Monitoring of ash trees as part of the Intercantonal Forest Observation Programme

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Introduction

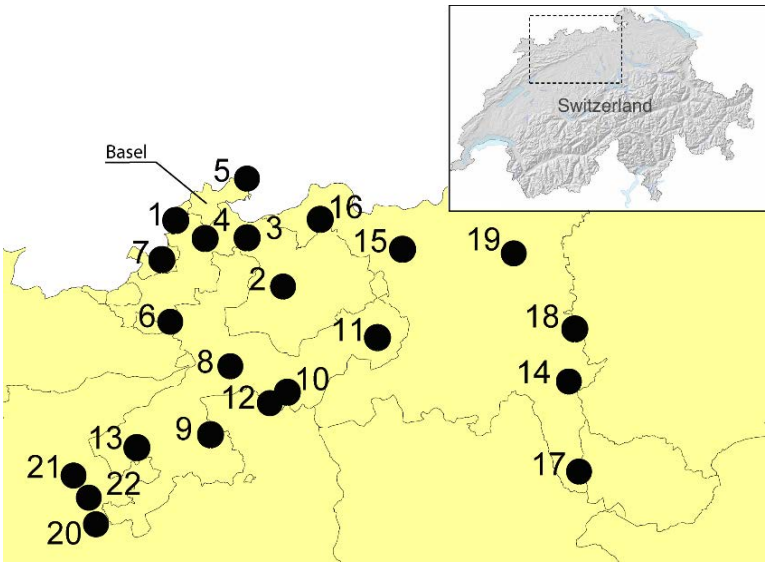
Since 1984, the Institute for Applied Plant Biology (IAP) has been conducting the Intercantonal Forest Observation Programme on behalf of several Swiss Cantons and the Swiss Federal Office for the Environment. In 2013, the IAP started a monitoring programme to study the development and the spatial variation of the ash dieback disease with the aim to find some partially resistant European ash trees (*Fraxinus excelsior*). By 2019, the programme includes 189 trees in 22 sites.

Materials & Methods

Site selection

With the help of local forest administrations, 22 European ash stands in north-west Switzerland were selected for observation (Figure 1). All stands where dominated by European ash and at the time of selection the disease was fully established throughout the region. In these stands, between six and ten apparently healthy trees were selected and labelled in each site.

Each year, at the end of August, the trees were visually inspected for the parameters shown in Table 1. Subsequently, crown transparency and disease intensity were combined to infestation levels (Table 2).



1 Allschwil
2 Lampenberg
3 Pratteln
4 Reinach
5 Riehen
6 Grindel
7 Hofstetten-Flüh
8 Laupersdorf
9 Luterbach
10 Niederbuchsiten
11 Obergösgen
12 Oensingen
13 Selzach
14 Aristau
15 Gipf-Oberfrick
16 Möhlin
17 Oberrüti
18 Rudolfstetten
19 Turgi
20 Diessbach
21 Pieterlen
22 Scheuren

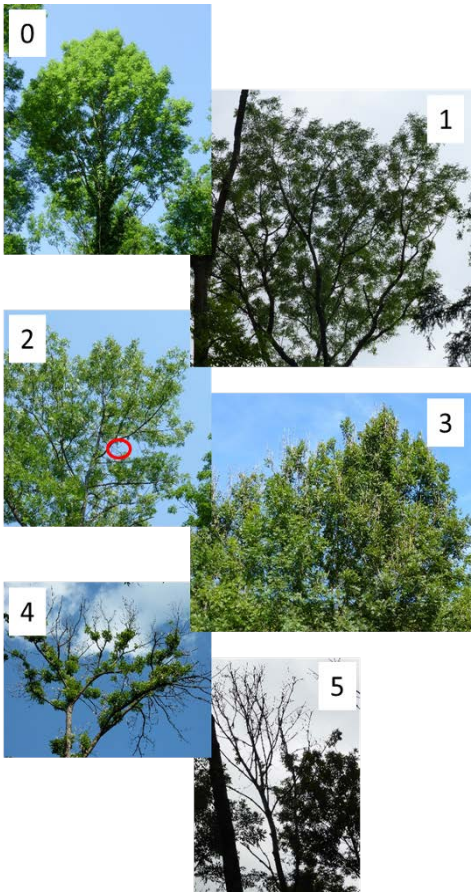
Figure 1: Map with the 22 sites in north-west Switzerland.

Table 1: Parameters that were assessed in the observation sites.

Parameters	Unit
Crown transparency	Percentage of crown
Disease intensity	Percentage of crown
Dead branches	Percentage of crown
Bark discoloration and necrosis	yes/no
Shoots	yes/no
Flowers and fruits	yes/no

Table 2: Key of infestation levels.

Level 0
Fully healthy tree without symptoms
Crown transparency: 0-15%
Level 1
Crown with reduced foliation
Free of ash dieback symptoms
Crown transparency: 20-25%
Level 2
Minor ash dieback symptoms
Disease intensityt: 1-20%
Crown transparency: 5-25%
Level 3
Obvious ash dieback symptoms
Disease intensityt: 20-30%
Crown transparency: 30-40
Level 4
Heavily affected
Dieback of the crown, formation of shoots and foliage clusters
Disease intensity: 40-95%
Crown transparency: 40-90%
Level 5
Dieback of the tree
Disease intensity and crown transparency: 100%



Results

The progress of the disease in percentage over all observed trees is shown in figure 2.
In 2019, 189 European ash trees were observed. On one hand 25 trees (13%) didn`t show any symptoms. Two of them never showed symptoms in any year since observation started. On the other hand, five more trees died because of the disease.
Since 2013, totally 11 trees died. This is 5.4% of the originally 204 trees. Further reduction of the total number of trees was caused by wind and fellings.
Between 2018 and 2019, more trees were counted to level 3 and 4. But with 132 trees, a majority (69.8%) was still judged in level 2. These trees just showed one single twig with symptoms while the rest of the crown was in good shape.

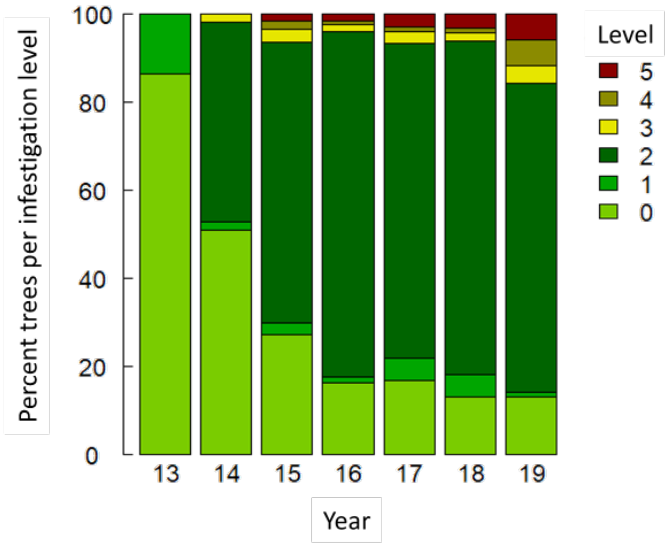


Figure 2: Progress of infestation from 2013 to 2017 in percentages.
(2013 n= 169, 2014 n= 204, 2015 n= 201, 2016 n= 197, 2017 n= 196, 2018 n= 192, 2019 n= 189)