REPORT ON STUDYING *MIYAWAKI* FORESTS IN BELGIUM

Urban Forests started in 2016 and specializes in creating and monitoring micro-forests using the Miyawaki method [1]. To date, we created more than 80 micro-forests in Belgium and France, totaling more than 120,000 trees. With over 6 years of experience, our team wanted to study the evolution of tiny forests in details. The results are published in this report.
We obtained precise data on growth rate, mortality rate, foliage density, ground cover on forest floor, soil biology, temperature and water infiltration rate.
Results are positive.
This unique report helps everyone to better understand the evolution of Miyawaki forests and their impact. The findings show the positive impact of Miyawaki forests for the well-being of local residents, for biodiversity and for adapting to climate change.

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URBAN FORESTS
DO IT WITH TREES !

Study made by par Nicolas de Brabandère
and Dorian Malengreau

"We don't regenerate the living - in fact, that's not within our power: we initiate autonomous powers of regeneration. We let it express its own resilience. We put in place the minimum, delicate, discreet conditions for it to regain its full vitality."

Baptiste Morizot, Raviver les braises du vivant

AKNOWLEDGEMENTS

I would like to extend my warmest thanks to the people who supported Urban Forests, before anyone else, and recognized the value of micro-forests as a way of reconnecting with the living world and improving the quality of life. My aim is to create places of well-being, learning, inspiration and renewal.

Each of our micro-forests is a tangible and impactful act to heal ourselves and regenerate nature one piece at a time.

My special thanks go to my brother Olivier, who was the very first person to make it possible to create a Miyawaki forest in Belgium (Ormeignies).
I would also like to thank the incredible team at the school in Barvaux who continuously support micro-forests for children, as well as Institut Technique Horticole in Gembloux, Axisparc business park in Mont-Saint-Guibert and, last but not least, the owners of the incredible gardens at Bois de Fa and Willemeau.
I do not forget all the volunteers who helped with the planting and maintenance. Without you, without your enthusiasm, your boldness and curiosity, none of this would have been possible.

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1. INTRODUCTION

The Miyawaki method was developed by botanist Akira Miyawaki in the 60s [2]. The objective is to create native forests made of native tree species by accelerating tree successions, enabling the return of a complex, self-sustaining and diversified forest ecosystem that is as close as possible to the primordial forest. In today's world, it is becoming difficult to ensure enough time for the long return of well-developed native forests. Successions to build back native forests are slow and take at least 200 years in temperate climate. The technique developed by Professor Akira Miyawaki can speed up the return of native forests.

The impact of Miyawaki forests is multiple and transversal [3]. Micro-forests heal the land and people, improving living conditions and promoting biodiversity. They protect us from environmental adversity, encourage human interactions and meet sustainable development goals as defined by the United Nations.

The main steps in establishing a Miyawaki forest[4] are as follows. Once a suitable site is identified, the soil is prepared to facilitate the establishment and growth of native trees.
Micro-forests generally occupy areas of between 100 and 3,000m2.
Trees are usually planted by volunteers during pubic events open to all.
Little maintenance is required for 2 to 3 years, which consists in controlling weeds and occasional watering when it's necessary.
The Miyawaki forests become self-sustaining after 3 years. Micro forests evolve freely and provide positive environmental services that only improve with time.

EVOLUTION OF A MIYAWAKI FOREST

Initial site 08-11-2016

Plantation day 12-11-2016

Forest 28-09-2017

Forest 07-06-2023

2. STUDY

OBJECTIVES

Planting many Miyawaki forests since 2016 has given us much experience. The Urban Forests team wanted to find out more about the evolution of micro forests with reliable and objective data. So we decided to carry out an in-depth study of 6 sites in Belgium. Our aim was to map precisely the position of each tree in the forest, to find out about growth rate, mortality, soil biology, temperature and water infiltration. We are also learning more about the characteristics of different tree species, and about the type of habitat that Miyawaki forests provide to support biodiversity and their impact for local residents. We studied the evolution of 6 micro-forests in details and made comparisons to understand the difference between what happens inside these forests and what happens outside them.

Francis Hallé is a well-known French botanist who studied native forests worldwide. We are inspired by his magnificent drawings on the architecture of native forests as a way to gain a better understanding about the form and evolution of our own micro-forests created using the Miyawaki method. It is difficult to grasp the complexity of a forest without observing it closely. Even if it is impossible to grasp the entire ecosystem as such, we wanted, in the manner of Francis Hallé, to highlight its main characteristics.

A drawing by Francis Hallé that inspired us for the study.

RESEARCH LOCATION OF MIYAWAKI FORESTS

1 BARVAUX - COMMUNAL SCHOOL
- adress : 2, Basse Commène, 6940 Durbuy.
- in the lawn at the end of the playground.

2 MONT-ST-GUIBERT - AXIS PARC
- adress : 11, Rue Emile Francqui 1, 1435 Mont-Saint-Guibert.
- in the lawn, around the offices, in a business park.

3 GREZ DOICEAU - PRIVATE GARDEN
- adress : Bois de Fa, 1390 Grez-Doiceau.
- on the edge of a forest management plot, in a private garden.

4 GEMBLOUX - ITH
- adress : 31A, Rue de l'Entrée Jacques, 5030 Gembloux.
- on the site of former greenhouses at the Institut Technique Horticole.

5 WILLEMEAU - PRIVATE GARDEN
- adress : 733, Chaussée de Douai, 7506 Tournai.
- on a plot surrounded by monoculture fields, in a private garden.

6 ORMEIGNIES - ROADSIDE
- adress : (near) 431, Chaussée de Valenciennes, 7802 Ath.
- on a plot between the road and the fields.

The numbering follows the chronological order of the data taken.

METHOD FOR DATA COLLECTION

Data were collected in late May and early June 2023, in sunny conditions between 9 and 4pm.

Data were collected with 2 people: Nicolas de Brabandère, founder of Urban Forests, and Dorian Malengreau, collaborator since 2018. For each project, one of us took the measurements and the other took notes. Data collection took between 5 and 6 hours on each site. Data were then analyzed and compiled in this report.

A short film supplements the publication of this report with real situations in the field.
Link to the film. (www.urbanforest.be)

3. METHODOLOGY

LIST OF DATA COLLECTED

We collected the data along a 10 m long transect. On each site, we placed the transect at a location considered sufficiently representative of the entire forest.
We collected date for all the indicators listed below, perpendicular to the transect and up to 3 meters on either side.

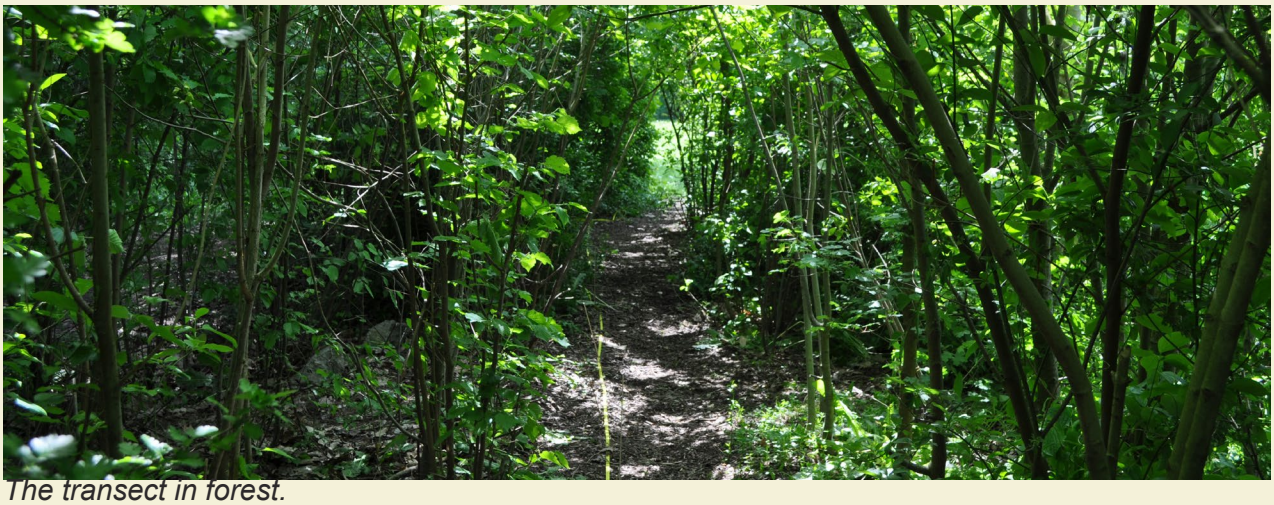
We took the following measurements:

Data	Aim	Tool(s)	Unit	Transcription
Location of every tree	*Precise position along the transect. *Mortality rate. *Easily find trees to follow their evolution.	Measuring wheel	cm	Plan
Species name for every tree	*Precise position along the transect. *Species diversity. *Canopy tree layers.	Visual observation	Gender + species	Each tree has a number with all the data
Height of every tree	*Height measurement. *Growth rate.	Telescopic meter	cm	Plan and elevation
Amplitude of the crown of every tree	*Crown measurement. *Characteristic of each species.	Telescopic meter	cm	Plan and elevation
Width of trunk of every tree	*Measurement of the circumference of every tree at its base. *Secondary growth rat. *Characteristic of each species.	Measuring tape	cm	Plan and elevation
Overall health of the forest	*General health situation. *Presence of calamity. *Sign(s) of tree being unhealthy.	Visual observation	1: poor 2: good 3: very good	Short description

Ground cover on the forest floor	*Diversity of plant cover over the forest floor. *Spontaneous colonization. *Diversity.	Visual observation	1: bare ground 2: leaves/ mulch 3: few very common plants (<5) 4: diversity of plant cover (>5) 5: diversity of ground plant cover with uncommon species	Short description
Foliage density	*Density of tree leaves. *Luminosity.	Visual observation	1: <50% 2: between 50 and 80% 3: >80%	Short description
Soil biology inside and outside the forest	*Differences in the soil food web inside and outside the forest. *Soil biology. *Changes in soil biology.	Light microscope	Presence/ absence of bacteria, fungi, ciliates, flagellates, amoebae, nematodes, micro-arthropods	Short description with comparaison
Temperature inside and outside the forest	*Temperature difference inside and outside the forest. *Cooling effect.	Infrared thermometer	Celsius degree	Plan
Water infiltration inside and outside the forest	*Capacity to absorb rainwater inside and outside the forest. *Impact on runoff and erosion.	Bottomless container and stopwatch.	minutes/ seconds	Short description

MEASUREMENT TRANSECT

*The transect is laid out in the forest over a length of 10m and a width of 3m on either side.
*The total surface area is 60m2, divided into 1m2 grids.
*The location of each tree is precisely recorded, along with its genus and species, height, trunk width and crown width.
*The transect was laid out on an area of the forest that is most representative of the entire forest. We did our best to determine the most representative area where we saw as many characteristics as possible observed elsewhere in the forest.
*The transect is lined along the decameter with poles every meter. The width is measured on either side of the poles with a measuring wheel held at a right angle to the transect.
*All trees are noted before progressing along the transect.
*Observations are noted on the plan.



The transect in forest.

Writing data on the plan.

VISUAL OBSERVATIONS

We made visual observations in order to measure the overall health of the forest, ground cover on the forest floor and density of tree foliage.

Determining the overall health of the forest :

1: poor - leaves are unwell with indications that something is wrong (caterpillar or bug invasion, parasitic fungus, sickness, etc.), covered in yellow, black or brown, many leaves fell from the trees, the leaves are hanging because of lack of water, the trunks are often damaged or looking sick.
2: good - intermediate condition between 1 and 3 with only a small proportion of trees or leaves affected.
3: very good - the trees are in good health, the leaves are healthy, green and upright, there is no apparent disease on the trunks and there is no lack of water.

Determining the ground cover on the forest floor

1: bare ground - no plants on the forest floor. Soil is empty of any plant.
2: leaves/mulch - no plants on the ground. Only dead leaves or mulch can be seen.
3: few very common plants (<5) - few plants are present and fairly scattered. These plants are very common plants (nettles, cottongrass, dandelion, plantain, etc.). A maximum of 5 common species are seen.
4: diversity of plant cover (>5) - plants are present on the forest floor. They may be common plants with some lesser common. More than 5 species are seen.
5: diversity of ground plant cover with uncommon species – the forest floor is very diverse, full of many different plants, some of which you might not recognize at first glance.

Determining foliage density :

The observer is positioned in the forest, looking through the foliage towards the light. It enables the observer to assess the density of the foliage according to 3 criteria: less than 50% foliage cover, between 50 and 80% foliage cover, and foliage cover more than 80%.

SOIL BIOLOGY UNDER THE MICROSCOPE

*Soil samples were taken at 3 different locations in the forest and then outside the forest.
*The 3 sampling points were then mixed together, differentiating between the 2 sources (inside or outside the forest).
*The samples are stored in a closed plastic bag in the shade for a maximum of 24 to 48 hours before they are studied under the light microscope.
*1ml of soil is taken in the sample at multiple points, then diluted with 4ml of clean water.
*The whole mixture is mixed by shaking the arm 30 times.
*A drop is taken using a clean pipette and immediately spread onto a glass slide and covered with a cover slip. Air bubbles are removed.
*The entire field view is carefully observed under a light microscope at magnifications ranging from 40 to 400x.
*Observations are made several times, noting the presence of bacteria, fungi, ciliates, flagellates, amoebae, nematodes and microarthropods. Other observations are also noted, such as the presence of agglomerates of organic matter, the presence of humic acid (brown-black) or fulvic acid (honey-coloured) or their absence, which would indicate a soil with very little biological activity.
*The procedure is repeated 2x for each source, first for the sample in the forest and then for the sample outside the forest.
*Photos and videos are recorded.
*A comparison is made.

We assume that the presence of more trophic levels in the soil food web is an indicator that biological activity is more dynamic, which is favorable for the health of the trees, their growth, the quality of the soil, for rainwater infiltration and storing.

TEMPERATURE MEASUREMENT

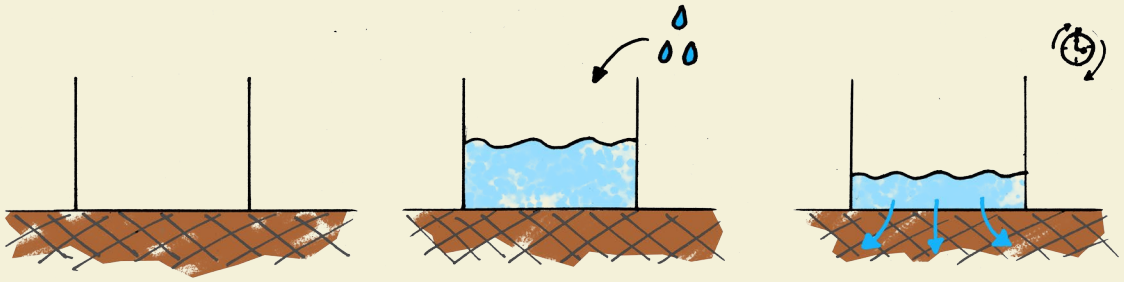
An infrared thermometer is used to measure temperature at different points in and around the forest. Temperature is taken on different surfaces to make comparison and assess the cooling capacity of the forest.

Measurements were taken over a short period (less than 2min) under identical climatic conditions, taking care, for example, that the passage of a cloud did not bias the results. Measurement points are recorded at numerous locations on the same surface to obtain a truly representative reading.

WATER INFILTRATION TIME

*We made an infiltrometer by opening a plastic bottle on both sides.
*The cylinder was carefully placed on the ground to prevent leaking.
*The same volume of water was then poured into the cylinder.
*The time taken for the water to infiltrate in the soil was measured using a stopwatch.
*The operation was carried out by 2 people.
*The same operation was carried out in the forest and then outside.

We assume that good soil allows water to infiltrate much more quickly. Biological activity in the soil prevents hard pan compaction, better aeration, better soil texture, enabling water to infiltrate more quickly and to store soil moisture more effectively. The ecosystem is cooler, with more moisture, and it is more resilient in the event of drought or extreme heat. Faster water infiltration reduces surface run-off, thus diminishing the risk of flooding and soil erosion.



4. RESULTS

BARVAUX - COMMUNAL SCHOOL

Adress : 2, Basse Commène, 6940 Durbuy.
Planting day : 07-05-2018 (5,1years)
Number of trees/shrubs : 300
Surface of forest : 100m²
Number of volunteers during the planting event : 300
Date of observation : 15-05-2023 between 9h30 and 14h30
Weather : sunny day

Initial site 12-03-2018

Planting day 07-05-2018

Day of observation 15-05-2023

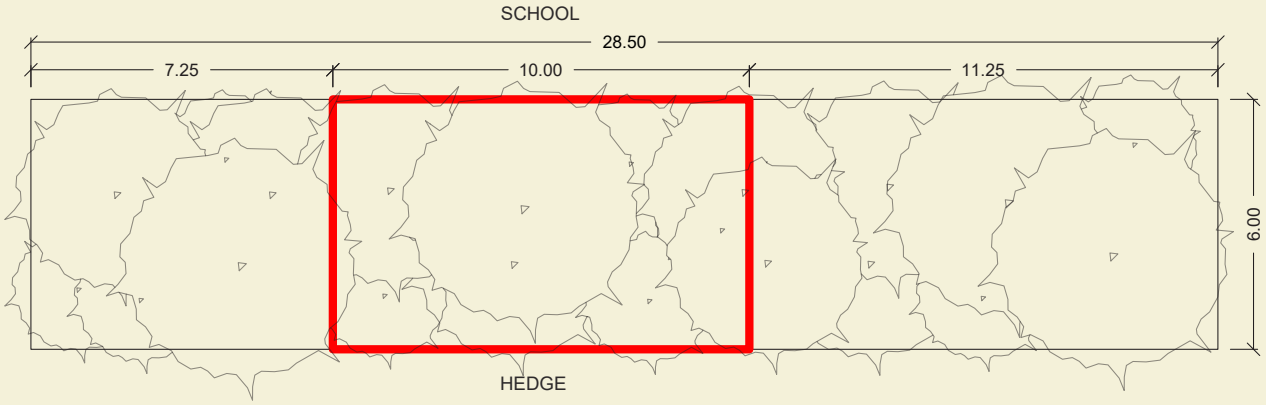
INDICATORS	1	2	3	4	5
Overall health of forest	Poor	Good	Very good		
Foliage density	<50%	50-80%	>80%		
Forest ground cover	Bare ground	Leaves/ mulch	Few very common plants	Diversity of plant cover	Rich ground cover with uncommon spieces

