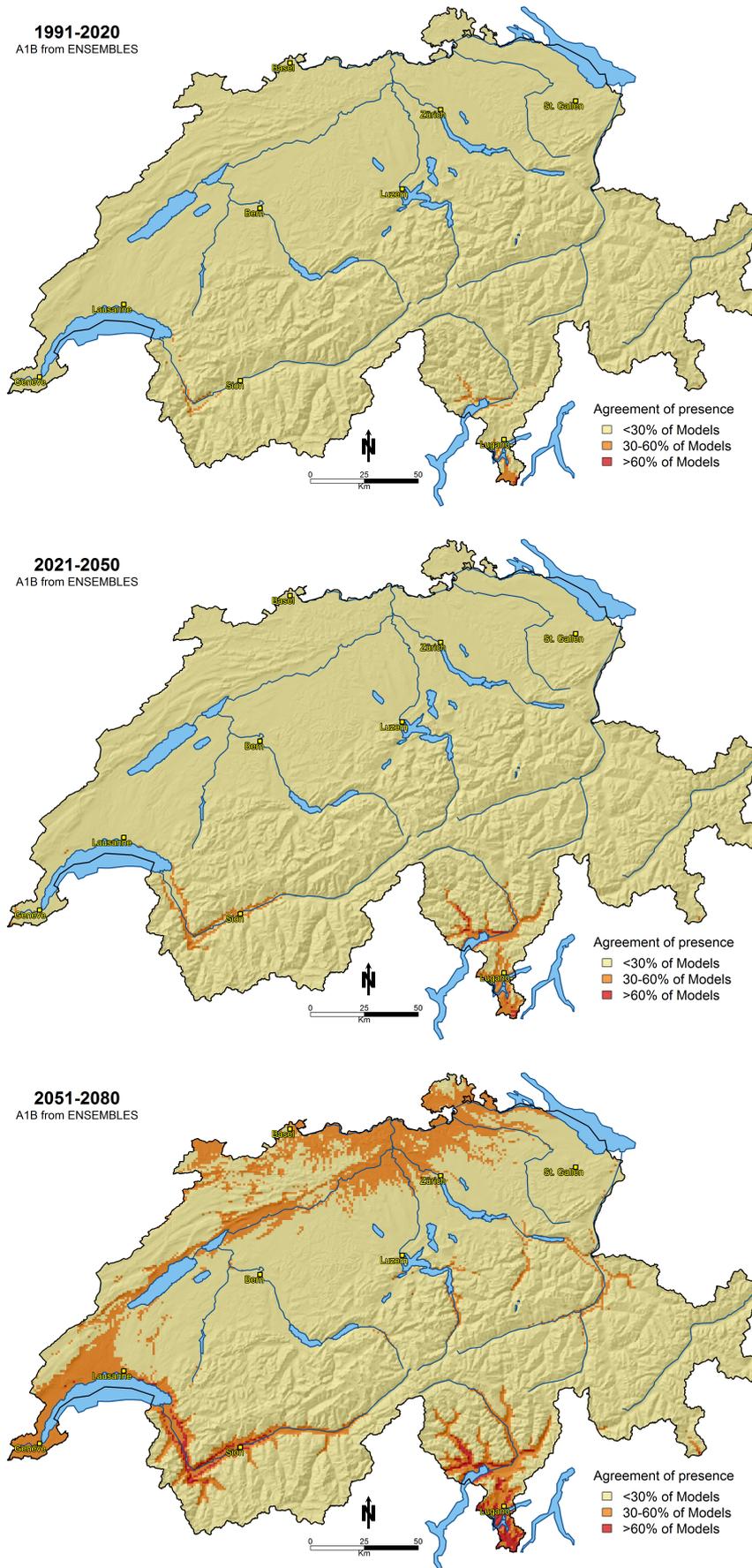


Figure 2: Ensemble of projected future ranges of suitable habitat as modeled from six RCMs and six statistical models. Light yellow colors indicate that all climate & statistical model combinations project absence of the species, while dark red colors indicate presence. Orange colors indicate uncertainty regarding habitat suitability.