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COULD BRITTANY BECOME A NEW COOL CLIMATE REGION FOR VITICULTURE IN FRANCE?

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Purpose/aim

Brittany is situated at ~48°N to the North West of France and experiences a cool and humid oceanic climate, qualified as "very cool" for viticulture. The region is not a wine-growing territory recognized by the French wine industry although the presence of vines before the phylloxera crisis is proven in the region (Musset, 1917). Looking at low resolution climate change projections, this region now appears among the "new" regions suitable for viticulture (Hannah et al., 2013), although the "nomad" scenario focusing on relocation of vineyards as a means to face climate change is unanimously not the preferred one for the French wine industry as it may jeopardize the existing wine appellations (Aigrain et al., 2019). However, since 2016 and the new regulation that allows plantation for the production of wines without geographical indication (Legifrance: décret n°2015-1903), commercial vineyards are establishing in Brittany while preliminary climate studies showed that climate change could improve grapevines growing and ripening in this region (Bonnardot & Quénol, 2020). This present study was conducted with the aim to develop higher resolution knowledge on the future regional climate conditions and to test a methodology to assess the thermal potential of this emerging wine-growing region for the maturity of different grape varieties. Results are extracted and adapted from the Master Thesis of Maria Zavlyanova (2020) led under the ACCAF-LACCAVE project research.

Methodology

The Grapevine Flowering and Veraison index-GFV (Parker et al, 2013) was used to calculate the date of veraison (BBCH85) for four cultivars i.e Chardonnay, Chenin, Pinot noir and Cabernet Sauvignon. The GFV index corresponds to the cumulative daily mean temperature above 0°C starting as from the 1st of March (Northern hemisphere). The thermal requirements in degree-days for these four cultivars to reach veraison are respectively: 2547, 2712, 2511 and 2689, as found in Parker et al. (2013). Using a set of climatic data at a spatial resolution of 8 km originating from the CNRM-Aladin63 climate model (http://www.drias-climat.fr/ the 2014 simulations dataset), the projected dates of veraison were calculated for Brittany on average for different future periods under the climatic conditions of various greenhouse gas emissions (RCP scenarios). Moreover, given that in the northern hemisphere, the ripening window for grapevine closes around October 15 (van Leeuwen et al, 2006) and that grape ripening, starting at veraison, requires approximately 45 days to be achieved, the 1st of September was used as a threshold date for veraison to be reached with the objectives to produce dry wines. The mean values above each thermal requirement reached on 1st of September were then mapped for the different periods and RCP scenarios in order to identify suitable areas for these cultivars to ripen in the region. Results for the 2031-2060 period under the RCP4.5 scenario is presented here as an example.

Results

Figure 1 identifies the areas in Brittany where Chardonnay, Chenin, Pinot noir and Cabernet Sauvignon are projected to reach veraison on the latest on the 1st of September, on average for the 2031-2060 period, using the thermal conditions simulated under the RCP 4.5 emissions scenario. The early grape varieties, Chardonnay and Pinot Noir, would reach veraison on this date in most of the region, except in the interior and to the extreme North-West. Chenin and Cabernet Sauvignon, both greater heat-demanding grape varieties than Chardonnay and Pinot noir, would reach veraison on this date in a more reduced part of the territory situated to the East and South of the region. At the edge and beyond these sectors, veraison by September 1st at the latest could be possible depending on the year, making the activity economically fragile.

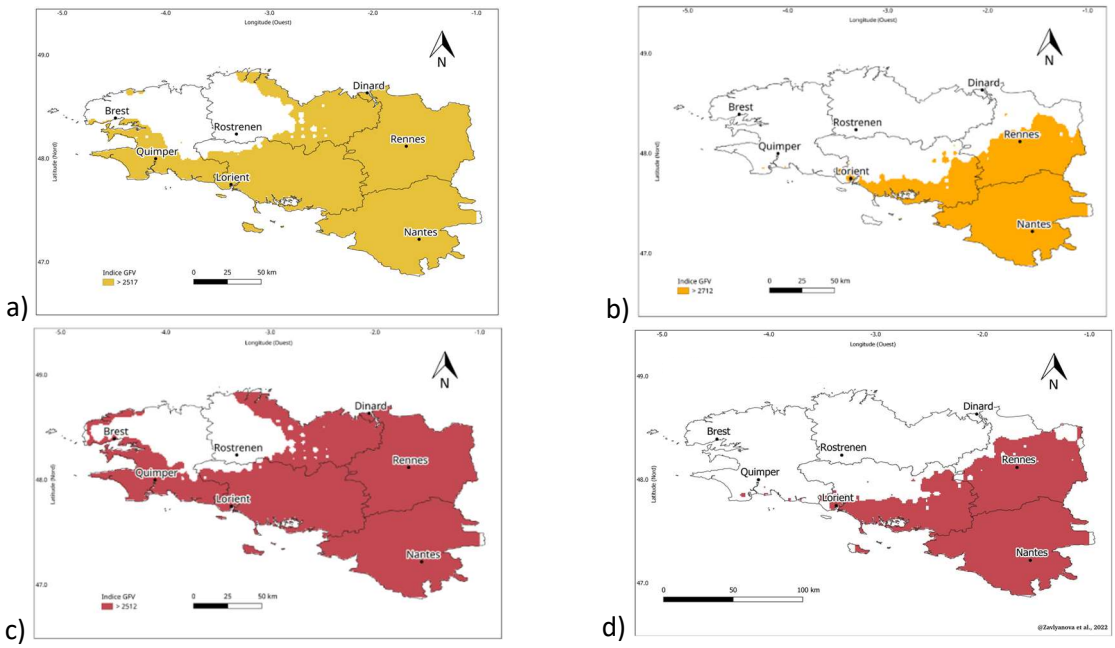

Figure 1: Locations within Brittany where a) Chardonnay, b) Chenin, c) Pinot noir and d) Cabernet Sauvignon cultivars are projected to reach veraison on the latest on 1st September (average for the 2031-2060 period) under the RCP4.5 scenario.

Conclusion

Disregarding all other environmental and structural factors in this region, the calculation and mapping of the GFV index for some cultivars is as a useful method to identify suitable areas for ripening of selected cultivars. It shows that Brittany has the thermal potential to become a new cool climate wine region. Projections for the end of the century would be even more favourable and further use of the grape sugar ripeness index allows targeting various objectives of wines production.

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Keywords Climate Change, viticulture, GFV index, Brittany, France.