OVERALL HEALTH OF FOREST

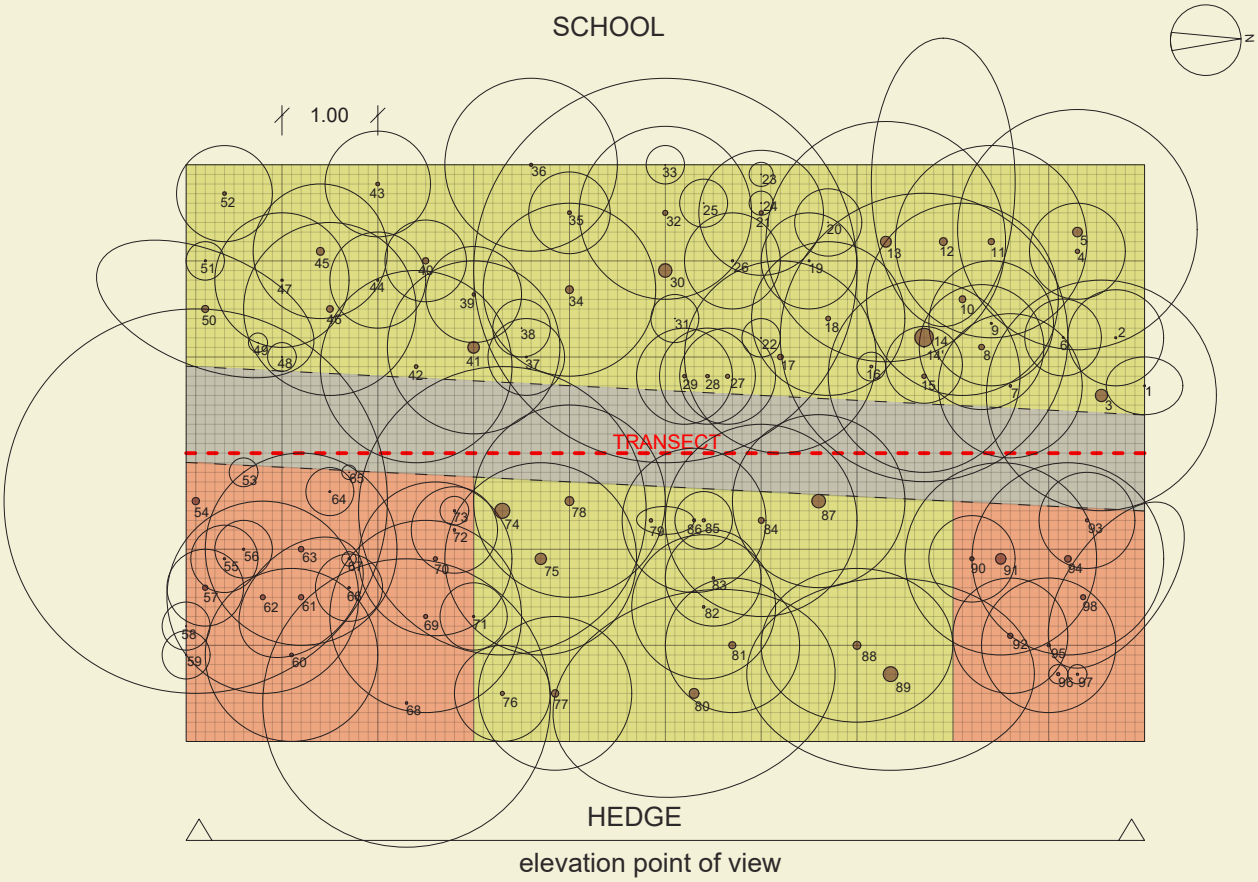
FOLIAGE DENSITY

FOREST GROUND COVER

LOCATION OF THE TRANSECT



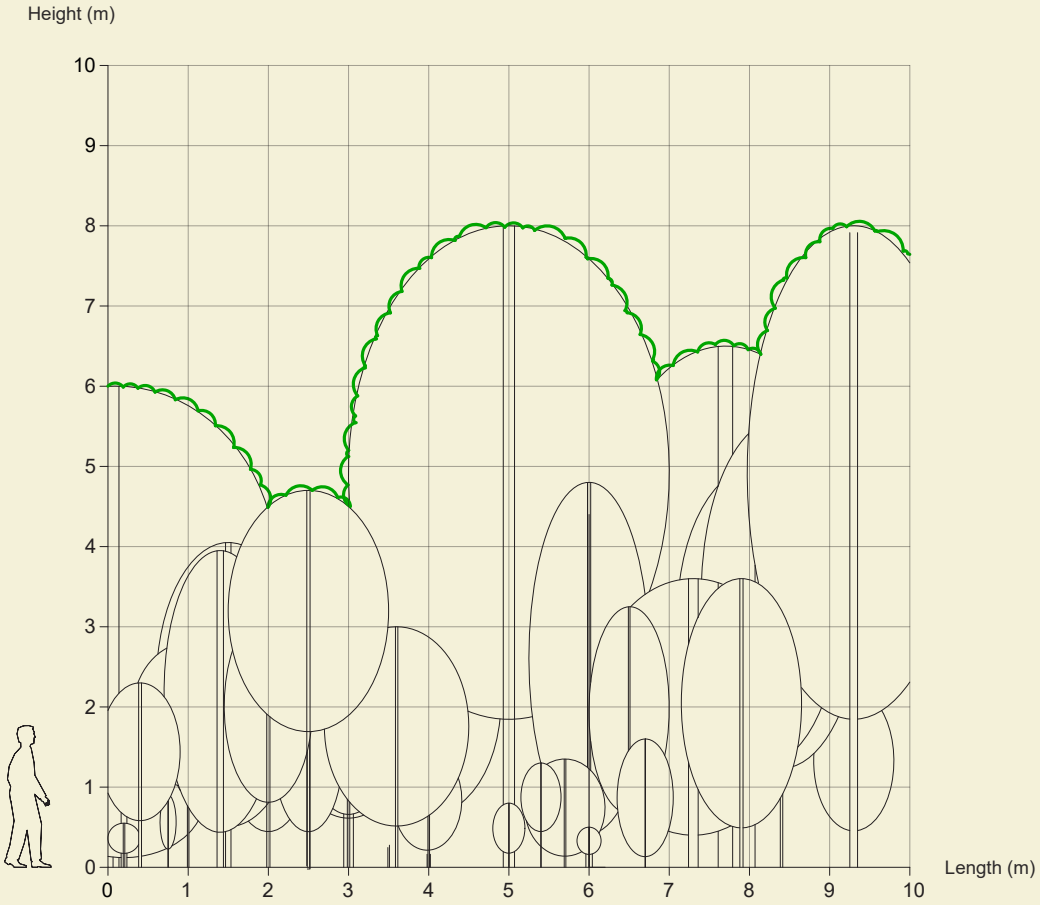
PLAN OF THE TRANSECT



LEGEND OF THE TRANSECT

- 1 - Bare ground
- 2 - Leaves/mulch
- 3 - Few very common plants
- 4 - Diversity of plant cover
- 5 - Rich ground with uncommon spieces
- Scope of study
- Grid pattern (mesh 10x10cm)
- Trunks
- Crowns

ELEVATION OF THE TRANSECT



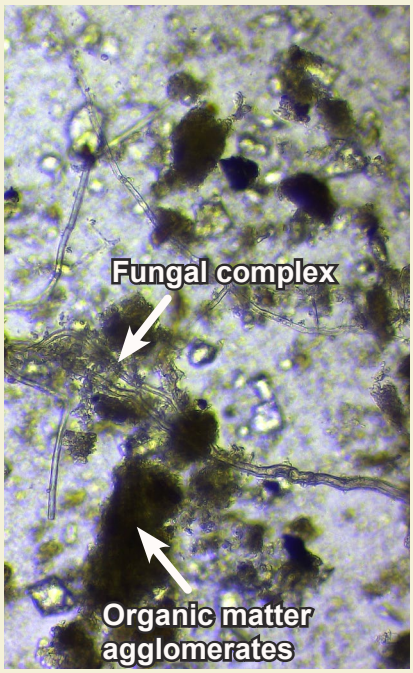
KEY FIGURES

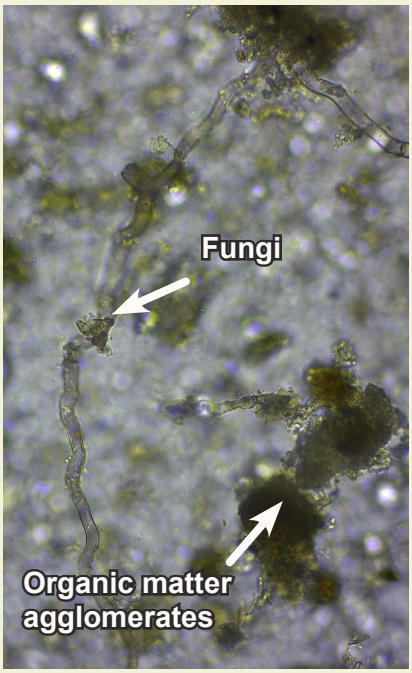
INDICATORS	BARVAUX
Planting date	07-05-2018
Age	5,1years
Transect (total surface)	60m²
Transect (planted surface)	50m²
Number of trees/shrubs planted	150
Number of trees/shrubs notified	99
Mortality rate	34,00%
Proportion of trees	47,96%
Proportion of shrubs	52,04%
Height of the tallest tree/shrub	800cm
Height of the smallest tree/shrub	30cm
Average height of the 15 tallest trees	546cm
Average height	281,02cm
Average growth rate (trees and shrubs)	55,28cm/year
Average growth rate (trees)	66,28cm/year
Average growth rate (shrubs)	45,20cm/year
Average trunk diameter	4,67cm
Largest trunk diameter	18,1cm
Smallest trunk diameter	0,6cm
Average crown	138,06cm
Largest crown	400cm
Smallest crown	20cm

SOIL BIOLOGY UNDER THE MICROSCOPE

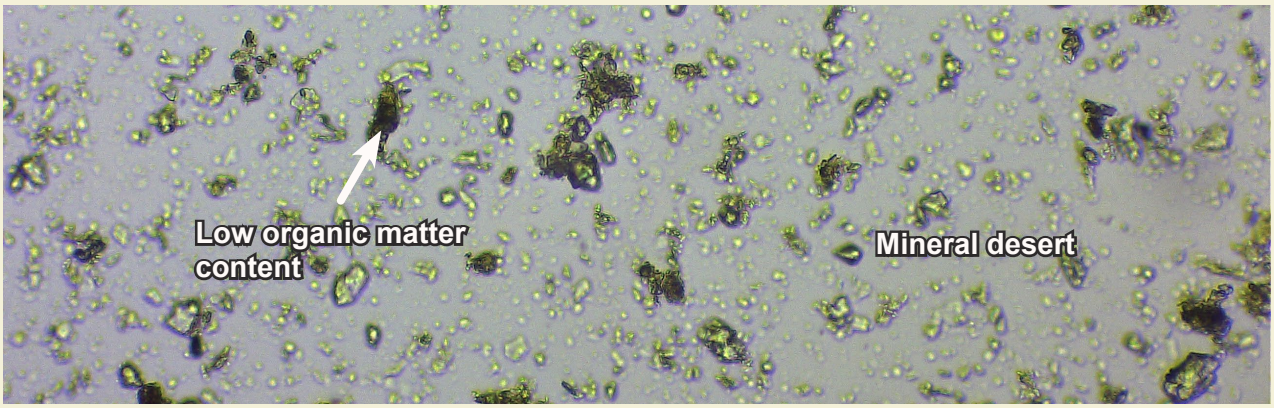
BARVAUX		INISDE THE FOREST	OUTSIDE THE FOREST
Mushrooms	Few		
	A lot		
Bacterias			
Ciliates			
Flagellates			
Amoebas			
Nematodes			
Micro-arthropods			
Fulvic acid			
Humic acid			

INSIDE THE FOREST



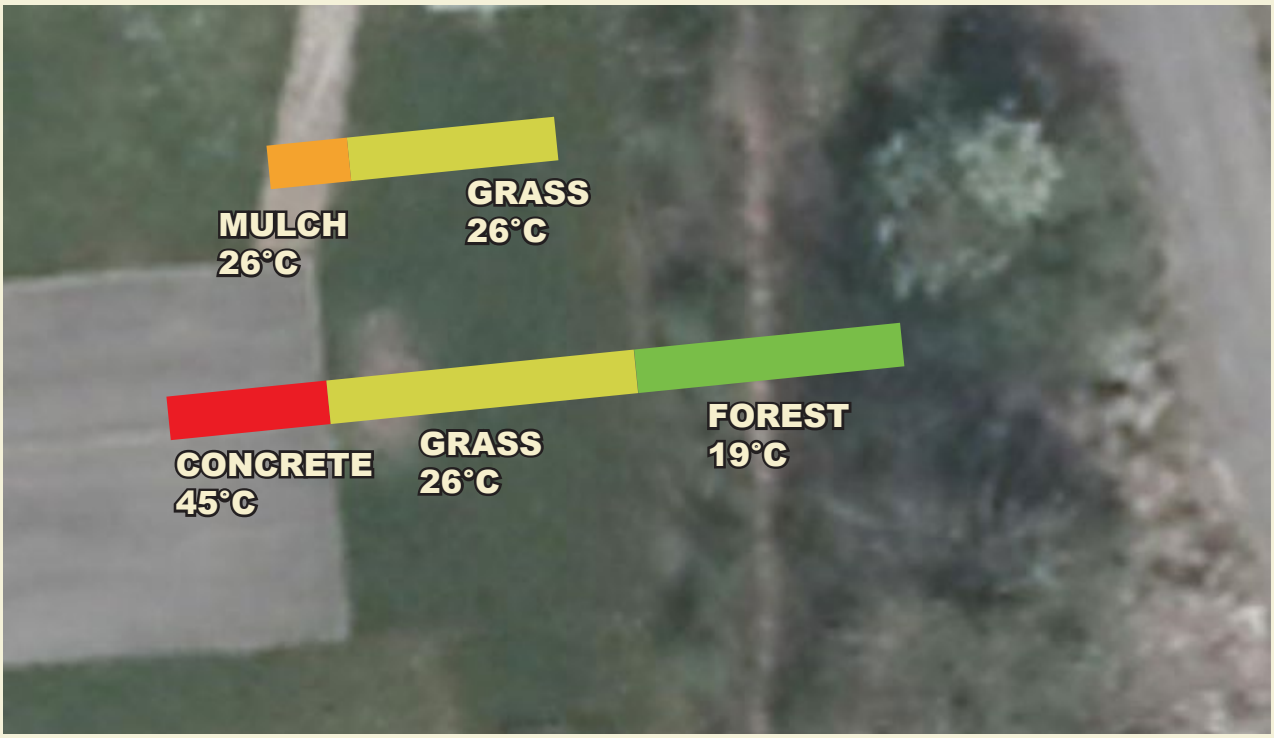


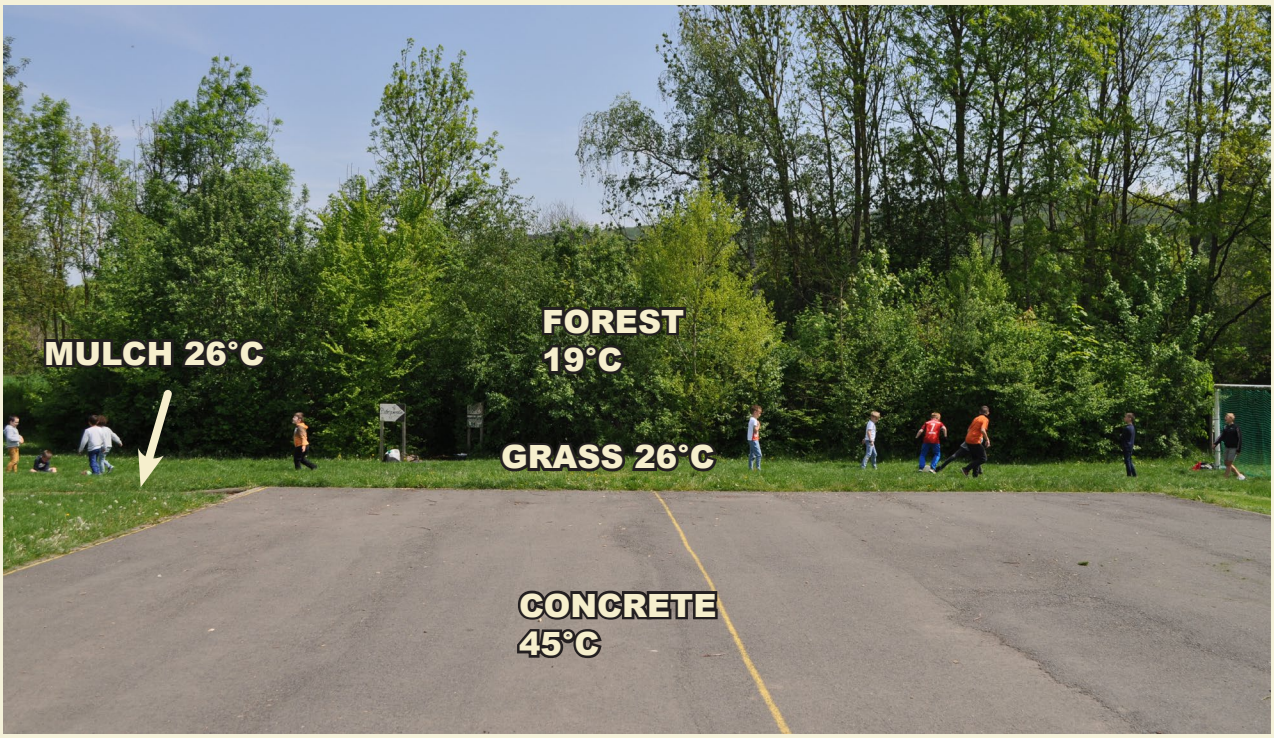
OUTSIDE THE FOREST



TEMPERATURE MEASUREMENT

Time of data collection : 14h
Weather : full sun





WATER INFILTRATION TIME

Time of data collection : 13h45
Weather : dry for several days.
Water volume : ~85cl

INFILTRATION SPEED :

- INSIDE THE FOREST : 1'15"
- OUTSIDE THE FOREST : 5'00"

COMMENTS

The tiny forest in Barvaux has grown and developed very well . Although it was planted late in the season (May 2018), it did not suffer from the severe drought on the first year of planting.

It was watered twice in May then no more. The forest established itself well and grow rapidly thereafter. The site is cool and damp.

The overall condition of the forest is excellent. It withstood a huge flood in July 2021, which caused very strong water mass currents. It did not affect its survival or create any visible degradation. On the contrary, the micro-forest has shown that it can reduce flood-related destruction and save lives by absorbing the shock of a catastrophic flood. The capacity to infiltrate water better in the forest is confirmed because water infiltration in the forest is 5x quicker than for the surrounding lawn.

Our observations confirmed that temperature is lower in the forest than outside. Micro forests create a cooling effect. We saw that children naturally move closer to the forest on a hot day, attracted by the coolness. We measured a lower temperature in the forest than on the football field and than on the hard playground around the forest.

Tree mortality is in part associated with children playing in the forest, occasionally breaking branches and trampling trees. This is not a major cause of concern because the forest retains its aura and its function. We don't see too much of a negative impact. It should be noted that teachers ask children not to go in the forest in the spring when birds are nesting.

In addition, we were able to make a number of other observations, such as such as many tree sprouting (Prunus avium, Quercus rubra, Salix alba, Fraxinus excelsior, Acer pseudoplatanus), the fact that the soil color is much darker inside the forest than outside, and that lime trees are the last to bud.

Barvaux micro-forest has the highest proportion of shrubs of all 6 sites.

MONT-ST-GUIBERT - AXIS PARC

Adress : Parc Économique "Axis Parc", 1, Rue Emile Francqui 1, 1435 Mont-Saint-Guibert.
Planting day : 21-11-2019 (3,6years)
Number of trees/shrubs : 900
Surface of forest : 350m²
Number of volunteers during the planting event : 160
Date of observation : 30-05-2023 between 9h00 and 15h00
Weather : sunny day

Initial site 19-06-2019

Planting day 21-11-2019

Day of observation 30-05-2023

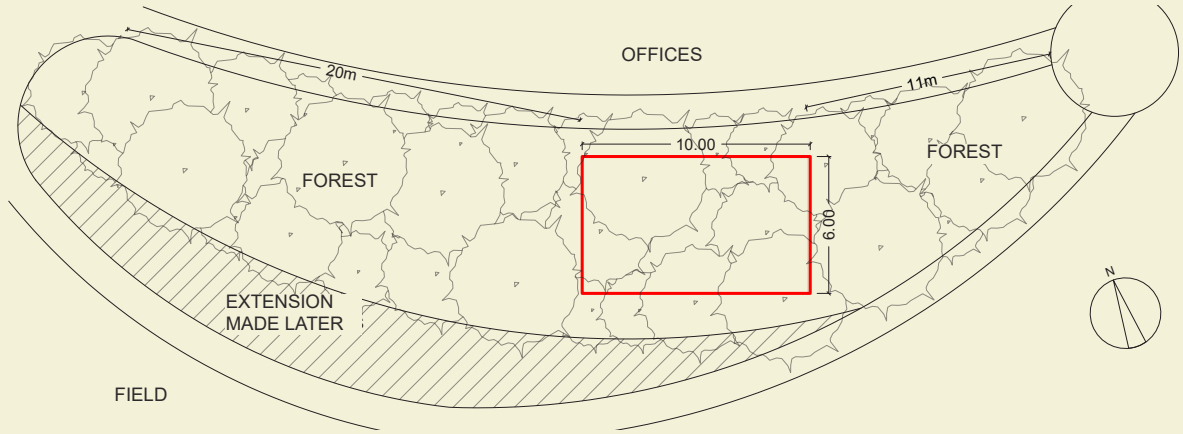
INDICATORS	1	2	3	4	5
Overall health of forest	Poor	Good	Very good		
Foliage density	<50%	50-80%	>80%		
Forest ground cover	Bare ground	Leaves/ mulch	Few very common plants	Diversity of plant cover	Rich ground cover with uncommon spieces

