

## Survey on future distribution of South-Western Alps' endemic species *Gentiana ligustica* R.Vilm. & Chopinet

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### INTRODUCTION & AIM

*Gentiana ligustica* is an endemic species growing in the south-western Alps and is protected under the Habitat Directive 92/43/EEC (Annex II and IV). Its populations are under two different climates—alpine and Mediterranean—resulting in differing IUCN Red List Categories and Criteria based on the two Natura 2000 Biogeographical Regions. In the Alpine Region, the species is rated as "Good" with a stable trend, while in the Mediterranean Region, it is classified as "Inadequate," with an unknown trend due to insufficient studies and habitat degradation. This preliminary study aims to investigate how climate change impacts the distribution of *Gentiana ligustica* by employing Species Distribution Modeling.

### METHOD

Using two different sets of bioclimatic variables obtained from the CHELSA database, we projected the current and future distribution of the species in the south-western Alps. The first set comprised five correlated variables considered physiologically important (bio1, bio4, bio7, bio12, bio18). The second set included three uncorrelated variables (bio4, bio10, bio19).

Fig. 1: Habitat suitability with correlated variables

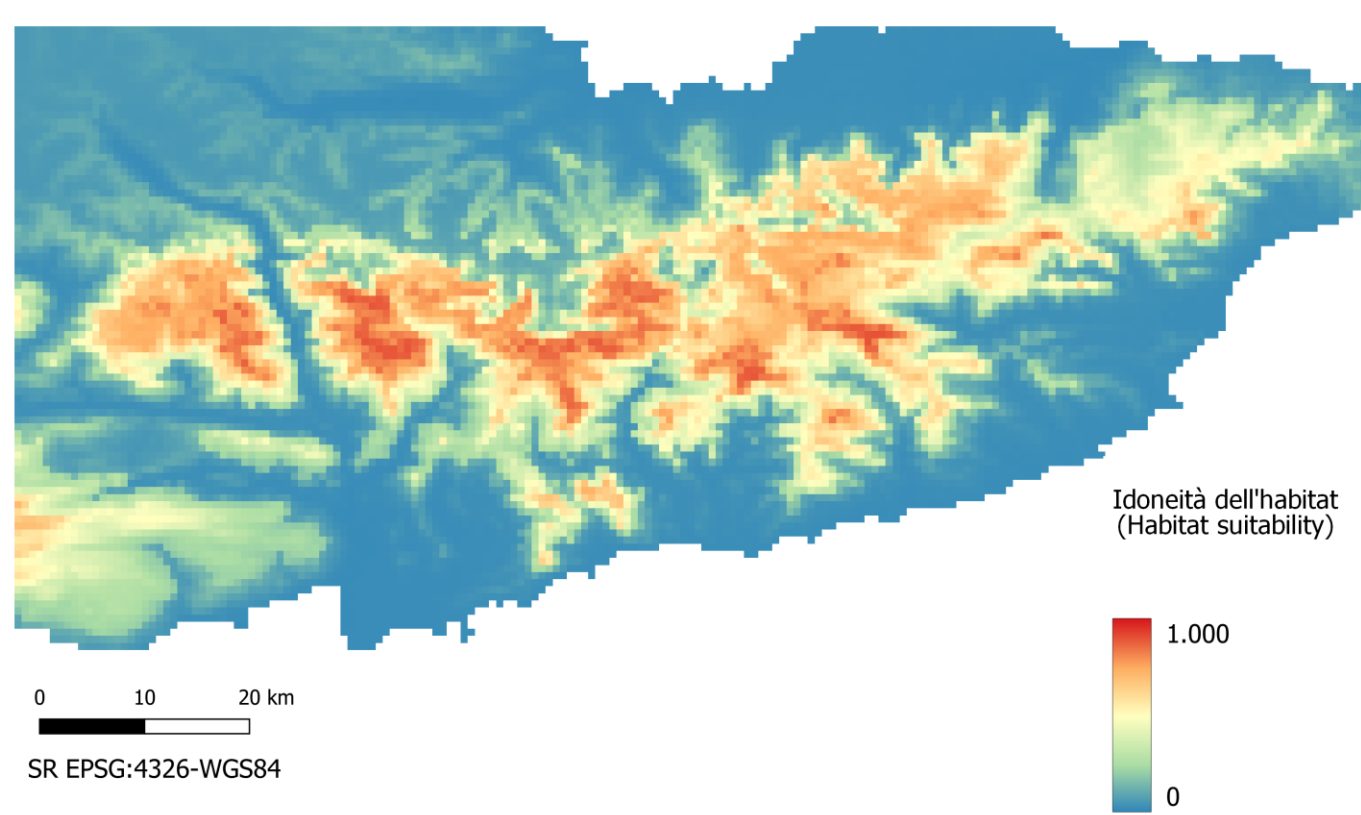
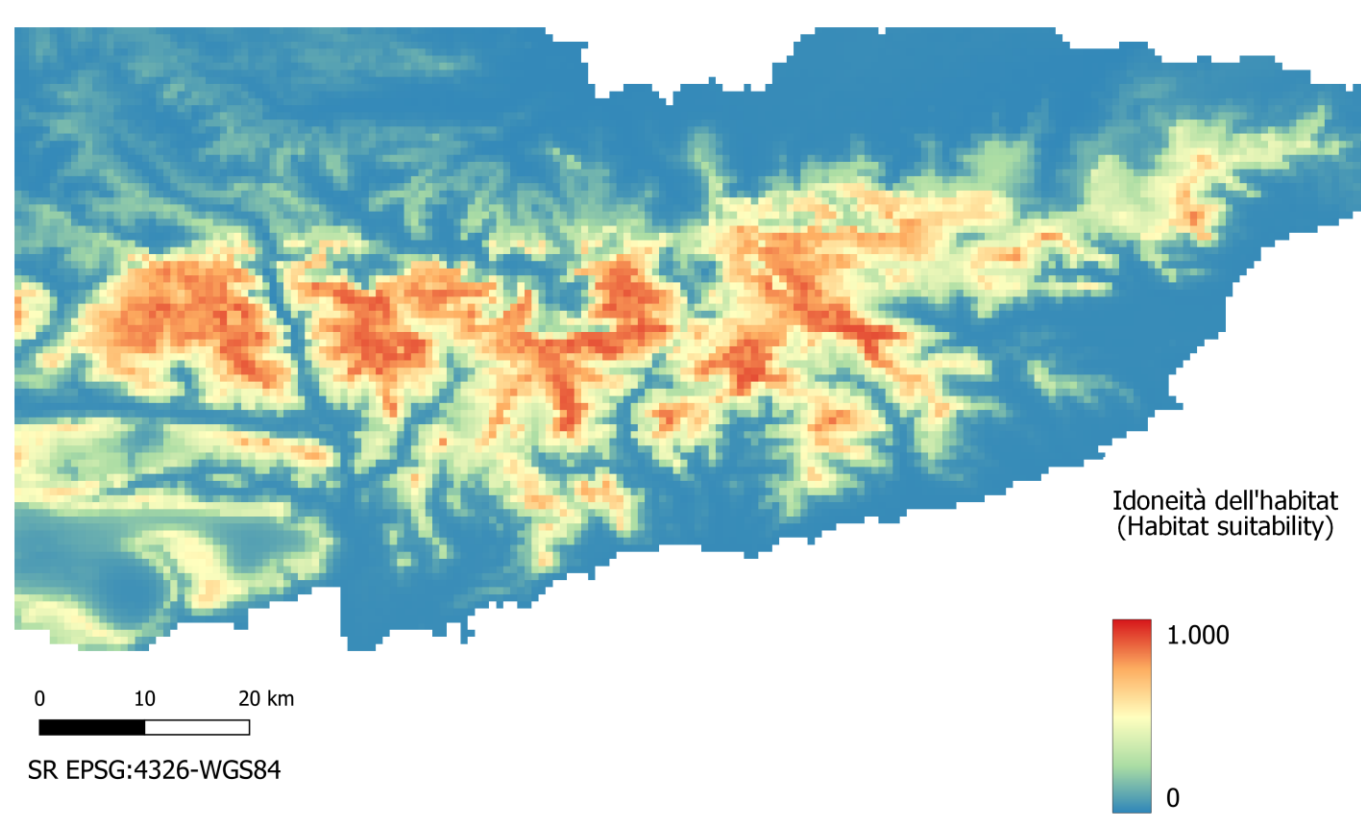


Fig. 2: Habitat suitability with uncorrelated variables



The future potential distribution of *G. ligustica* had been projected under two different RCP scenarios (SSP3-7.0 and SSP5-8.5) for the years 2070-2100 by using 5 GCMs.

### RESULTS & DISCUSSION

In both scenarios and with both sets of bioclimatic variables, the models indicate that the southernmost populations within the Mediterranean Biogeographical Region will be severely negatively impacted by climate change, facing extinction due to a loss of habitat suitability. Furthermore, habitat suitability in the Alpine Region is projected to decline significantly, shifting northward toward higher elevation areas. This shift poses a high extinction risk not only for Mediterranean populations but also for a substantial portion of the Alpine populations as well.

