Use of Remote Sensing for selection of ash trees (Fraxinus excelsior) tolerant to ash dieback

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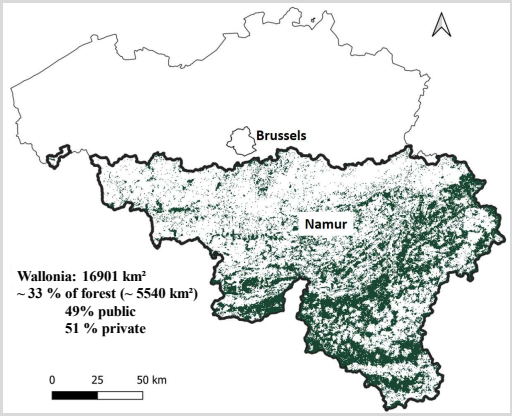
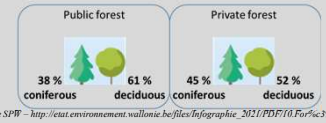
Wallonia forests…



Coniferous / deciduous (2018)



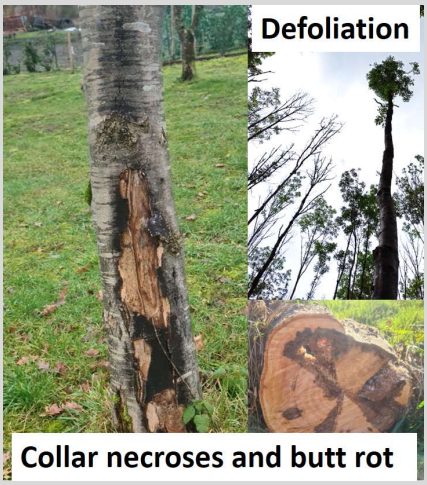
Source SPW – http://etat.environnement.wallonie.be/files/Infographie_2021/PDF/10.For%c3%aats.pdf

…, as mostly worldwide forest, are impacted by climate changes

Since the 1990s, Hymenoscyphus fraxineus, causal agent of Ash Dieback, has posed a threat to Fraxinus excelsior (common ash) in Europe.

In Belgium, the disease was first reported in 2010.

Besides crown defoliation and dieback, collar lesions is a critical parameter to take into account in assessing trees that are potentially resistant to the disease (3-4%).



Douglas ~ 0.9 % from total Walloon forest area (~ 5000 ha)
- **20 % pure stands**
- **80 % mixed-species stands**

The main objective of this study consist in identification of ash trees naturally tolerant to ash dieback disease in Wallonia using aerial/satellite imagery.

DATA

Ground truth data:

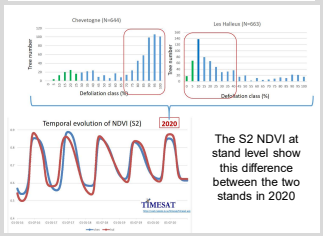
- ground observations (2015 and 2020) for two ash provenances trials instaled in 1987: defoliation, collar necroses.
- trees position measured with GNSS receiver (< 20 cm accuracy)

EO data:

- aerial orthoimagery (0.25 m): 2015, 2020
- Digital Surface Model 2014 (LIDAR) and 2020 (aerial imagery)
- UAV imagery (0.05 m): march and june 2021
- S2 2016-2020

PRELIMINARY RESULTS

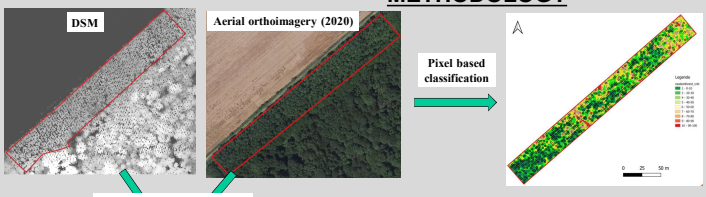
Distribution of trees with different defoliation degrees from the two stands in 2020



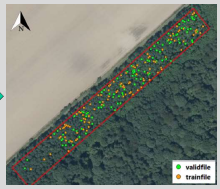
The S2 NDVI at stand level show this difference between the two stands in 2020

88 ash trees potentially tolerants to ash dieback disease (from 1300 on both stands)

METHODOLOGY

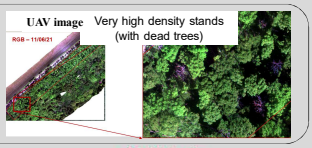


OBIA



Visual check of collar for sample of trees identified in area of potential healthy trees

Shift between visible crown and the ground position !



PERSPECTIVES

- **Test the method over other ash stands in Wallonia (including OBIA approach)**
- **Test hyperspectral imagery**

The work was done in the framework of CARTOFOR research project :

Wallonie environnement SPW · LIÉGE université Gembloux Agro-Bio Tech · DNF