OVERALL HEALTH OF FOREST

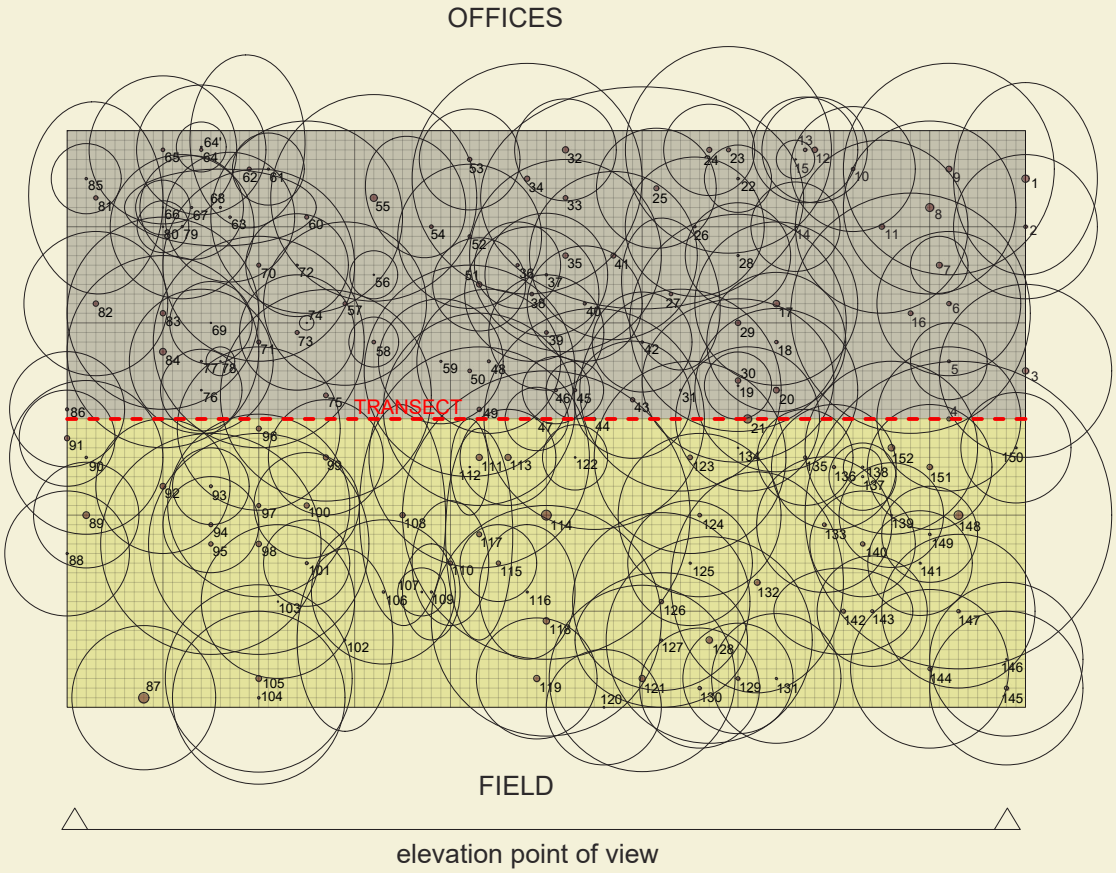
FOLIAGE DENSITY

FOREST GROUND COVER

LOCATION OF THE TRANSECT



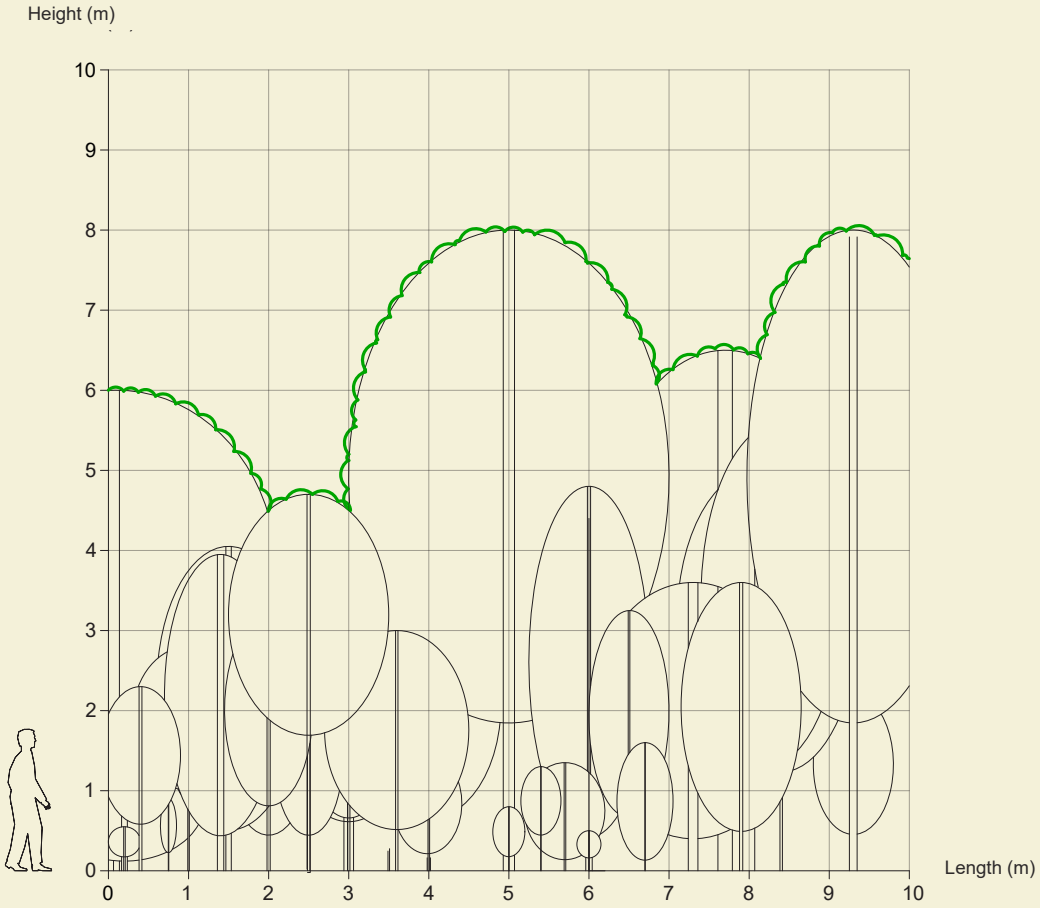
PLAN OF THE TRANSECT



LEGEND OF THE TRANSECT

- 1 - Bare ground
- 2 - Leaves/mulch
- 3 - Few very common plants
- 4 - Diversity of plant cover
- 5 - Rich ground with uncommon spieces
- Scope of study
- Grid pattern (mesh 10x10cm)
- Trunks
- Crowns

ELEVATION OF THE TRANSECT



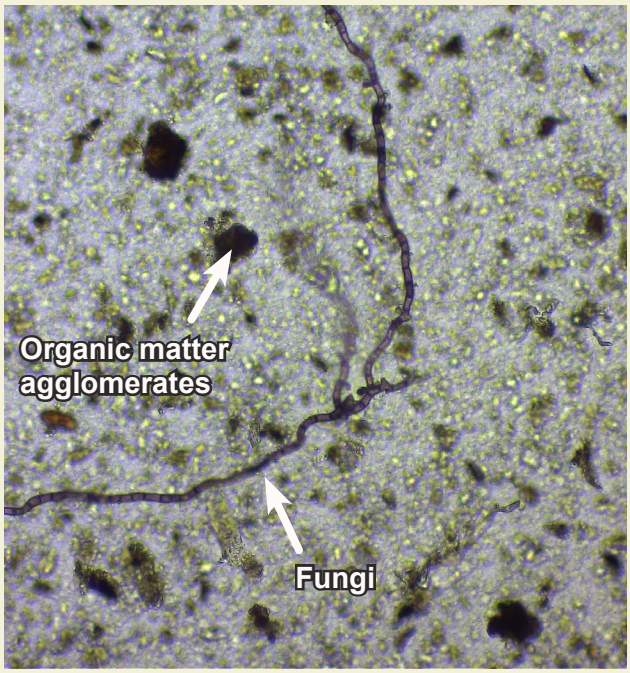
KEY FIGURES

INDICATORS	AXIS PARC
Planting date	21-11-2019
Age	3,6years
Transect (total surface)	60m²
Transect (planted surface)	60m²
Number of trees/shrubs planted	180
Number of trees/shrubs notified	153
Mortality rate	15,00%
Proportion of trees	67,11%
Proportion of shrubs	32,89%
Height of the tallest tree/shrub	590cm
Height of the smallest tree/shrub	77cm
Average height of the 15 tallest trees	461cm
Average height	290,25cm
Average growth rate (trees and shrubs)	81,00cm/year
Average growth rate (trees)	86,05cm/year
Average growth rate (shrubs)	73,24cm/year
Average trunk diameter	4,7cm
Largest trunk diameter	10,8cm
Smallest trunk diameter	1cm
Average crown	142,17cm
Largest crown	320cm
Smallest crown	15cm

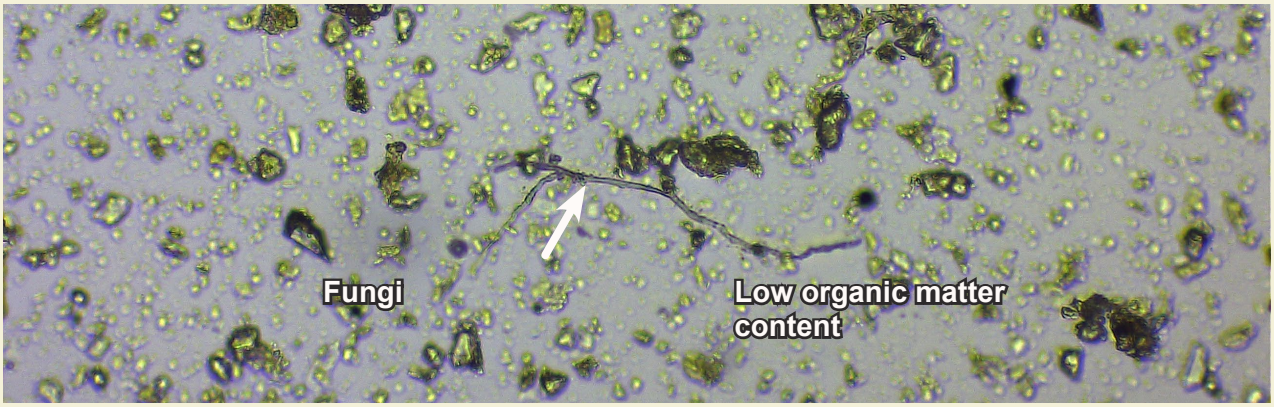
SOIL BIOLOGY UNDER THE MICROSCOPE

AXIS PARC		INISDE THE FOREST	OUTSIDE THE FOREST
Mushrooms	Few		
	A lot		
Bacterias			
Ciliates			
Flagellates			
Amoebas			
Nematodes			
Micro-arthropods			
Fulvic acid			
Humic acid			

INSIDE THE FOREST

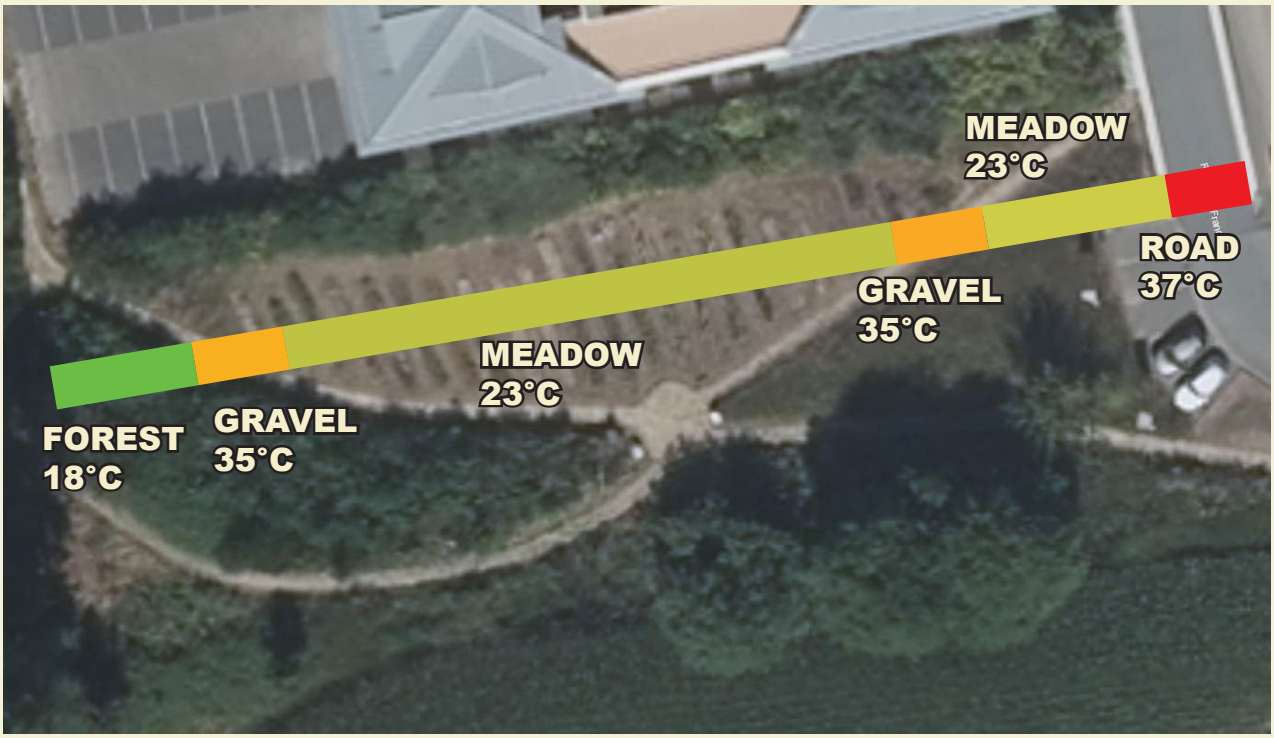


OUTSIDE THE FOREST



TEMPERATURE MEASUREMENT

Time of data collection : 12h55
Weather : full sun



WATER INFILTRATION TIME

Time of data collection : 13h15
Weather : dry for several days.
Water volume : ~85cl

INFILTRATION SPEED :

- INSIDE THE FOREST : 1'33"
- OUTSIDE THE FOREST : 11'38"

COMMENTS

The urban forest at Axisparc is doing well. Tree growth is very good, with a mortality rate of only 15% over 3.6 years (the lowest mortality rate of all 6 sites we studied). We saw evidence that deers cross the forest without causing any major damage (browsing can sometimes be a major concern on newly-planted Miyawaki forests). It is also visited by many birds (empty broken snail shells observed).

On the other hand, the undergrowth is relatively poor and lacks diversity, especially on the side of the existing hedge.

This Miyawaki forest was never watered and maintenance was done only one time. It shows that the forest is very resilient despite having endured very dry summers. It should be noted that maintenance level is unpredictable from one project to the next. Sometimes very little maintenance is needed, and sometimes much more than on average.

Looking back, it is pleasing to see how much the Axisparc is transformed since the urban forest project was launched. Before, the lawn used to be mown very regularly with very little biodiversity. Now, the site is totally transformed with a micro-forest brimming with life and attracting much biodiversity. I am glad to hear that the transformation is well received by companies having offices at Axisparc. The general acceptance is confirmed by the fact that Axisparc has already commissioned an extension of the urban forest and more trees have already been planted. Footpaths have also been created, with the urban forest being one main element in the park.

Aside from the Miyawaki forest itself, it is also pleasing to note that its presence and development have reassured the Axisparc's park managers. The managers told us that they transitioned from traditional management with regular maintenance, lawns and little biodiversity, to gentle, ecological management: less maintenance, more biodiversity, planting hedges, fruit trees, installation of beehives, less mowing, high meadows. It shows that the tiny forest movement is a motivational incentive to make that transition. Green space managers and landscapers are pushing for more ecology because it works and people like it. There are more people now walking in the park than ever before.

GREZ DOICEAU - PRIVATE GARDEN

Adress : Bois de Fa, 1390 Grez-Doiceau.
Planting day : 01-11-2017 (5,7years)
Number of trees/shrubs : 1500 arbres
Surface of forest : 500m²
Number of volunteers during the planting event : 180
Date of observation : 31-05-2023 between 9h30 and 15h00
Weather : sunny day.

Initial site 27-03-2017

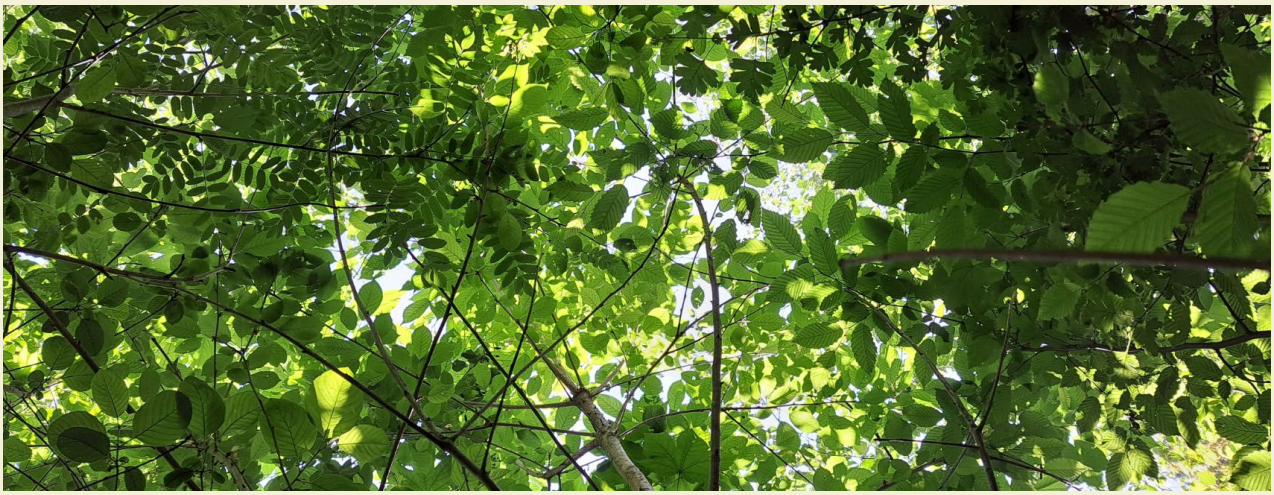
Planting day 01-11-2017

Day of observation 31-05-2023

INDICATORS	1	2	3	4	5
Overall health of forest	Poor	Good	Very good		
Foliage density	<50%	50-80%	>80%		
Forest ground cover	Bare ground	Leaves/ mulch	Few very common plants	Diversity of plant cover	Rich ground cover with uncommon spieces