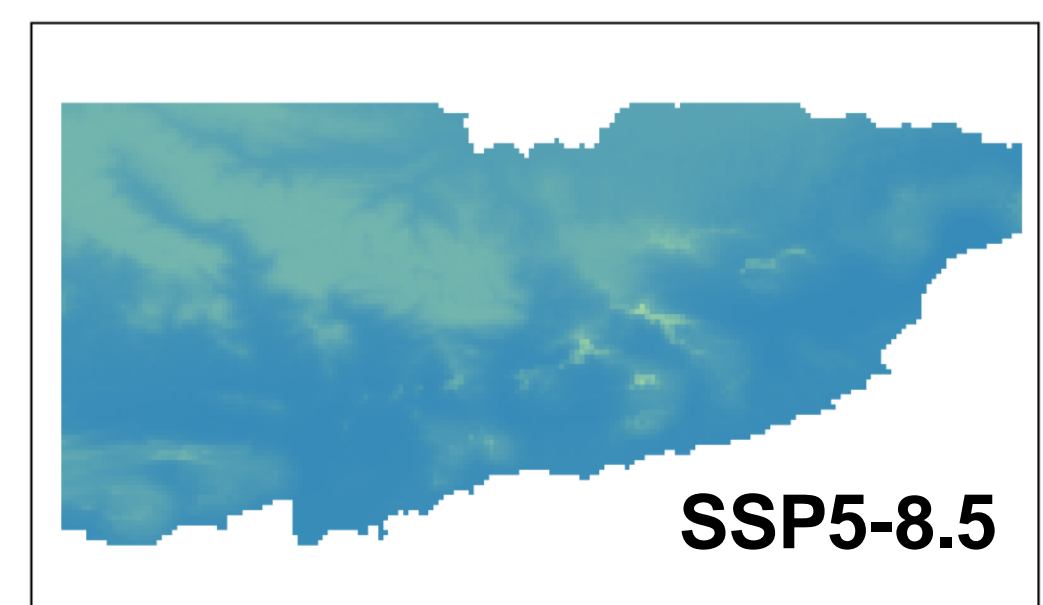
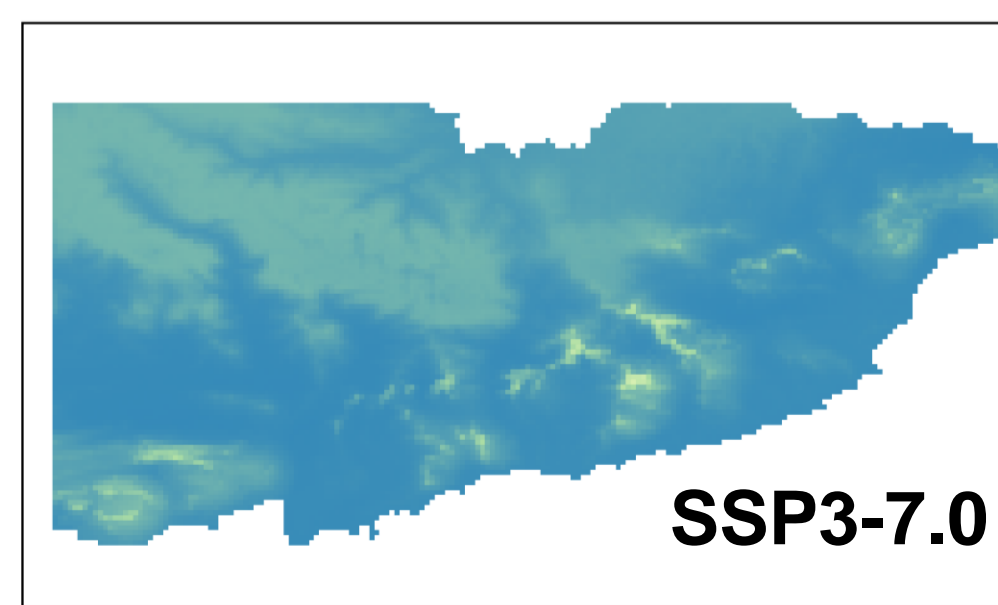


