Tree health and annual and periodical radial growth in coniferous trees in northern Italy

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INTRODUCTION

With the 2018 megadrought causing widespread canopy damage to forests in central Europe, the question whether, this can result in reduced tree and forest growth became of renewed interest. Such a question has clear relevance for the functional interpretation of forest health data as collected in Europe since the 1980s and in the climate change debate (Ferretti et al., 2021 https://doi.org/10.1016/j.ecolind.2021.107749).

METHODS

We investigated relationships between tree health indicators (crown defoliation, damage to trees) on annual (measured in 2012 by tree-ring width on 69 Norway spruce trees) and periodical (expressed in terms of 5-10 year diameter increments for 346 trees from five coniferous species between 2001 and 2009) tree growth. Data originated from ICP Forests Level I (n=7) and Level II (n=1) plots in Trentino, N. Italy. In a one-step and two-step modeling approach for diameter increment and ring widths respectively, relating defoliation and other tree and site characteristics, multiple regression was applied along with model selection. Three main questions were addressed:

1

Is there a generalized relationship between crown defoliation and damage (single and in combination) and tree growth?

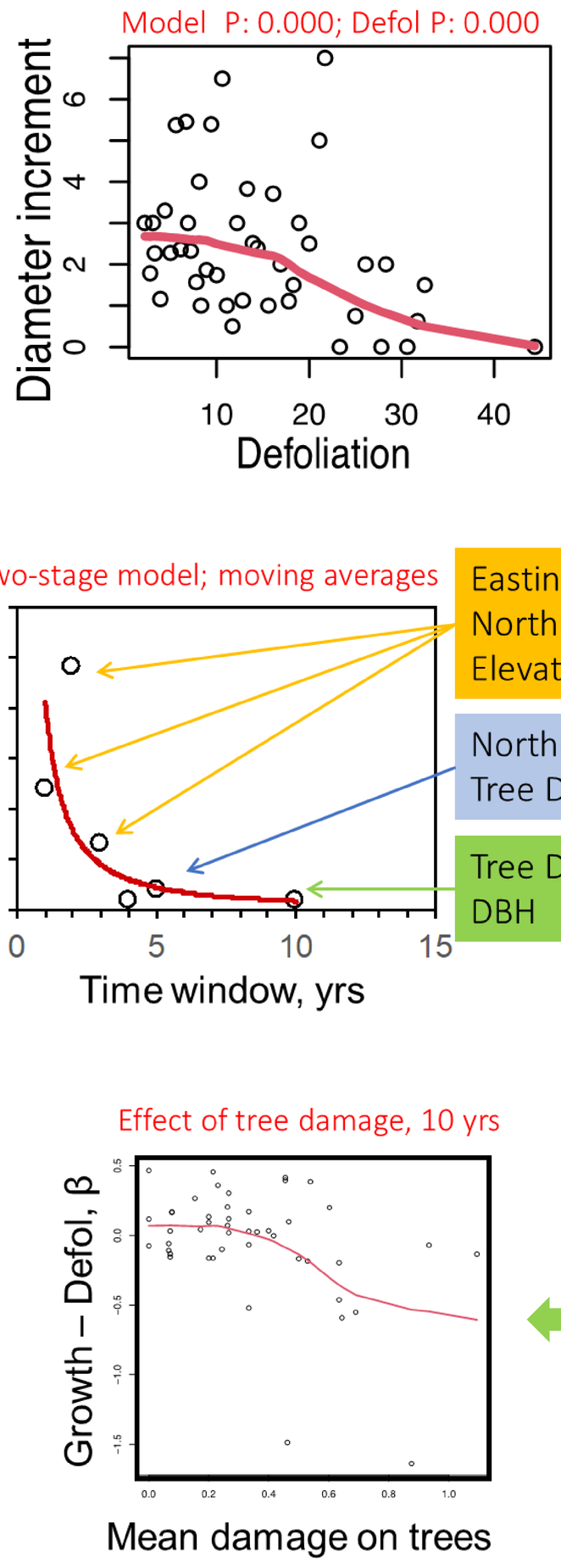
2

Is such a relationship influenced by the time window considered for growth: annual, 5 years, 10 years?

3

Do site factors affect such a relationship?

RESULTS



CONCLUSION

Generally, and for all time windows considered, defoliation shows a negative relationship with diameter increment. The larger the time window, the stronger the relationship. Such a relationship is influenced by site and tree characteristics.