



Contrasted Warning patterns in both hemispheres result in divergent blooming trends for apple.

Gustavo Malagi, Adnane El Yaacoubi, Marc Bonhomme, Gabriel Berenhauser Leite, Jean-Michel Legave

► To cite this version:

Gustavo Malagi, Adnane El Yaacoubi, Marc Bonhomme, Gabriel Berenhauser Leite, Jean-Michel Legave. Contrasted Warning patterns in both hemispheres result in divergent blooming trends for apple.. 14th EMS Annual Meeting & 10th European Conference on Applied Climatology (ECAC), Oct 2014, Prague, Czech Republic. pp.1 P. hal-01268822

HAL Id: hal-01268822

<https://hal.science/hal-01268822>

Submitted on 3 Jun 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Contrasted warming patterns in both hemispheres result in divergent blooming trends for apple.

Gustavo Malagi (1,6), Adnane El Yaacoubi (2), Marc Bonhomme (3,7), Gabriel Berenhauser Leite (4), and Jean Michel Legave (5)

(1) Federal University -UFPEL, Pelotas, Brazil (malagi@agronomo.eng.br), (2) University Moulay Ismaïl, Faculty of Science, Department of Biology, Meknès, Morocco, (3) INRA UMR 547 PIAF, Clermont-Ferrand, France (Marc.bonhomme@clermont.inra.fr), (4) Center of Agricultural Research and Extension of Santa Catarina (EPAGRI), Caçador, Brazil (gabriel@epagri.sc.gov.br), (5) INRA UMR AGAP, Montpellier, France (legave@supagro.inra.fr), (6) INRA SupAgro, Montpellier, France, (7) Clermont Université Université Blaise Pascal UMR 547 PIAF, Clermont-Ferrand, France

This study aimed to compare the difference of temperature and apple phenology patterns and their relationships, in contrasting climates of Southern (SH) and Northern (NH) Hemispheres, using long historical series of data. Relatively high divergences of temperature and blooming patterns were found. The most important changes were observed in the NH sites, experiencing a significant warming of temperatures (especially maximum temperature) in whole year and mainly during early-spring. The oceanic and Mediterranean sites of Europe were also warmed during winter. Similarly, important increase of heat during early-spring was found in all sites and a strong decrease of chill during winter was highlighted in the mild sites of Europe. We outlined that blooming dates toward early for some apple cultivars with a higher advance in the continental regions (cold). In these colder regions, we found a strong relationship between blooming dates and heat accumulation during early-spring (February and March). In the mild sites, advance is lower and moderate relationship with heat accumulation in the mild sites can be linked to chill decrease during winter, leading us to consider this zone as more vulnerable to climate changes. By contrast, in the SH sites, only the continental site (Caçador) outlined a little warming and small advance of the blooming dates. Significant correlations were found between blooming dates and accumulated chilling doses, supporting the idea that blooming dates are mainly controlled by winter temperatures, especially June one's. We concluded that blooming dates and blooming duration are distinctly determined according climate pattern. The important warming of European sites led us to predict that apple crop in this region can be soon (around 2050) under climatic conditions observed today in mild climate regions like Southern Brazil, and, consequently, submitted to the same cropping difficulties.