Fig. 3: Habitat suitability projection with uncorrelated variables

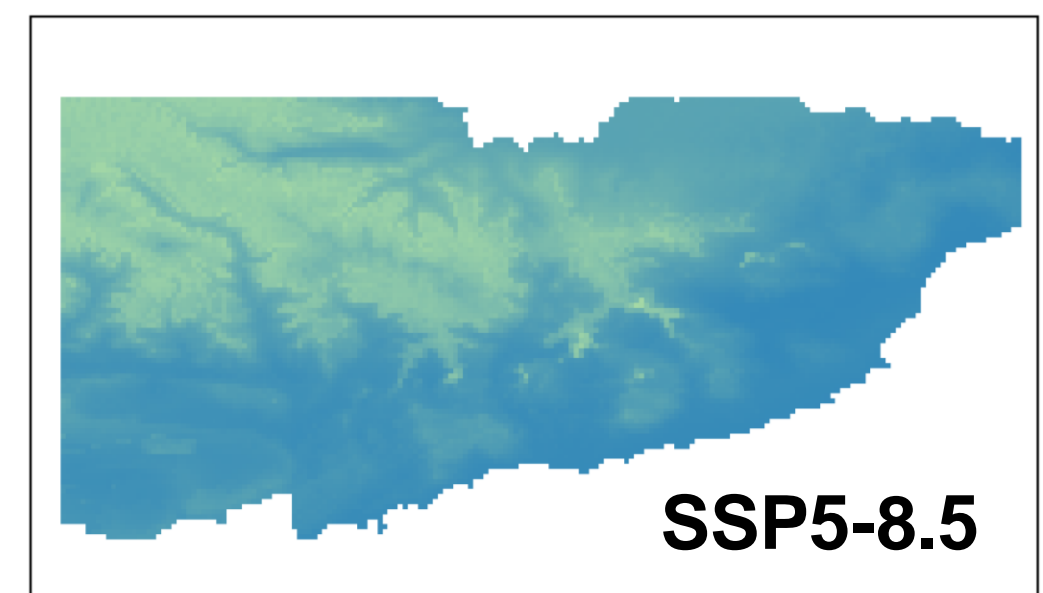
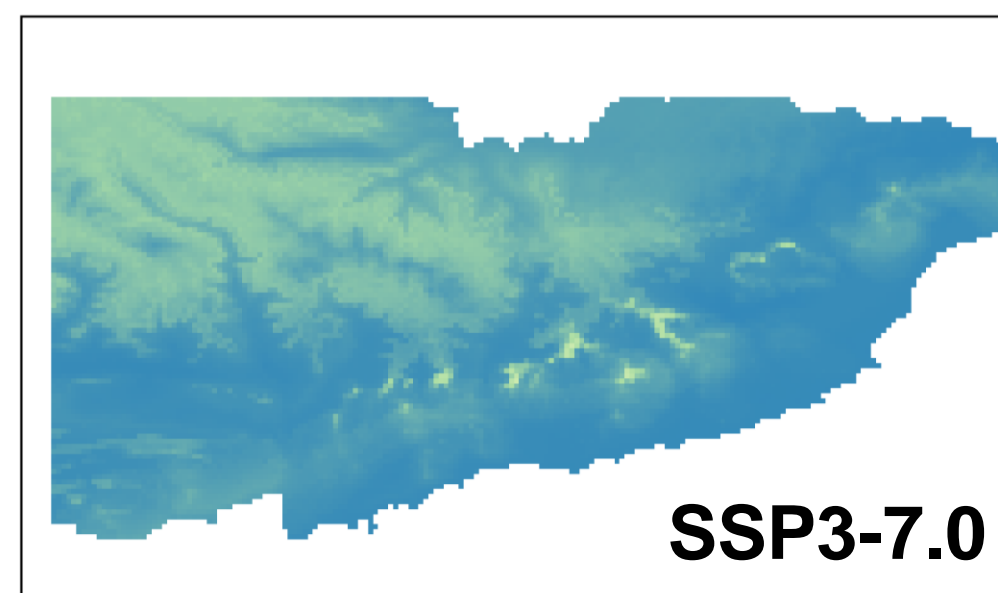


Fig. 4: Habitat suitability projection with uncorrelated variables

### CONCLUSION

This preliminary study highlights the urgent need for proactive conservation plans and assisted colonization strategies in suitable areas to preserve *Gentiana ligustica* in the face of climate change. This will be supported by the species' other ecological requirements, such as soil composition and structure.

### FUTURE WORK / REFERENCES

Others studies about *Gentiana ligustica*'s ecology are going on. Is in progress a study about ecological requirements of this species that can contribute to new and more accurate habitat suitability models. A first important result is the soil characterisation: this species seems to grow mostly in infertile and sandy soils.