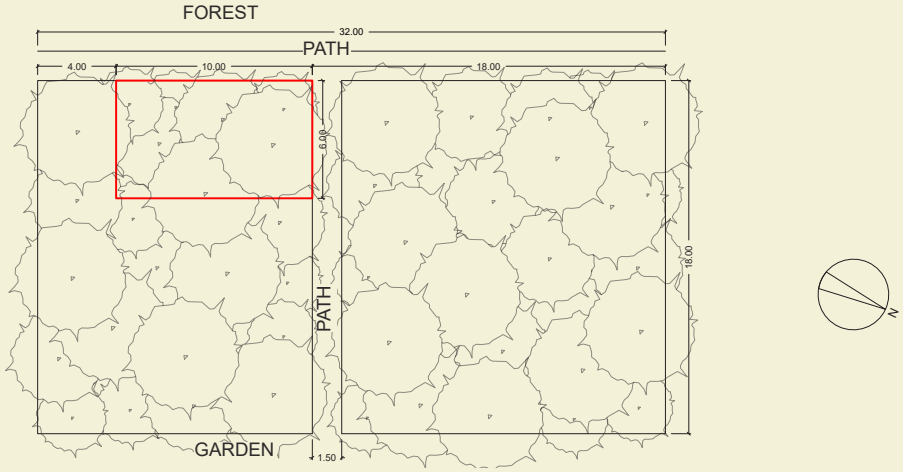
OVERALL HEALTH OF FOREST

FOLIAGE DENSITY

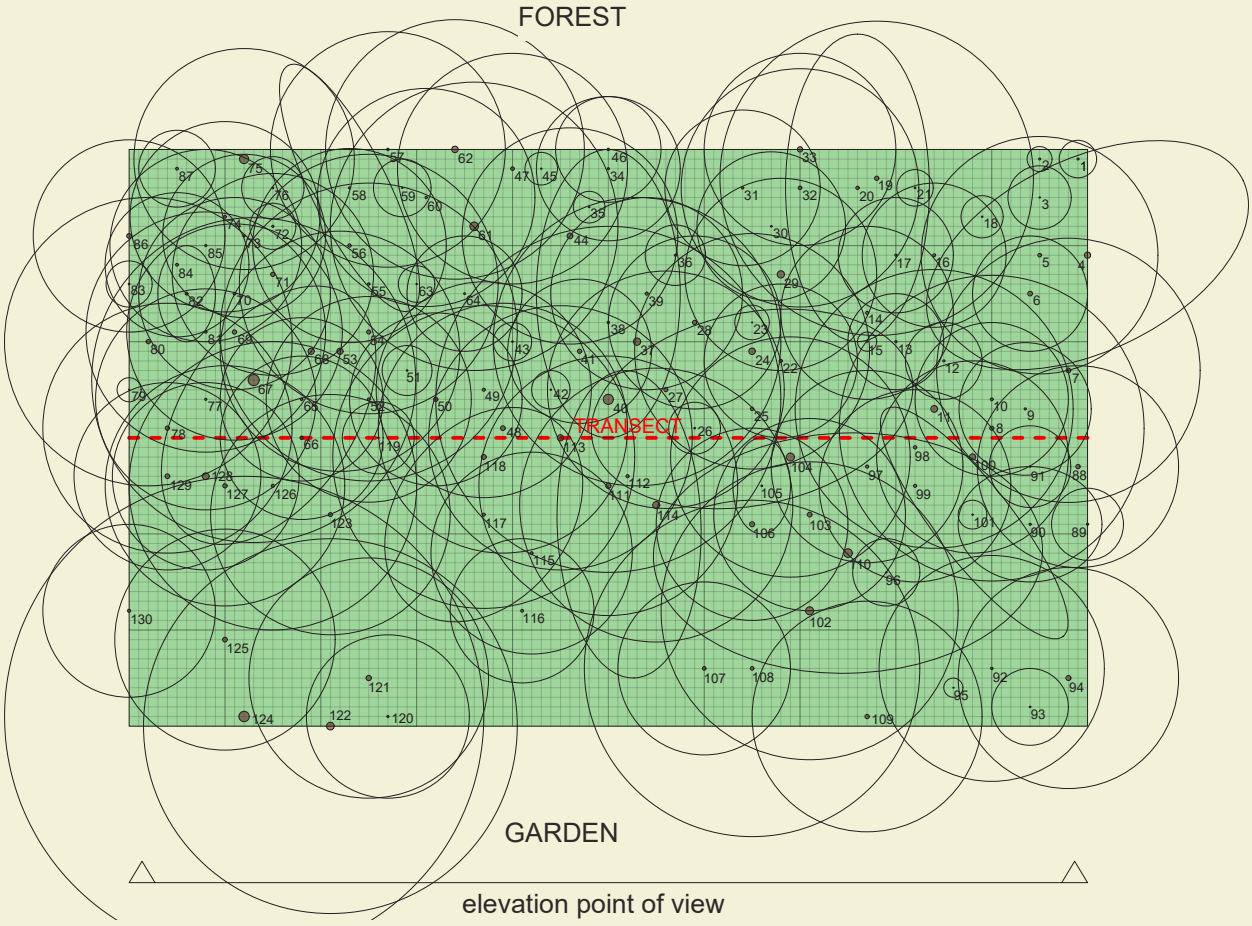


FOREST GROUND COVER

LOCATION OF THE TRANSECT



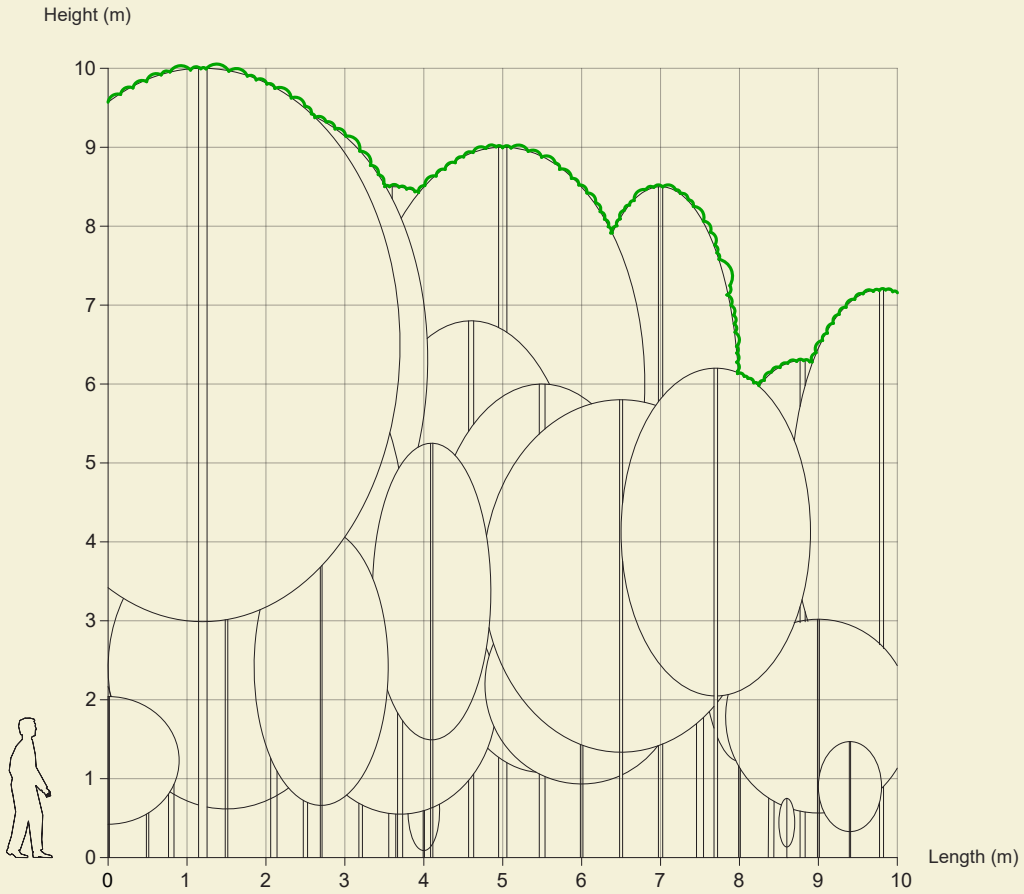
PLAN OF THE TRANSECT



LEGEND OF THE TRANSECT

- 1 - Bare ground
- 2 - Leaves/mulch
- 3 - Few very common plants
- 4 - Diversity of plant cover
- 5 - Rich ground with uncommon spieces
- Scope of study
- Grid pattern (mesh 10x10cm)
- Trunks
- Crowns

ELEVATION OF THE TRANSECT



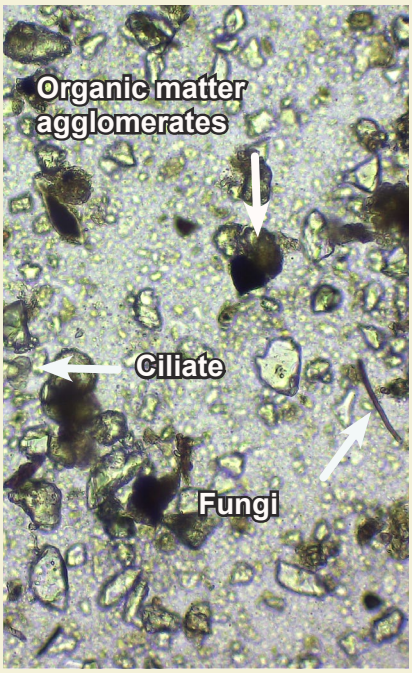
KEY FIGURES

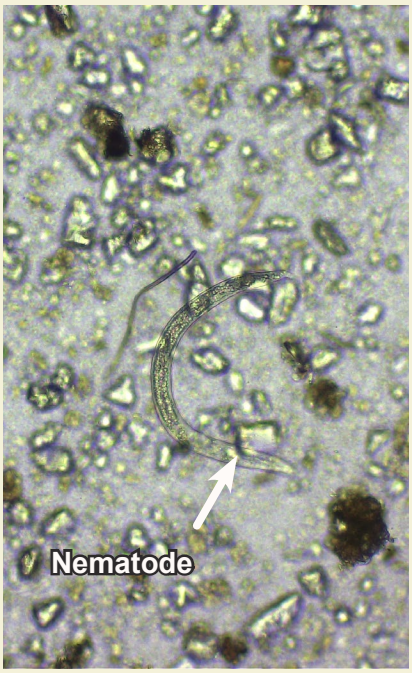
INDICATORS	BOIS DE FA
Planting date	01-11-2017
Age	5,7years
Transect (total surface)	60m²
Transect (planted surface)	60m²
Number of trees/shrubs planted	180
Number of trees/shrubs notified	130
Mortality rate	27,78%
Proportion of trees	66,92%
Proportion of shrubs	33,08%
Height of the tallest tree/shrub	1000cm
Height of the smallest tree/shrub	25cm
Average height of the 15 tallest trees	830cm
Average height	432,33cm
Average growth rate (trees and shrubs)	76,29cm/year
Average growth rate (trees)	83,07cm/year
Average growth rate (shrubs)	62,22cm/year
Average trunk diameter	3,79cm
Largest trunk diameter	11,5cm
Smallest trunk diameter	1cm
Average crown	188,93cm
Largest crown	500cm
Smallest crown	20cm

SOIL BIOLOGY UNDER THE MICROSCOPE

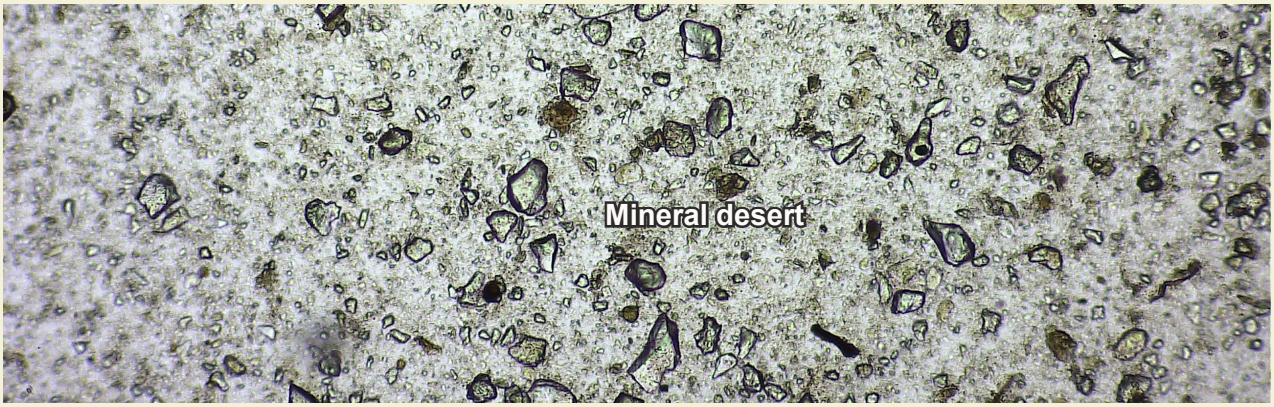
BOIS DE FA		INISDE THE FOREST	OUTSIDE THE FOREST
Mushrooms	Few		
	A lot		
Bacterias			
Ciliates			
Flagellates			
Amoebas			
Nematodes			
Micro-arthropods			
Fulvic acid			
Humic acid			

INSIDE THE FOREST



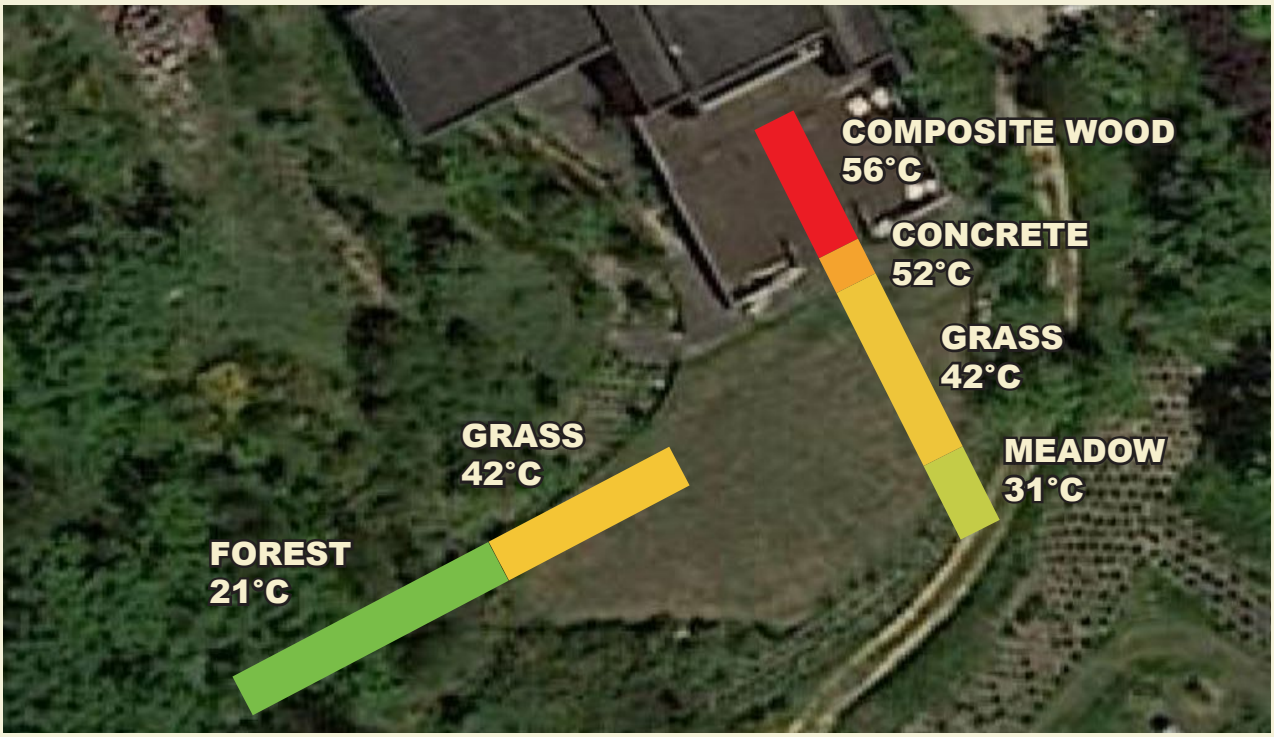


OUTSIDE THE FOREST



TEMPERATURE MEASUREMENT

Time of data collection : 14h35
Weather : full sun



WATER INFILTRATION TIME

Time of data collection : 14h45
Weather : dry for several days.
Water volume : ~85cl

INFILTRATION SPEED :

- INSIDE THE FOREST : 0'23"
- OUTSIDE THE FOREST : 2'46"

COMMENTS

The Miyawaki forest at Bois de Fa is without doubt the most impressive. Growth is very strong with trees over 8m tall after 5 years. Average tree growth is the highest of all the projects.

The impact of the forest on temperature is remarkable. We recorded a temperature difference of 35°C between the forest and the terrace of the adjacent house. We felt it ourselves. While we were in the forest for our study, we weren't suffering from the heat. The situation became difficult once we wanted to have a snack on the terrace in the sun. It was really too hot so we decided to return to the forest for shelter.

We saw signs of many animals. Deers are present. We saw antler rubbing and battering on many trees without increasing tree mortality (one deer was caught on film with a camera trap). We also saw many broken snails by birds (probably thrushes) and various animal tracks on the ground. We also heard a lot of birdsongs without always seeing the birds because the forest cover is very dense (many hiding places for birds). There is ample evidence that a Miyawaki forest provides habitat for wildlife.

The forest floor at Bois de Fa was the most diverse and the richest in species. The presence of an existing forest around the Miyawaki forest most probably facilitate the colonization of new seedlings in the micro-forest through natural expansion. We saw many seedlings and seeds on the ground. Forest dynamic is well in place.

It is interesting to note that there are no black locusts (*Robina pseudoacacia*) growing inside the Miyawaki forest. Black locust is a tree from North America. It is invasive in Belgium, outgrowing many native trees. Despite the presence of many black locusts just outside the Miyawaki forest, this invasive species does not reach inside the Miyawaki forest once the forest is 3 years of age. This observation confirm the idea that well-grown native forest ecosystems act as a barrier against invasive species.

Average tree height is the highest at Bois de Fa.

GEMBLOUX - ITH

Adress : Institut Technique Horticole, Rue de l'Entrée Jacques 31A, 5030 Gembloux.
Planting day : 21-02-2019 (4,3years)
Number of trees/shrubs : 2700 arbres
Surface of forest : 900m²
Number of volunteers during the planting event : 70
Date of observation : 05-06-2023 between 9h30 and 15h00
Weather : sunny day.

Initial site 28-09-2018

Planting day 21-02-2019

Day of observation 05-06-2023

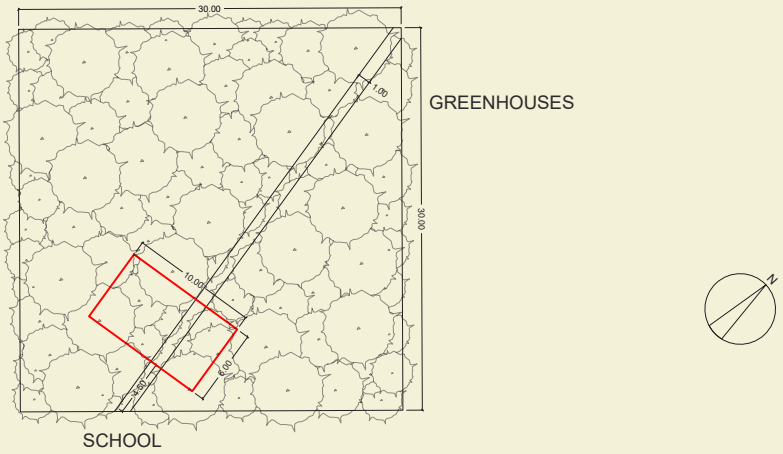
INDICATORS	1	2	3	4	5
Overall health of forest	Poor	Good	Very good		
Foliage density	<50%	50-80%	>80%		
Forest ground cover	Bare ground	Leaves/ mulch	Few very common plants	Diversity of plant cover	Rich ground cover with uncommon spieces

OVERALL HEALTH OF FOREST

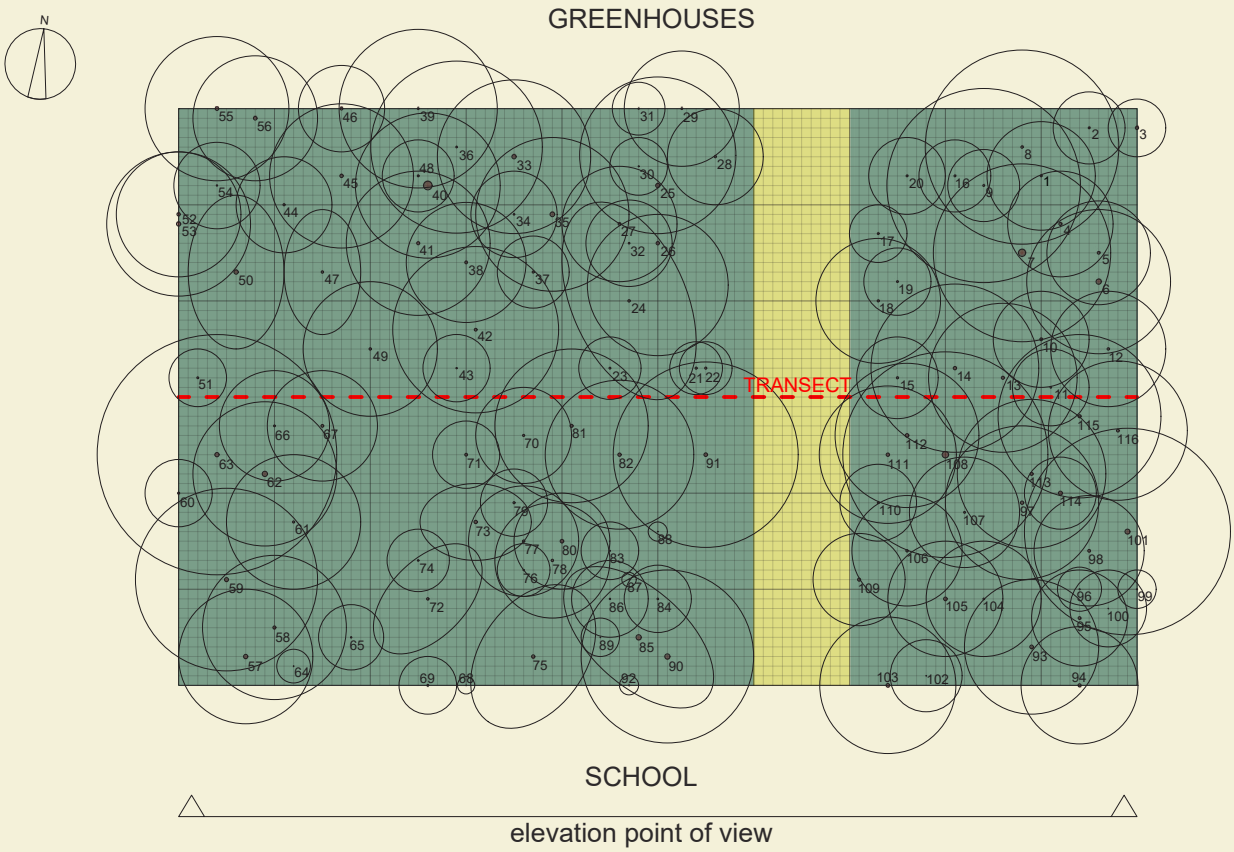
FOLIAGE DENSITY

FOREST GROUND COVER

LOCATION OF THE TRANSECT



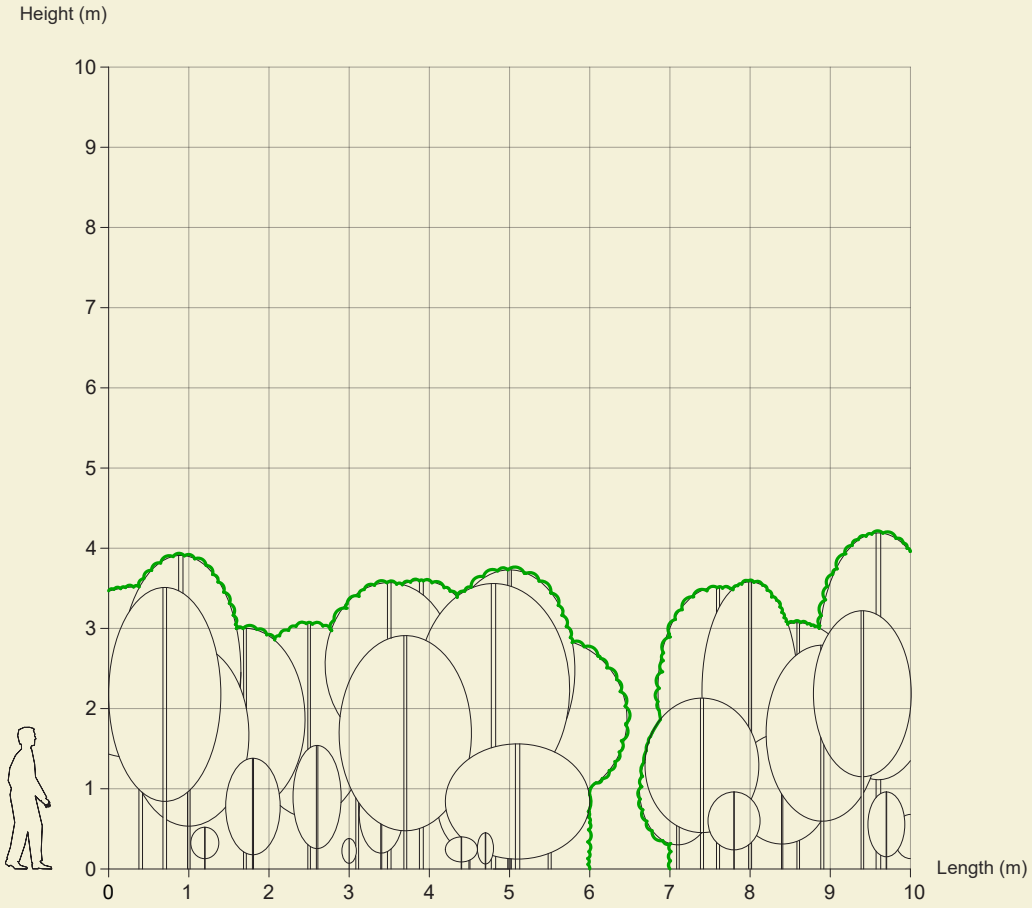
PLAN OF THE TRANSECT



LEGEND OF THE TRANSECT

- 1 - Bare ground
- 2 - Leaves/mulch
- 3 - Few very common plants
- 4 - Diversity of plant cover
- 5 - Rich ground with uncommon spieces
- Scope of study
- Grid pattern (mesh 10x10cm)
- Trunks
- Crowns

ELEVATION OF THE TRANSECT



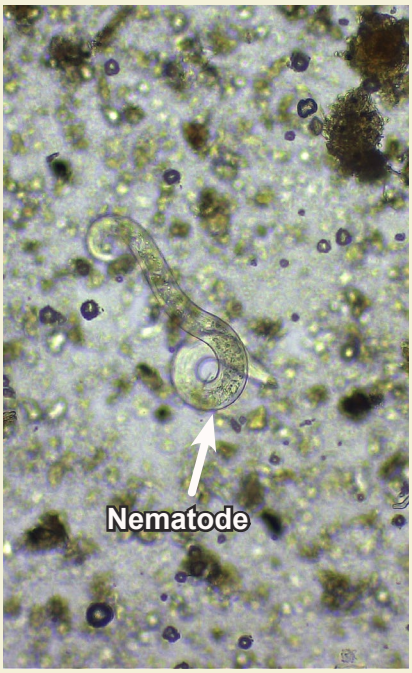
KEY FIGURES

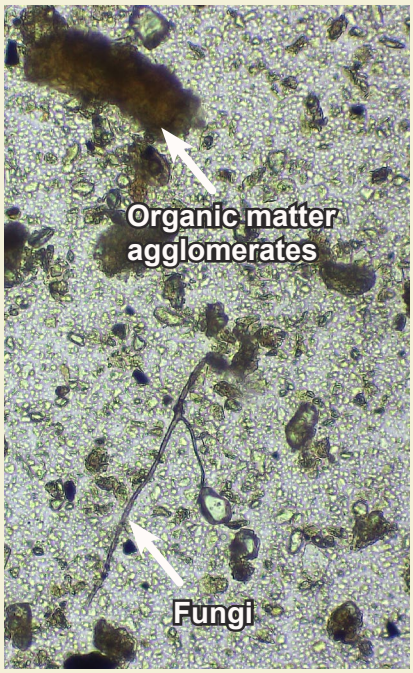
INDICATORS	ITH
Planting date	21-02-2019
Age	4,3years
Transect (total surface)	60m²
Transect (planted surface)	54m²
Number of trees/shrubs planted	162
Number of trees/shrubs notified	116
Mortality rate	28,30%
Proportion of trees	64,66%
Proportion of shrubs	35,34%
Height of the tallest tree/shrub	419cm
Height of the smallest tree/shrub	25cm
Average height of the 15 tallest trees	356cm
Average height	213,55cm
Average growth rate (trees and shrubs)	49,28cm/year
Average growth rate (trees)	55,99cm/year
Average growth rate (shrubs)	37,29cm/year
Average trunk diameter	2,79cm
Largest trunk diameter	8,9cm
Smallest trunk diameter	0,6cm
Average crown	113,06cm
Largest crown	250cm
Smallest crown	15cm

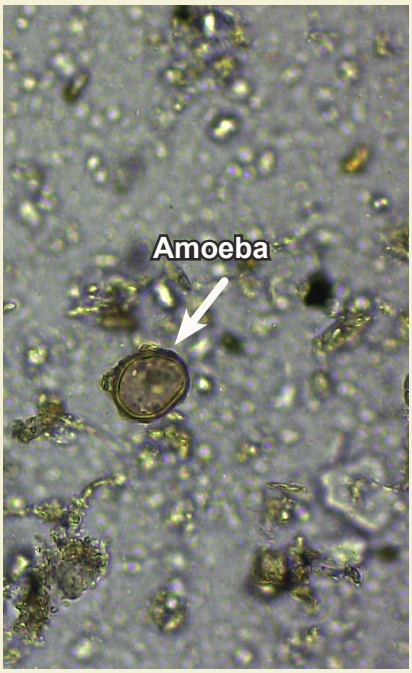
SOIL BIOLOGY UNDER THE MICROSCOPE

ITH		INISDE THE FOREST	OUTSIDE THE FOREST
Mushrooms	Few		
	A lot		
Bacterias			
Ciliates			
Flagellates			
Amoebas			
Nematodes			
Micro-arthropods			
Fulvic acid			
Humic acid			

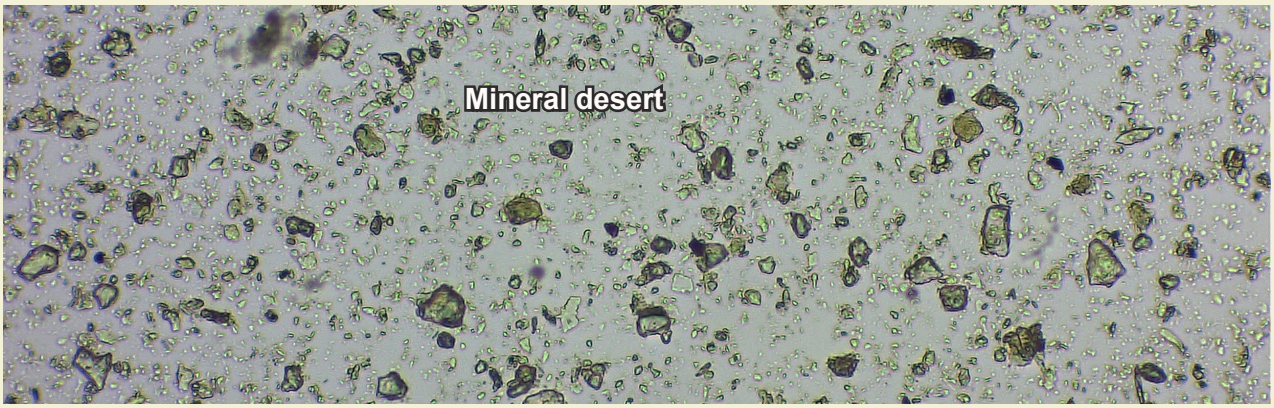
INSIDE THE FOREST





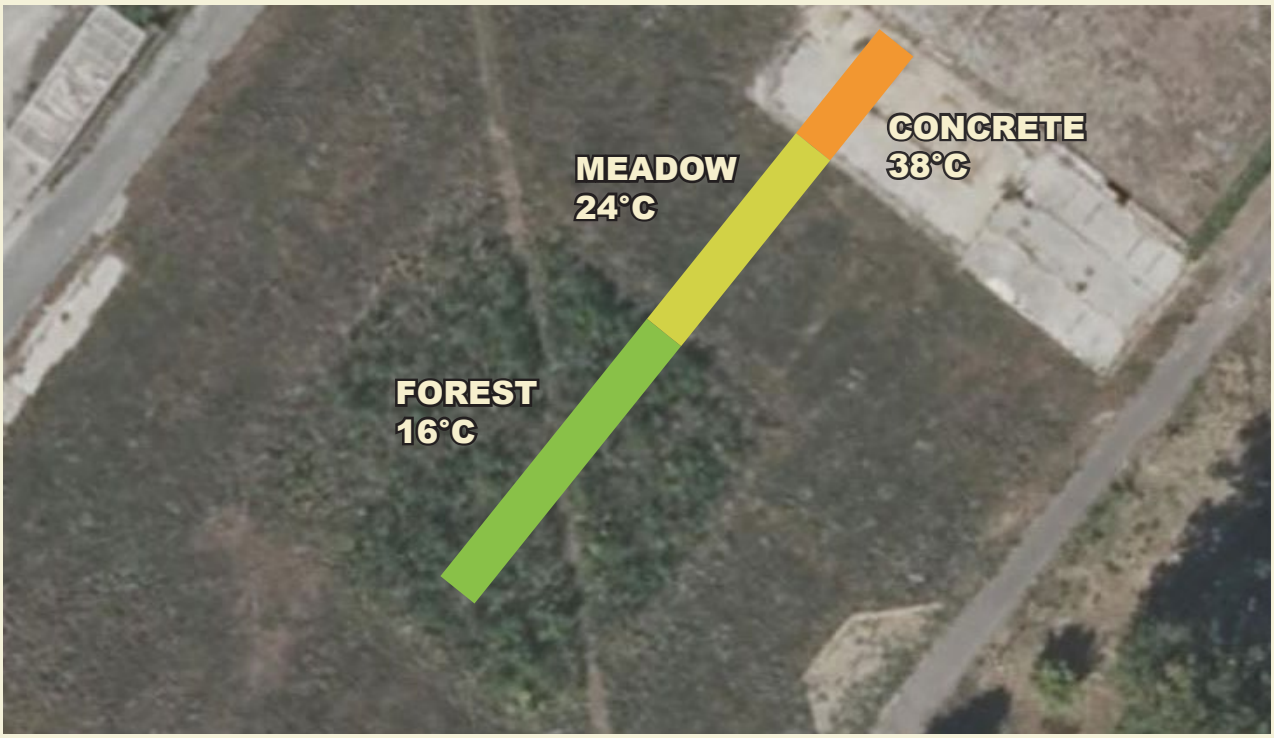


OUTIDE THE FOREST



TEMPERATURE MEASUREMENT

Time of data collection : 14h40
Weather : full sun



WATER INFILTRATION TIME

Time of data collection : 14h50
Weather : dry for several days.
Water volume : ~60cl

INFILTRATION SPEED :

- INSIDE THE FOREST : 0'47"
- OUTSIDE THE FOREST : 6'20"

COMMENTS

The urban forest on the site at ITH has grown the slowest. However, the forest is very healthy. The soil before plantation was the most degraded of all our 6 projects. There used to be a large greenhouse standing on a concrete base for decades. We also prepared the soil differently, less intensively. Instead of the usual soil preparation using an excavator and mixing the soil with natural amendments, we only scraped the surface (deeply) using a tractor. Then we spread a layer of manure on the top. The fact that the soil was very degraded from the onset and that soil preparation was done differently, more superficially, certainly explain, at least in part, why growth in this forest is slower than for other projects. We believe tree growth would have been faster if we had done the usual soil preparation (intensive).

We spotted many insects. They benefit from a suitable habitat with abundant food and shelter. It's interesting that the area around the urban forest is a well grown meadows. The micro-forest and meadows around it help to raise awareness among students and public services that it is possible to create green spaces that stimulate biodiversity and reduce the need for regular maintenance.

The most interesting observation was hearing a marsh warbler (Acrocephalus palustris) sing for a long time in the micro-forest. This bird is not very common, especially in a city center like this one in Gembloux. It is likely that this bird was nesting in the urban forest in 2023.

ITH tiny forest is the slowest growing.

WILLEMEAU - PRIVATE GARDEN

Adress : Chaussée de Douai 733, 7504 Tournai.
Planting day : 07-11-2019 (3,6years)
Number of trees/shrubs : 1530
Surface of forest : 510m²
Number of volunteers during the planting event : 150
Date of observation : 06-06-2023 between 9h30 and 15h00
Weather : sunny day

Initial site 25-04-2019

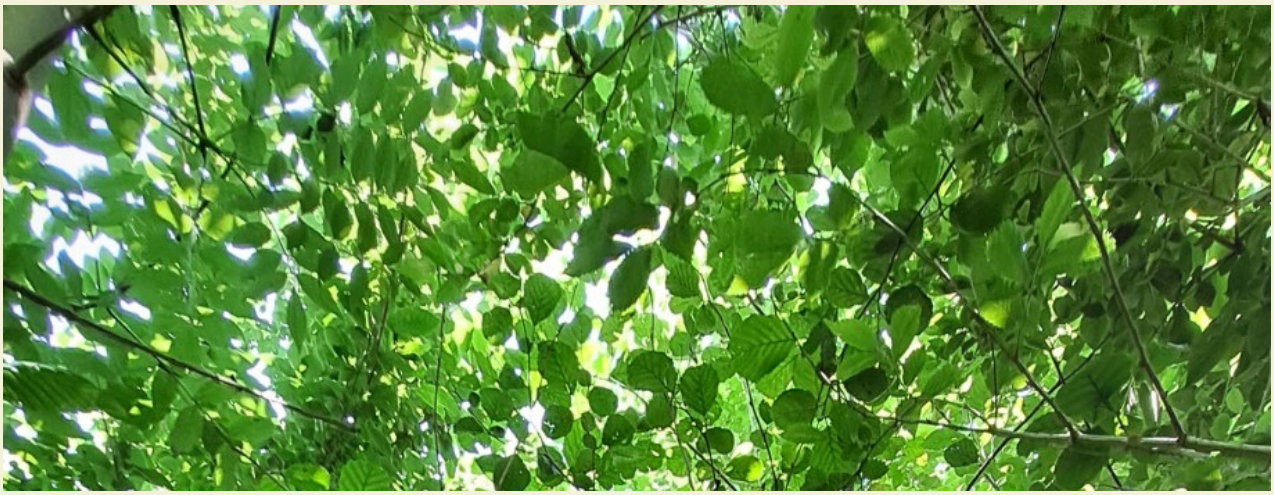
Planting day 07-11-2019

Day of observation 06-06-2023

INDICATORS	1	2	3	4	5
Overall health of forest	Poor	Good	Very good		
Foliage density	<50%	50-80%	>80%		
Forest ground cover	Bare ground	Leaves/ mulch	Few very common plants	Diversity of plant cover	Rich ground cover with uncommon spieces

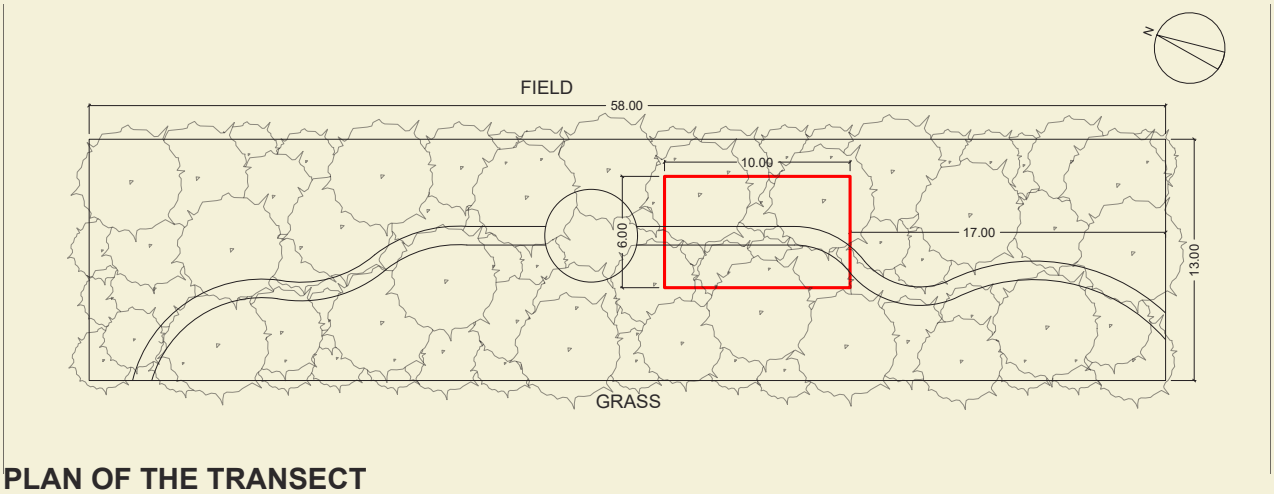
OVERALL HEALTH OF FOREST

FOLIAGE DENSITY

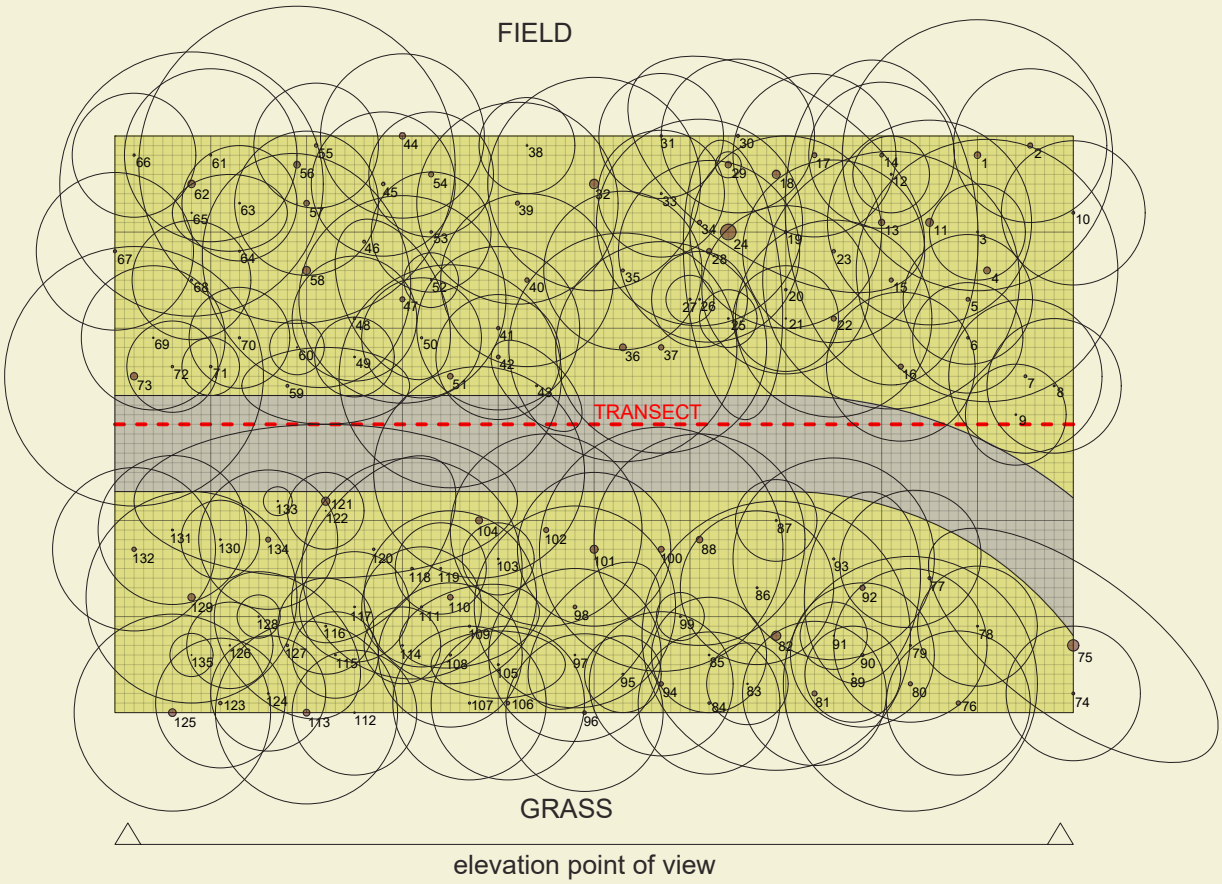


FOREST GROUND COVER

LOCATION OF THE TRANSECT



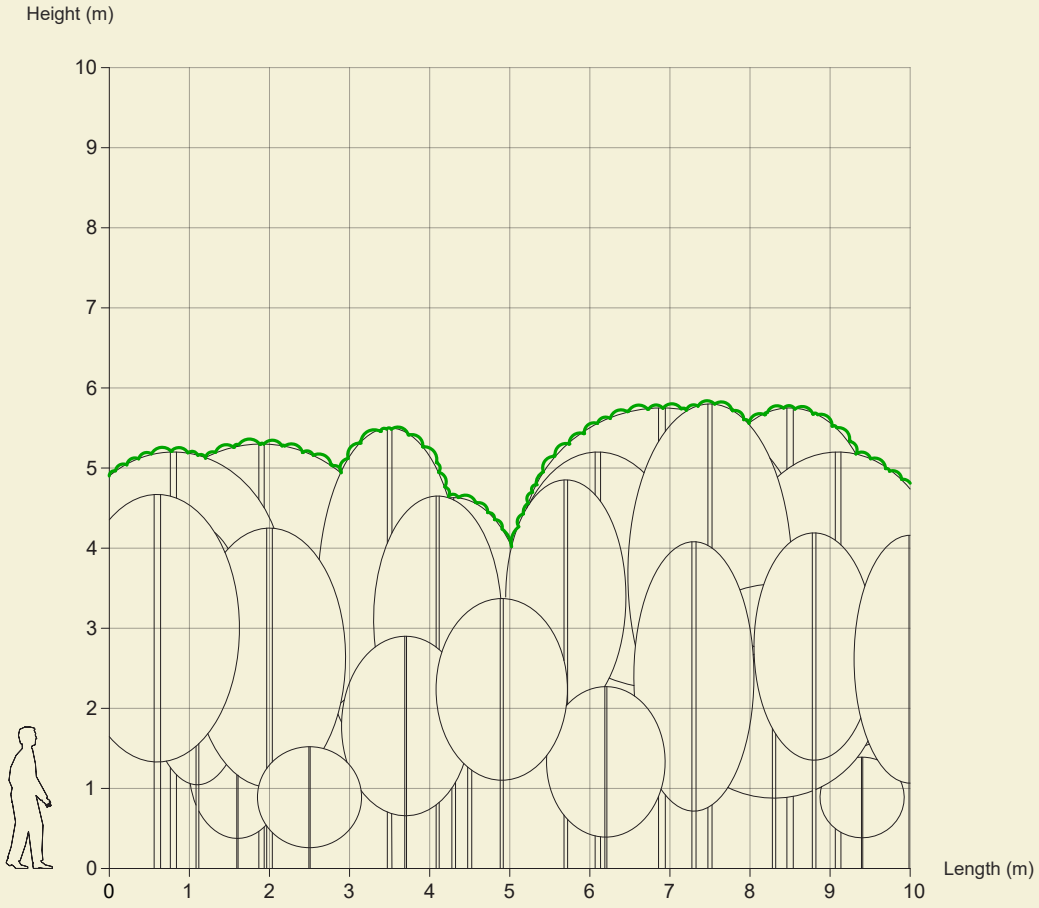
PLAN OF THE TRANSECT



LEGEND OF THE TRANSECT

- 1 - Bare ground
- 2 - Leaves/mulch
- 3 - Few very common plants
- 4 - Diversity of plant cover
- 5 - Rich ground with uncommon spieces
- Scope of study
- Grid pattern (mesh 10x10cm)
- Trunks
- Crowns

ELEVATION OF THE TRANSECT



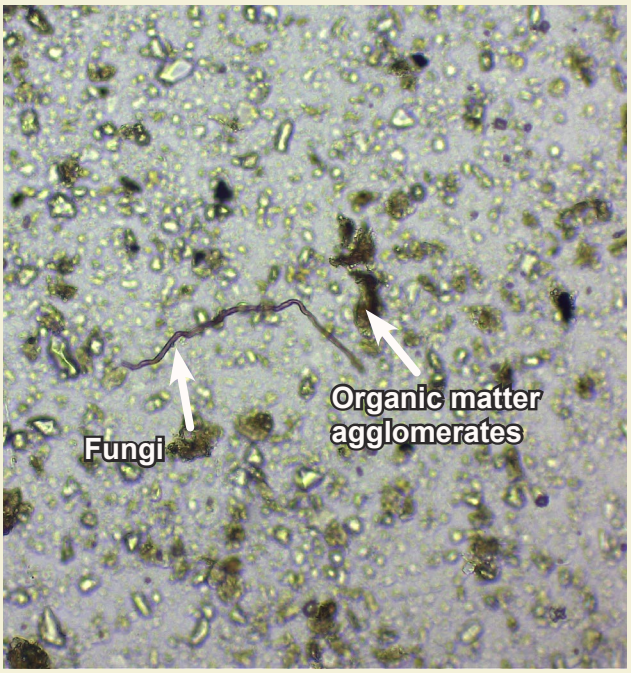
KEY FIGURES

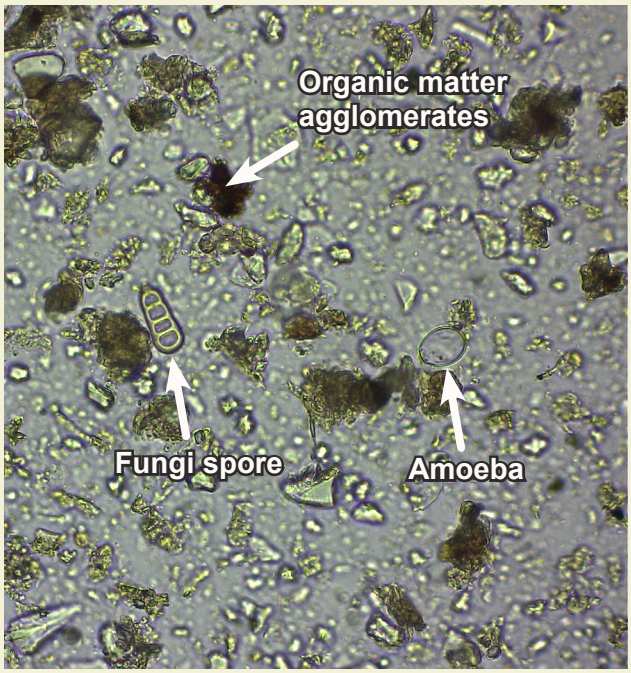
INDICATORS	WILLEMEAU
Planting date	07-11-2019
Age	3,6years
Transect (total surface)	60m²
Transect (planted surface)	50m²
Number of trees/shrubs planted	150
Number of trees/shrubs notified	135
Mortality rate	10,00%
Proportion of trees	59,26%
Proportion of shrubs	40,74%
Height of the tallest tree/shrub	580cm
Height of the smallest tree/shrub	30cm
Average height of the 15 tallest trees	527cm
Average height	304,94cm
Average growth rate (trees and shrubs)	85,10cm/year
Average growth rate (trees)	90,72cm/year
Average growth rate (shrubs)	76,57cm/year
Average trunk diameter	3,70cm
Largest trunk diameter	16,2cm
Smallest trunk diameter	0,6cm
Average crown	158,36cm
Largest crown	400cm
Smallest crown	27cm

SOIL BIOLOGY UNDER THE MICROSCOPE

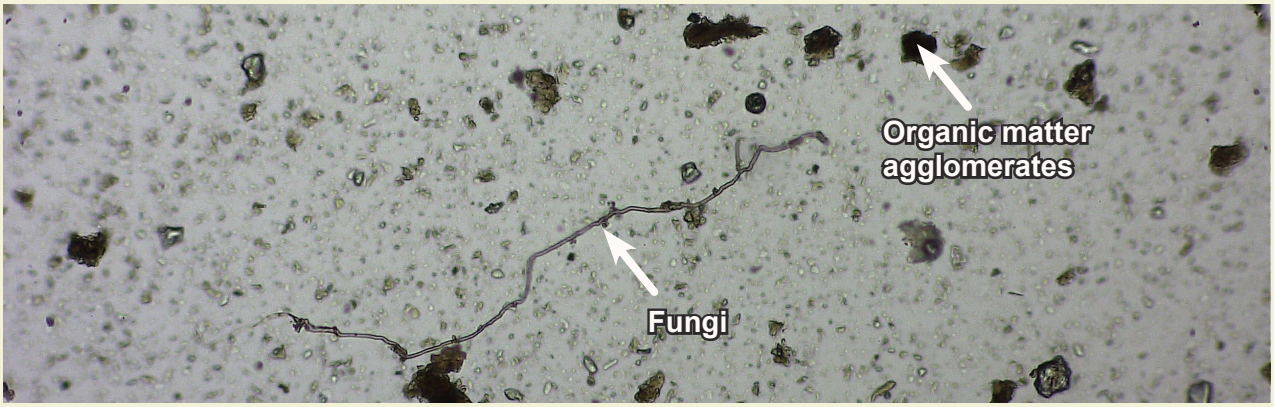
BARVAUX		INISDE THE FOREST	OUTSIDE THE FOREST
Mushrooms	Few		
	A lot		
Bacterias			
Ciliates			
Flagellates			
Amoebas			
Nematodes			
Micro-arthropods			
Fulvic acid			
Humic acid			

INSIDE THE FOREST



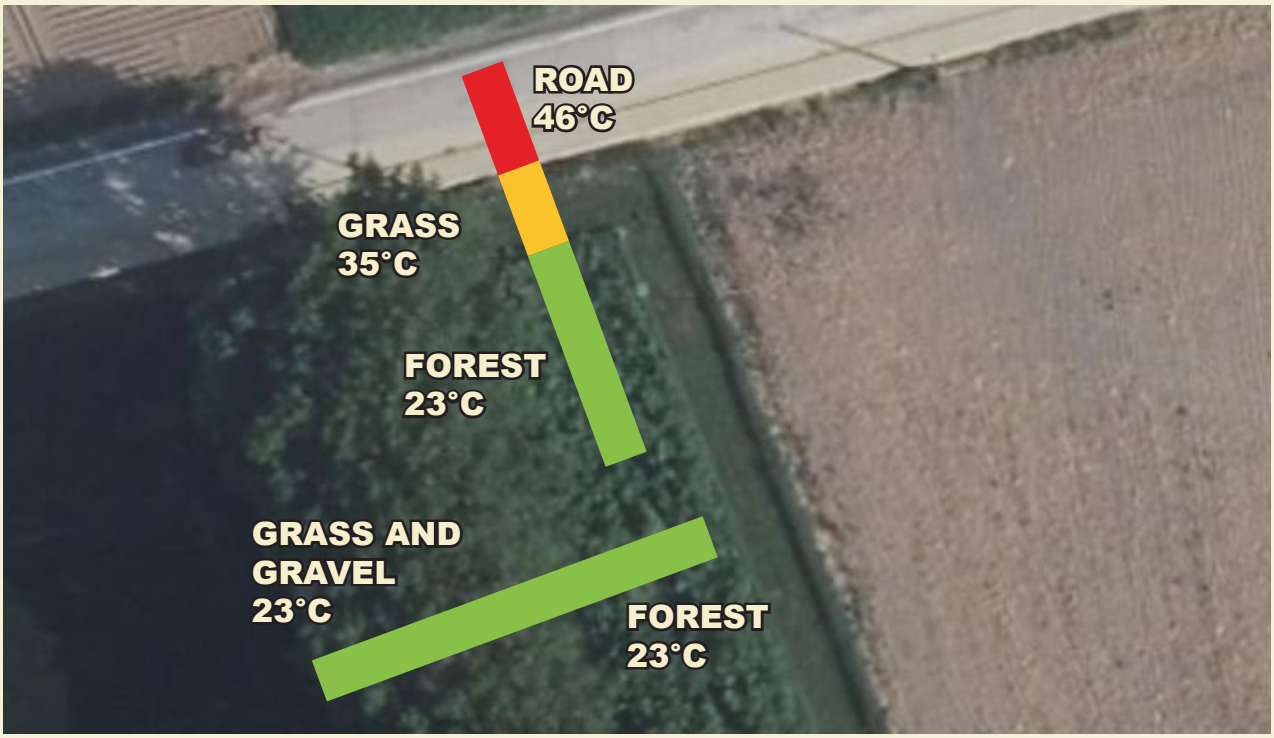


OUTSIDE THE FOREST



TEMPERATURE MEASUREMENT

Time of data collection : 14h30
Weather : full sun



WATER INFILTRATION TIME

Time of data collection: 14h45
Weather : dry for several days.
Water volume : ~60cl

INFILTRATION SPEED :

- INSIDE THE FOREST : 0'26"
- OUTSIDE THE FOREST : 1'52"

COMMENTAIRES

The Miyawaki forest at Willemeau is the most impressive from an aesthetic point of view and in terms of growth rate (the highest average growth rate of the 6 sites). Soil quality is very good. We didn't use any soil amendments when preparing the soil. We think that the large trees (poplars and lime trees) around the forest have a favorable impact on the development of the micro-forest, although we don't really know how. Do large root systems of the big trees help the new trees? Are there more beneficial fungi because of the presence of old trees? Are big trees providing benefits through the soil or through gaseous emissions?

It is interesting to note that there was a marked difference in growth within the micro forest, with one part growing faster than the other. However, this difference disappeared in the 3rd year. We did not notice such a difference any more.

We also observed numerous burrows throughout the forest. So there are lots of small mammals. They don't seem to have had a deleterious effect on the trees.

It is very comforting to note that at Willemeau, as for other projects (Axisparc, Bois de Fa), the Miyawaki forest is integrated into the garden with other landscape elements that are designed to have a positive impact on biodiversity. It's heartening to see a paradigm shift in garden management gradually taking hold. We can see that Miyawaki forests are contributing to this awareness helping to bring a shift in garden management towards a more ecological approach.

Willemeau micro-forest has the fastest growth and the lowest mortality rate.

ORMEIGNIES - ROADSIDE

Adress : à hauteur du 431, Chaussée de Valenciennes, 7802 Ath.
Planting day : 12-11-2016 (6,6years)
Number of trees/shrubs : 300 arbres
Surface of forest : 135m²
Number of volunteers during the planting event : 60
Date of observation : 07-06-2023 between 9h30 and 14h00
Weather : sunny day

Initial site 08-11-2016

Planting day 12-11-2016

Day of observation 07-06-2023

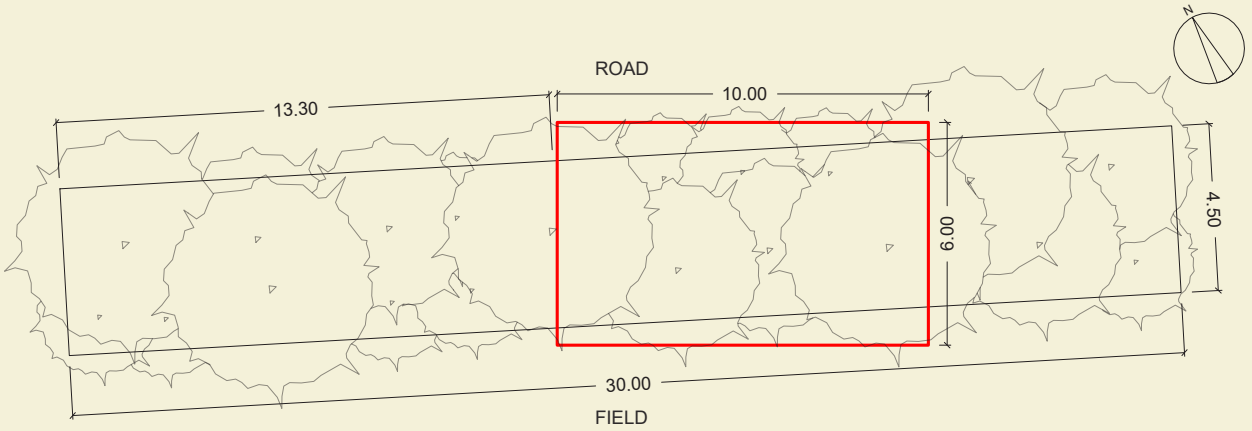
INDICATORS	1	2	3	4	5
Overall health of forest	Poor	Good	Very good		
Foliage density	<50%	50-80%	>80%		
Forest ground cover	Bare ground	Leaves/ mulch	Few very common plants	Diversity of plant cover	Rich ground cover with uncommon spieces

OVERALL HEALTH OF FOREST

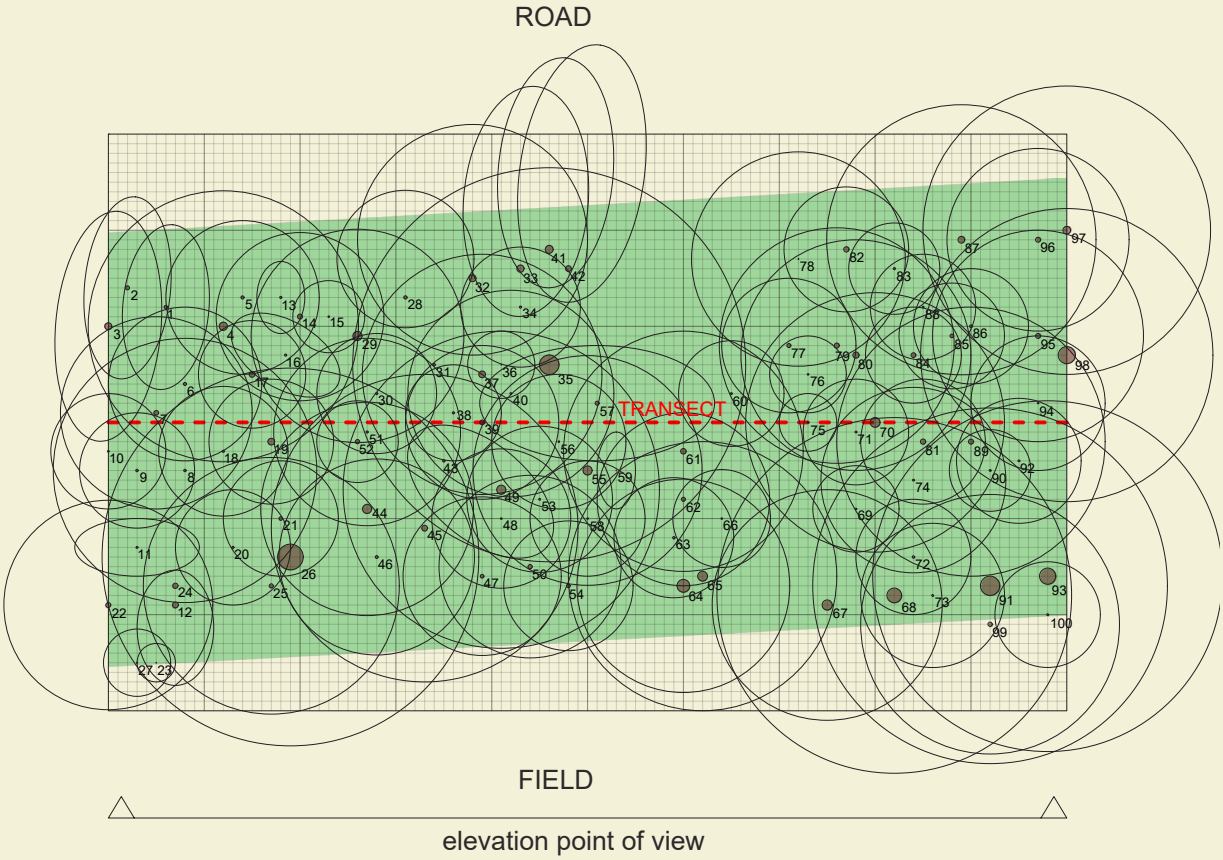
FOLIAGE DENSITY

FOREST GROUND COVER

LOCATION OF THE TRANSECT



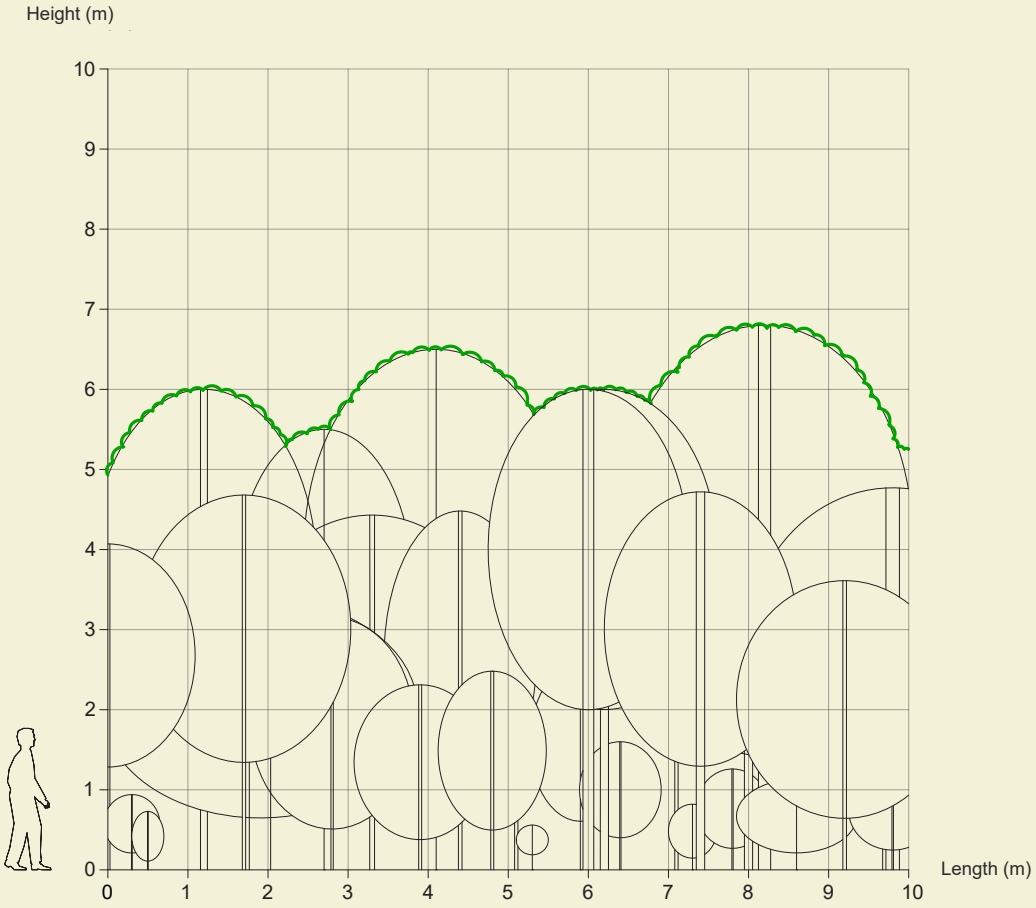
PLAN OF THE TRANSECT



LEGEND OF THE TRANSECT

- 1 - Bare ground
- 2 - Leaves/mulch
- 3 - Few very common plants
- 4 - Diversity of plant cover
- 5 - Rich ground with uncommon spieces
- Scope of study
- Grid pattern (mesh 10x10cm)
- Trunks
- Crowns

ELEVATION OF THE TRANSECT



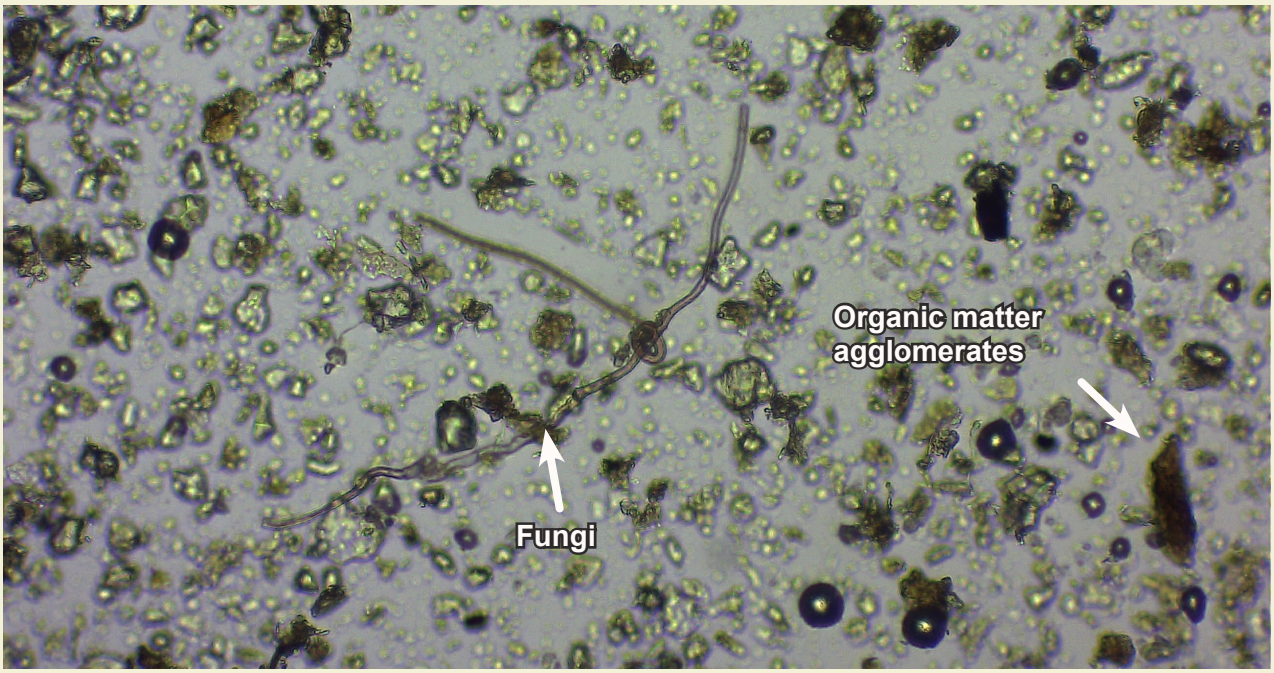
KEY FIGURES

INDICATORS	ORMEIGNIES
Planting date	12-11-2016
Age	6,6years
Transect (total surface)	60m²
Transect (planted surface)	45m²
Number of trees/shrubs planted	135
Number of trees/shrubs notified	100
Mortality rate	25,93%
Proportion of trees	72,00%
Proportion of shrubs	28,00%
Height of the tallest tree/shrub	680cm
Height of the smallest tree/shrub	87,50cm
Average height of the 15 tallest trees	548cm
Average height	304,11cm
Average growth rate (trees and shrubs)	54,47cm/year
Average growth rate (trees)	59,13cm/year
Average growth rate (shrubs)	42,34cm/year
Average trunk diameter	5,20cm
Largest trunk diameter	16,2cm
Smallest trunk diameter	0,6cm
Average crown	180,01cm
Largest crown	410cm
Smallest crown	40cm

SOIL BIOLOGY UNDER THE MICROSCOPE

ORMEIGNIES		INISDE THE FOREST	OUTSIDE THE FOREST
Mushrooms	Few	■	
	A lot		
Bacterias		■	■
Ciliates			
Flagellates			
Amoebas		■	
Nematodes			
Micro-arthropods			
Fulvic acid		■	■
Humic acid		■	

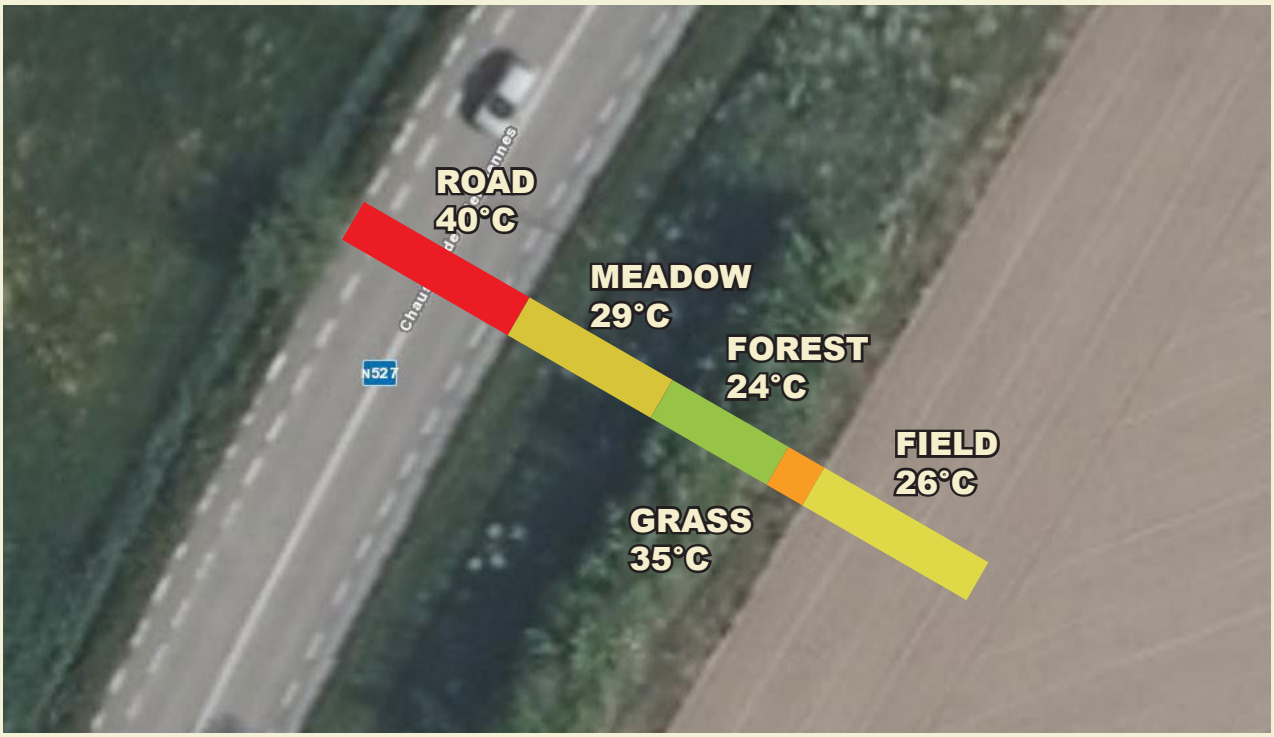
INSIDE THE FOREST



OUTSIDE THE FOREST

TEMPERATURE MEASUREMENT

Time of data collection : 14h10
Weather : full sun



WATER INFILTRATION TIME

Time of data collection: 14h15
Weather : dry for several days.
Water volume : ~60cl

INFILTRATION SPEED :

- INSIDE THE FOREST : 0'48"
- OUTSIDE THE FOREST : 3'33"

COMMENTS

This is the very first Miyawaki forest created in Belgium in 2016, and the 3rd in Europe after a project in Sardinia[6] in the 1990s (study carried out with European funding) and a project in Holland[7] a few months before Ormeignies (Dutch Institute for the Environment). The micro-forest is doing very well, with a mortality rate of 26% over 6 years. The tallest trees are over 5m.

The micro-forest is an island in a large area of open cultivation swept by regular winds. We saw that the forest provide habitat for many birds (we saw nests and snails eaten by birds inside the Miyawaki forest). The forest is a refuge for biodiversity.

It's also worth noting that this micro-forest was created on top of a road now abandoned. We saw the old layer of bitumen when we prepared the soil. This example shows that it is possible to regenerate soil and biodiversity quickly, even on degraded land, using the Miyawaki method.

The proportion of trees compared to shrubs is the highest at Ormeignies. Average trunk diameter is also the thickest of all 6 sites.

5. DISCUSSION

The table below summarizes the main results for 6 sites in Belgium occupied by micro forests created using the Miyawaki method. We believe that these results provide a representative overview for the evolution of Miyawaki forests in temperate Europe.

INDICATORS	BARVAUX	AXIS PARC	BOIS DE FA	ITH	WILLEMEAU	ORMEIGNIES	AVERAGE
Age	5,1years	3,6years	5,7years	4,3years	3,6years	6,6years	**4,1years**
Mortality rate	34,00%	15,00%	27,78%	28,30%	10,00%	25,93%	**24%**
Height of the tallest tree/ shrub	800cm	590cm	1000cm	419cm	580cm	680cm	**597cm**
Height of the smallest tree/ shrub	30cm	77cm	25cm	25cm	30cm	87,50cm	**41cm**
Average height of the 15 tallest trees	546cm	461cm	830cm	356cm	527cm	548cm	**473cm**
Average height	281,02cm	290,25cm	432,33cm	213,55cm	304,94cm	304,11cm	**303,2cm**
Average growth rate (trees and shrubs)	55,28cm/ year	81,00cm/ year	76,29cm/ year	49,28cm/ year	85,10cm/year	54,47cm/year	**74,8cm/ year**
Average trunk diameter	4,67cm	4,7cm	3,79cm	2,79cm	3,70cm	5,20cm	**3,7cm**
Average crown	138,06cm	142,17cm	188,93cm	113,06cm	158,36cm	180,01cm	**153,4cm**

The growth rate of the tallest trees is around 1m per year. The average growth of all the trees in the forest (trees and shrubs combined) is 74.8cm per year, with an average mortality rate of 24% after 4 years.

Average tree growth can double from one project to another (average growth of 49.28 cm/year at ITH and 85.10 cm/year at Willemeau). The mortality rate also varies from 10 to 34% from one project to another. A higher mortality rate may be the result of children playing in the tiny forest (site in a school) or simply due to more difficult local conditions (sunlight intensity, average wind velocity, soil, lack of maintenance, drought). Miyawaki forests show very good resistance to severe climatic conditions.

The growth rate observed in Belgium is significantly higher than that observed by Earthwatch in England, which indicates an average growth rate of around 0.53 cm per year. [5]

Experiments carried out by A. Miyawaki and K. Fujiwara in Japan showed that tree growth in Miyawaki forests outstrips that of a conventional urban plantation in just 3 to 5 years [4] . The researchers showed that the density and vegetation cover are also greater. Our own observations confirm the same results for 6 sites in Belgium.

The overall health of the forests is very good. Trees are in good health and stand up well to heatwaves and summer droughts with little maintenance and watering.

However, we observed the slowing or pause in tree growth and an increase in the mortality rate in the event of prolonged drought if no watering, even occasional, is carried out. Our own experience shows that occasional but generous watering is sufficient when water conditions are critical (more than 3 weeks without rain). Long droughts in temperate climates is relatively rare, but it is important to be prepared to do some watering during dry summers if one wish to maintain sustainable tree growth.
On the other hand, regular watering is essential for the first year at minimum in Mediterranean climates in order to avoid higher mortality because of very harsh weather conditions. [6]

Our experience shows that the need for maintenance is limited to 2 years (sometimes 3 years maximum). However, the intensity of maintenance varies from one site to another. Maintenance is sometimes not necessary at all (or limited to 1 intervention per year), while on other sites, more rarely, maintenance is more intensive than expected (3 to 4 interventions per year). However, in both cases, Miyawaki forests become completely self-sustaining after 3 years.

There are major differences in tree growth of different species. So-called pioneer and secondary species grow generally quicker in the first years. They also spread wider (larger crown cover). It is important not to plant many pioneer species (e.g. Salix, Betula) because these species risk interrupting the natural evolution of the forest by taking over all the space in favor of slower, more discreet species (e.g. Quercus, Fagus). The consequence is that the evolution of Miyawaki forests is interrupted before it reaches maturity. It is advisable not to plant pioneer species (or only in small numbers) and only if they have a proven role in facilitating the growth of other trees.

Our tree list methodology improved with experience. We are gaining a better understanding of the principle of potential natural vegetation by studying Professor Akira Miyawaki's publications ever more closely and by talking to Professor Kazue Fujiwara. We realized that no pioneer species (or very few) should be planted and that the proportion of shrubs in the overall mix should be low.

The spontaneous colonization of the forest floor varies greatly from one site to another. Some tiny forests is virtually bare grounds, while other forests have a much more dynamic plant cover in terms of numbers of species and individuals. We believe that the presence of an existing forest close to the micro forest facilitate the return of a natural forest floor with more diversity in plant cover (as at Bois de Fa, for example). It is likely that, given enough time, the diversity of plants on the forest floor will be similar at all sites. This is already observed in Japan in Miyawaki forests which are over 15 years old. [4]

The role of animals passing through the micro-forest is considerable. Birds and mammals disperse seeds in the forest. Natural regeneration of the forest floor gradually takes place with the help of animals and abiotic factors (wind, for example).

Tree diameter varies greatly from species to species. Multiple-branch shrubs and pioneer species have the largest trunks. Trees that characterize mature forests (oak, beech, lime trees) have thinner trunks on average.

The average diameter is 3.7 cm (4 years old forests), which is quite thin compared to their average height. We expected that. This is due to the fact that young trees tend to soar faster for the light instead of thickening the trunk as they grow older. We did not observe the collapse of tree stems. We did not notice negative effects of faster growth on tree strength. The trees are vertical, stable, tortuous, embedded together in a compact and diverse ecosystem. Forest density create a microclimate which decreases wind velocity and therefore the risk of stem collapse. In Japan, observations of young Miyawaki forests show the same trend (thinner trunks compared to their height at the beginning of growth) without it being problematic in the long term (15 to 50 years).[2]

Soil biology is significantly better inside micro-forests than outside, even though the distance between the two is just a few meters. We compared soil samples inside and outside the forest

using a light microscope.

We postulate that soil quality is better when soil biology is more complex, that is, when the soil food web is more diverse (different groups of organisms) with more biomass. We were able to confirm the assumption because the soil food web is more complex inside the forest soil than outside the forest (bacteria-fungi-ciliated-flagellates-amibae-nematodes-microarthropods). In Japan, research showed that soil biology is very similar in Miyawaki forests that are 10 years old compared to climax stable forest. [7] Our observations confirms that soil biology increases rapidly in tiny forests.

A complex soil food web indicates that the soil is of good quality. Better soil biology prevents hard pan compaction, improve aeration and soil texture (more nutrient in quantity and variety), enabling water to infiltrate more quickly and to store soil moisture more effectively. Soil biology has a positive impact on tree health, tree growth, faster rainwater infiltration and better moisture retention.

Our observations show that rainwater infiltration inside Miyawaki forests is 6x faster than outside micro-forests. Forest soil absorbs rainwater much faster than a lawn or a meadow. The biological activity in the soil is related to the presence of trees and microorganisms. Trees are thus more resistant in periods of heat or drought because forest soil store more water for longer periods of time.

Better rainwater infiltration in the forest reduces surface runoff during occasional (and sometimes dramatic) episodes of heavy rain. The risk of flooding and soil erosion is decreased by the double presence of vegetation cover and good soil biology. In other words, quicker rainwater infiltration observed in Miyawaki forest reduces surface water runoff, especially when the soil is dry, compact and bare. Micro-forests make it possible to curb damage from flooding and to stop soil erosion.

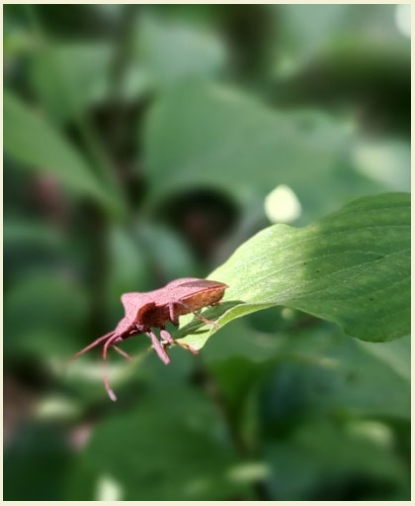
Site	**Water infiltration speed in seconds**		**Comparaison**
	Inside the forest	**Outide the forest**	
Barvaux	75	300	4x quicker in the forest
Axis Parc	93	698	8x quicker in the forest
Bois de Fa	23	166	7x quicker in the forest
ITH	47	380	8x quicker in the forest
Willemeau	26	112	4x quicker in the forest
Ormeignies	48	213	4x quicker in the forest
Total	**52**	**312**	**6x quicker in the forest**

Earthwatch indicates that water infiltration is 32% quicker inside tiny forests than outside (with 1 and 2 years old tiny forests) and 60% quicker in 3 years old tiny forests. [5] The difference is less than for our own observations (probably because they are younger) but it shows the same trend.

Similarly, Earthwatch published results on soil compaction. Compaction is on average 1.61kg/cm² in 1 and 2 years old tiny forests and 2.51kg/cm 2 outside. [5] This difference is expected to increase as the soil improve over the years.

Better soil biology improve carbon capture. Indeed, we observe that soil life increases inside micro-forests than outside. The filaments of fungi accumulate over time to make a very large biomass. Fungi and microorganisms absorb a significant amount of carbon. This carbon is stored for long periods of time in the soil beneath the forest. Carbon capture in the soil by microorganism adds to carbon capture on the surface by plant biomass, especially with woody material. Deciduous forests increase the volume of woody materials over time. This increase is reflected in the quantity of carbon that is captured, in wood but also in the soil. [8]

We also observed a significant temperature difference in micro-forests compared to surrounding areas (lawn and meadow for example). The difference in temperature is even more obvious when comparing micro-forests with hard surfaces (35°C cooler in the micro-forest than on the terrace at Bois de Fa for example). Urban forests have a significant cooling effect. The reduction in temperature in urban forests is the result of the foliage density, which increases in multi-layered



vegetation strata such as Miyawaki forests. Foliage density absorbs solar radiation, reduces wind speed and creates an insulating effect. Lower temperatures in urban forests is a consequence of tree shade and evapotranspiration, the cumulative effect of tree transpiration, soil moisture and water evaporation, which together cool the ambient air. [8]

While visiting forest sites for this report, we heard many good things about the impact of micro-forests. People told us that Miyawaki forests do good, that they are beautiful, that they grow fast, that they make us think positively, that they are a source of inspiration and well-being, that they promote calm, observations in nature and that they bring pleasant memories. The feeling of connection to nature is present. Micro-forests are also a place for children to learn, to experiment and to observe. Urban forests also promote citizen participation and the involvement of local residents.

Earthwatch conducted a survey based on 73 testimonies in order to assess the impact of micro-forests for the people. The results are positive: 97% feel closer to nature, 93% say they feel refreshed and revitalized, 90% say they are more calm and relaxed. Participants indicated that what attracts them the most to micro-forest projects is that planting is participatory, that communities are involved and that they learn more about nature. [5] We received similar feedbacks from the people we met.

We saw that Miyawaki forests have a positive impact on biodiversity by creating habitat with much potential for attracting many plants and animals. The diversity of trees and plants, the complexity of the habitat, the architecture of the forest, the different layers of vegetation, dynamics on the forest floor, the decomposition of organic matters, the diversity of microorganisms, the contrast between shade and light, moisture, all of these help to attract much biodiversity because the habitat has so much potential.

Forests in their natural state are the most complex and diverse ecosystems. They offer a wide variety of ecological niches through vertical development in vegetation strata, their profound impact on the soil and the internal microclimate under the tree canopy. These attributes reflect the well-functioning of the forest. This complex structure provides multiple niches for biodiversity at all levels of the forest. [8]

On sites, we observed many different plant species, earthworms, fungi, leaves decomposed by all sorts of living organisms, burrows from small mammals, deers, many insects, wildflowers. We believe that the diversity inside the Miyawaki forests is greater than that of woodlands nearby.

Researchers at Wageningen University showed that biodiversity is 18x higher in 2 micro-forests that are only 1 or 2 years old compared to a much older urban grove in Darwin Park near Amsterdam [8] . Micro forests increase biodiversity. Dutch scientists at Wageningen University also studied 11 Miyawaki forests between 2018 and 2021 that were over 3 years old, looking at biodiversity in particular. [10] In each forest, they observed on average 37 groups of different species with 636 animal species and 298 plant species. This is much more than the average of 15 to 30 tree species selected to create a Miyawaki forest. Research in Holland and our own observations show that Miyawaki forests increase biodiversity.

This report provides valuable data on the evolution of micro-forests created with the Miyawaki method. The evolution of micro forests is positive. The results are better than we originally expected. We wish that our results will boost everyone’s confidence for creating more micro forests for our own well-being, for biodiversity and climate adaptation. As well as having a direct impact on the quality of life of local residents, well-functioning forest ecosystems provide services in terms of climate regulation, soil and water protection, improving air quality, capturing fine particles and pollutants, controlling erosion, improving soil structure, and developing habitats for biodiversity. The role of forests goes well beyond timber production. [8]

Some foresters and academics believe that restoring late stage forest species in urban or intensively farmed areas could take a very long time, if not be impossible. 8 We hope that our results, as well as the many experiments carried out in many countries and the work of Professor Miyawaki may lead us to believe otherwise. The Miyawaki method makes it possible to speed up the recovery of complex forest ecosystems.

It is essential we reconcile human activities with more nature. Truly functioning ecosystems such as Miyawaki forests have much impact on the environment at multiple levels. Micro forests improve the quality of life, they bring people together, they provide habitat for biodiversity, and they stimulate better relationships with nature.

REFERENCES

[1] Urban Forests (2020). The Miyawaki method. Data & concepts. *Publication by Urban Forests.*

[2] Miyawaki A. (2004). Restoration of living environment based on vegetation ecology: Theory and practice. *Ecological Research 19: 83–90*

[3] Miyawaki A., Fujiwara K., Box E. (1987). Towards Harmonious Green Urban Environments in Japan and Other Countries. *Bull. Inst. Environ. Sci. Technol., Yokohama University. 14: 67-82*

[4] Miyawaki A., Fujiwara K. (1988). Restoration of natural environment by creation of environmental protection forest in urban areas. Growth and development of environmental protection forests on the Yokohama National University campus. *Bull. Inst. Environ. Sci. Technol., Yokohama University. 15: 95-102*

[5] Earthwatch UK (2023). Tiny Forests. Monitoring report 2022. *Publication Earthwatch.*

[6] Schirone B., Salis A., Vesella F. (2011). Effectiveness of the Miyawaki method in Mediterranean forest restoration programs. *Landscape Ecological Engineering 7:81–92*

[7] Miyawaki A., Golley F. (1993). Forest reconstruction as ecological engineering. *Ecological engineering. 2: 333-345*

[8] Claessens H., Wibail L., Cordier S., Haeghens M.A., Licoppe A. (2022). Les habitats d'intérêts communautaires en Wallonie. *EDIWALL Services publics de Wallonie.*

[9] Ottburg F., Lammertsma D., Bloem J., Dimmers W., Jansman H., Wegman R. (2018). Tiny forest Zaanstad. Citizen science and determining biodiversity in Tiny Forest Zaanstad. *Wageningen Environmental Research.*

[10] Ottburg F., Lammertsma D., Dimmers W., Lerink B., Schelhaas M., Janssen J. (2022). Tiny Forests: groene mini-oases in de stad. Monitoring van biodiversiteit en bijdragen aan CO2-opslag, wateropvang en tegengaan hittestress in elf Tiny Forests. *Wageningen Environmental Research.*

BARVAUX - Données brutes

N°	Species	Heights (cm)	Crowns (cm)	Circumferences (cm)	Diameter (cm)	Type	Comments
1	*Crataegus monogyna*	158	60x70	6	1,9	shrub	
2	*Sorbus torminalis*	260	100	6	1,9	tree	
3	*Cornus sanguinea*	390	240	40	12,7	shrub	
4	*Ligustrum vulgare*	220	100	14	4,5	shrub	
5	*Betula pendula*	800	250	31	9,9	tree	
6	*Fagus sylvatica*	195	80	6	1,9	tree	
7	*Euonymus europaeus*	188	150	8	2,5	shrub	
8	*Cornus sanguinea*	370	130	18	5,7	shrub	
9	*Crataegus monogyna*	230	130	6	1,9	shrub	
10	*Prunus avium*	500	200	22	7,0	tree	
11	*Acer pseudoplatanus*	560	200	20	6,4	tree	
12	*Salix caprea*	360	150x300	25	8,0	tree	
13	*Salix caprea*	360	250	35	11,1	tree	
14	*Salix caprea*	650	300	57	18,1	tree	
14'	*Cornus sanguinea*	150	80	2	0,6	arbuste	Grows in the trunk of n°14
15	*Frangula alnus*	400	200	14	4,5	arbuste	
16	*Euonymus europaeus*	90	30	9	2,9	arbuste	
17	*Acer campestre*	600	200	18	5,7	tree	
18	*Malus sylvestris*	480	150	15	4,8	tree	
19	*Quercus petraea*	325	100	6	1,9	tree	
20	*Prunus spinosa*	160	70	2	0,6	shrub	
21	*Prunus spinosa*	220	130	13	4,1	shrub	
22	*Prunus spinosa*	95	40	2	0,6	shrub	
23	*Prunus spinosa*	50	25	2	0,6	shrub	
24	*Prunus spinosa*	50	25	2	0,6	shrub	
25	*Prunus spinosa*	130	50	2	0,6	shrub	
26	*Carpinus betulus*	135	100	7	2,2	tree	
27	*Frangula alnus*	450	100	13	4,1	shrub	
28	*Salix caprea*	480	100	11	3,5	tree	
29	*Salix caprea*	480	100	11	3,5	tree	
30	*Populus tremula*	800	400	43	13,7	tree	
31	*Cornus sanguinea*	45	50	2	0,6	shrub	
32	*Tilia cordata*	265	180	16	5,1	tree	
33	*Prunus spinosa*	80	40	2	0,6	shrub	
34	*Ligustrum vulgare*	350	180	25	8,0	shrub	
35	*Carpinus betulus*	145	85	6	1,9	tree	
36	*Sorbus torminalis*	300	180	10	3,2	tree	
37	*Sorbus aucuparia*	270	80	6	1,9	tree	
38	*Carpinus betulus*	85	60	2	0,6	tree	
39	*Viburnum lantana*	250	100	10	3,2	shrub	
40	*Carpinus betulus*	235	85	10	3,2	tree	
41	*Corylus avellana*	400	180	37	11,8	shrub	
42	*Cornus sanguinea*	320	200	12	3,8	shrub	
43	*Carpinus betulus*	320	110	12	3,8	tree	
44	*Carpinus betulus*	240	100	6	1,9	tree	
45	*Tilia cordata*	395	140	25	8,0	tree	
46	*Sorbus aucuparia*	405	180	21	6,7	tree	
47	*Crataegus monogyna*	280	140	7	2,2	shrub	
48	*Carpinus betulus*	40	30	3	1,0	tree	
49	*Cornus sanguinea*	90	20	2	0,6	shrub	
50	*Ligustrum vulgare*	160	200	23	7,3	shrub	
51	*Carpinus betulus*	55	40	6	1,9	tree	
52	*Crataegus monogyna*	230	100	11	3,5	shrub	
53	*Ligustrum vulgare*	50	30	2	0,6	shrub	
54	*Acer campestre*	600	400	24	7,6	tree	
55	*Tilia cordata*	160	70	7	2,2	tree	
56	*Crataegus monogyna*	110	60	7	2,2	shrub	
57	*Ligustrum vulgare*	80	80	17	5,4	shrub	
58	*Prunus spinosa*	135	50	2	0,6	shrub	

59	*Prunus spinosa*	140	50	4	1,3	shrub	
60	*Prunus spinosa*	315	180	12	3,8	shrub	
61	*Ligustrum vulgare*	185	150	17	5,4	shrub	
62	*Ligustrum vulgare*	165	200	16	5,1	shrub	
63	*Ligustrum vulgare*	215	200	18	5,7	shrub	
64	*Quercus petraea*	155	160	6	1,9	tree	
65	*Prunus spinosa*	55	70	2	0,6	shrub	
66	*Carpinus betulus*	210	90	7	2,2	tree	
67	*Carpinus betulus*	30	30	6	1,9	tree	
68	*Crataegus monogyna*	300	300	8	2,5	shrub	
69	*Sorbus torminalis*	470	200	13	4,1	tree	
70	*Prunus spinosa*	350	100	13	4,1	shrub	
71	*Fagus sylvatica*	225	160	7	2,2	tree	
72	*Salix caprea*	260	200	8	2,5	tree	
73	*Quercus petraea*	55	60	7	2,2	tree	
74	*Corylus avellana*	390	300	49	15,6	shrub	
75	*Corylus avellana*	390	140	37	11,8	shrub	
76	*Tilia cordata*	260	150	13	4,1	tree	
77	*Corylus avellana*	350	100	24	7,6	shrub	
78	*Corylus avellana*	365	200	29	9,2	shrub	
79	*Tilia cordata*	230	60	11	3,5	tree	
80	*Cornus sanguinea*	350	300	32	10,2	shrub	
81	*Acer pseudoplatanus*	455	140	23	7,3	tree	
82	*Salix caprea*	350	150	8	2,5	tree	
83	*Carpinus betulus*	350	100	8	2,5	tree	
84	*Tilia cordata*	350	200	19	6,0	tree	
85	*Sorbus aucuparia*	315	60	10	3,2	tree	
86	*Salix alba*	365	150	9	2,9	tree	
87	*Corylus avellana*	280	180	44	14,0	shrub	
88	*Corylus avellana*	390	200	26	8,3	shrub	
89	*Corylus avellana*	375	300	48	15,3	shrub	
90	*Sorbus torminalis*	435	90	13	4,1	tree	
91	*Corylus avellana*	360	200	34	10,8	shrub	
92	*Sorbus aucuparia*	430	120	17	5,4	tree	
93	*Salix alba*	390	100	10	3,2	tree	
94	*Cornus sanguinea*	390	200	21	6,7	shrub	
95	*Frangula alnus*	370	140	10	3,2	shrub	
96	*Prunus spinosa*	80	20	10	3,2	shrub	
97	*Corylus avellana*	80	20	7	2,2	shrub	
98	*Cornus sanguinea*	160	100x200	16	5,1	shrub	

AXIS PARC - Données brutes

N°	Species	Heights (cm)	Crowns (cm)	Circumferences (cm)	Diameter (cm)	Type	Comments
1	*Ulmus campestre*	454	150*200	24	7,6	tree	
2	*Fraxinus excelsior*	442	150	12	3,8	tree	
3	*Ulmus campestre*	428	180	20	6,4	tree	
4	*Acer pseudoplatanus*	370	150	13	4,1	tree	
5	*Tilia cordata*	288	80	9	2,9	tree	
6	*Betula pendula*	416	150	14	4,5	tree	
7	*Corylus avellana*	249	60	19	6,0	shrub	
8	*Corylus avellana*	276	180	26	8,3	shrub	
9	*Corylus avellana*	260	220	19	6,0	shrub	
10	*Prunus avium*	331	130	12	3,8	tree	
11	*Prunus avium*	374	180	17	5,4	tree	
12	*Viburnum opulus*	237	110	18	5,7	shrub	
13	*Ulmus campestre*	200	110	12	3,8	tree	
14	*Fraxinus excelsior*	153	98	5	1,6	tree	
15	*Quercus robur*	98	40	4	1,3	tree	
16	*Viburnum opulus*	275	250	15	4,8	shrub	
17	*Cornus sanguinea*	202	170	21	6,7	shrub	
18	*Ulmus campestre*	338	145	11	3,5	tree	
19	*Tilia cordata*	146	70	5	1,6	tree	
20	*Prunus avium*	465	170	19	6,0	tree	
21	*Cytisus scoparius*	347	150	27	8,6	shrub	
22	*Tilia cordata*	176	70	8	2,5	tree	
23	*Ulmus campestre*	305	215	13	4,1	tree	
24	*Viburnum opulus*	187	95	16	5,1	shrub	
25	*Corylus avellana*	180	125	13	4,1	shrub	
26	*Acer pseudoplatanus*	280	145	8	2,5	tree	
27	*Fraxinus excelsior*	400	100*160	12	3,8	tree	
28	*Sorbus torminalis*	245	110	7	2,2	tree	
29	*Betula pendula*	590	226	18	5,7	tree	
30	*Salix caprea*	440	170*200	18	5,7	tree	
31	*Cornus sanguinea*	152	210	6	1,9	shrub	
32	*Viburnum opulus*	118	106	20	6,4	shrub	
33	*Cytisus scoparius*	217	232*337	15	4,8	shrub	
34	*Ulmus campestre*	324	240	17	5,4	tree	
35	*Betula pendula*	439	200	18	5,7	tree	
36	*Viburnum opulus*	229	90	10	3,2	shrub	
37	*Acer pseudoplatanus*	214	128	8	2,5	tree	
38	*Viburnum opulus*	272	140	12	3,8	shrub	
39	*Corylus avellana*	300	120	12	3,8	shrub	
40	*Viburnum opulus*	252	120	9	2,9	shrub	
41	*Prunus avium*	500	175	16	5,1	tree	
42	*Fraxinus excelsior*	241	104	8	2,5	tree	larger leaflets at the top of the tree
43	*Corylus avellana*	285	122	14	4,5	shrub	
44	*Ulmus campestre*	223	230	10	3,2	tree	
45	*Fraxinus excelsior*	368	60	10	3,2	tree	
46	*Acer platanoides*	359	70	9	2,9	tree	
47	*Euonymus europaeus*	207	66	5	1,6	shrub	
48	*Ulmus campestre*	300	150	9	2,9	tree	
49	*Corylus avellana*	315	200	14	4,5	shrub	
50	*Ulmus campestre*	280	110	12	3,8	tree	
51	*Viburnum opulus*	255	97	10	3,2	shrub	
52	*Ulmus campestre*	402	150	18	5,7	tree	terrier at foot
53	*Sorbus torminalis*	287	105	8	2,5	tree	
54	*Carpinus betulus*	137	100*130	11	3,5	tree	
55	*Prunus avium*	332	215	14	4,5	tree	
56	*Fraxinus excelsior*	150	50	12	3,8	tree	strongly toothed leaflets
57	*Corylus avellana*	294	170	23	7,3	shrub	
58	*Quercus petraea*	107	52	4	1,3	tree	
59	*Prunus avium*	378	130	13	4,1	tree	
60	*Prunus avium*	315	200	12	3,8	tree	

61	*Quercus petraea*	134	75	7	2,2	tree	
62	*Mespilus germanica*	233	120*180	13	4,1	shrub	
63	*Acer pseudoplatanus*	302	135	8	2,5	tree	
64	*Tilia cordata*	200	135	10	3,2	tree	
64'	*Acer pseudoplatanus*	268	52	5	1,6	tree	
65	*Cytisus scoparius*	209	154	12	3,8	shrub	
66	*Quercus petraea*	155	57	4	1,3	tree	
67	*Salix caprea*	295	108	7	2,2	tree	
68	*Carpinus betulus*	252	80*200	7	2,2	tree	
69	*Sorbus aria*	211	86	4	1,3	tree	
70	*Prunus avium*	380	200	13	4,1	tree	
71	*Prunus avium*	369	220	13	4,1	tree	
72	*Carpinus betulus*	119	107	7	2,2	tree	
73	*Tilia cordata*	202	120	13	4,1	tree	
74	*Acer campestre*	155	15	3	1,0	tree	very thin, relies on neighbors to grow (like a liana)
75	*Prunus avium*	423	220	15	4,8	tree	
76	*Sorbus torminalis*	260	85	5	1,6	tree	
77	*Tilia cordata*	128	150	6	1,9	tree	
78	*Salix caprea*	216	30	4	1,3	tree	
79	*Salix caprea*	285	150	7	2,2	tree	
80	*Quercus petraea*	167	54	4	1,3	tree	
81	*Ulmus campestre*	329	140*200	14	4,5	tree	
82	*Corylus avellana*	335	150	18	5,7	shrub	
83	*Prunus avium*	388	200	18	5,7	tree	
84	*Ulmus campestre*	404	200	22	7,0	tree	
85	*Tilia cordata*	213	73	8	2,5	tree	
86	*Salix caprea*	420	120	10	3,2	tree	
87	*Corylus avellana*	340	150	34	10,8	shrub	
88	*Acer pseudoplatanus*	300	130	7	2,2	tree	
89	*Corylus avellana*	337	110	22	7,0	shrub	
90	*Fraxinus excelsior*	311	160	8	2,5	tree	Roe deer rub
91	*Viburnum opulus*	267	100	17	5,4	shrub	
92	*Viburnum opulus*	265	140	19	6,0	shrub	
93	*Fraxinus excelsior*	375	80	9	2,9	tree	
94	*Corylus avellana*	320	100	13	4,1	shrub	
95	*Prunus avium*	415	230	14	4,5	tree	
96	*Fraxinus excelsior*	450	170	16	5,1	tree	
97	*Betula pendula*	420	190	13	4,1	tree	
98	*Ulmus campestre*	471	230	18	5,7	tree	
99	*Corylus avellana*	363	120	17	5,4	shrub	
100	*Corylus avellana*	298	110	17	5,4	shrub	
101	*Corylus avellana*	306	90	9	2,9	shrub	
102	*Sorbus torminalis*	77	100*190	5	1,6	tree	
103	*Carpinus betulus*	138	159	4	1,3	tree	
104	*Acer pseudoplatanus*	395	180	8	2,5	tree	
105	*Corylus avellana*	305	195	19	6,0	shrub	
106	*Salix caprea*	320	150	8	2,5	tree	
107	*Quercus robur*	156	49	5	1,6	tree	
108	*Acer pseudoplatanus*	416	90*230	17	5,4	tree	
109	*Ulmus campestre*	198	60*100	7	2,2	tree	
110	*Corylus avellana*	318	80*130	14	4,5	shrub	
111	*Sambucus nigra*	300	230	20	6,4	shrub	
112	*Crataegus monogyna*	92	40*100	4	1,3	shrub	
113	*Salix caprea*	419	100	20	6,4	tree	
114	*Ulmus campestre*	498	300	32	10,2	tree	
115	*Ulmus campestre*	380	80	14	4,5	tree	
116	*Corylus avellana*	287	100*140	6	1,9	shrub	
117	*Ulmus campestre*	378	70*220	16	5,1	tree	
118	*Ulmus campestre*	430	240	21	6,7	tree	
119	*Cornus sanguinea*	104	126	20	6,4	shrub	
120	*Sorbus torminalis*	302	120	5	1,6	tree	

121	*Ulmus campestre*	440	194	20	6,4	tree	
122	*Cornus sanguinea*	84	68	5	1,6	shrub	
123	*Prunus avium*	397	200	15	4,8	tree	
124	*Acer pseudoplatanus*	420	170	12	3,8	tree	
125	*Crataegus monogyna*	247	130	7	2,2	shrub	
126	*Ulmus campestre*	398	185	14	4,5	tree	
127	*Euonymus europaeus*	130	140*180	7	2,2	shrub	
128	*Sambucus nigra*	320	215	21	6,7	shrub	
129	*Prunus avium*	356	115	12	3,8	tree	
130	*Prunus avium*	338	125	11	3,5	tree	
131	*Euonymus europaeus*	220	135	7	2,2	shrub	
132	*Prunus avium*	417	180*230	19	6,0	tree	
133	*Corylus avellana*	290	141	12	3,8	shrub	
134	*Quercus robur*	152	35	4	1,3	tree	
135	*Fraxinus excelsior*	383	100	10	3,2	tree	
136	*Acer pseudoplatanus*	365	130	10	3,2	tree	
137	*Tilia cordata*	231	70	6	1,9	tree	
138	*Ulmus campestre*	172	40	6	1,9	tree	
139	*Tilia cordata*	150	109	5	1,6	tree	
140	*Corylus avellana*	303	110	14	4,5	shrub	
141	*Crataegus monogyna*	146	109	6	1,9	shrub	
142	*Ulmus campestre*	210	90*145	13	4,1	tree	
143	*Frangula alnus*	298	125	10	3,2	shrub	
144	*Betula pendula*	351	165	12	3,8	tree	
145	*Prunus avium*	373	160	13	4,1	tree	
146	*Euonymus europaeus*	95	120	4	1,3	shrub	
147	*Prunus avium*	312	160	11	3,5	tree	
148	*Ulmus campestre*	450	320	28	8,9	tree	
149	*Fraxinus excelsior*	276	100	8	2,5	tree	
150	*Corylus avellana*	282	115	6	1,9	shrub	
151	*Corylus avellana*	306	130	18	5,7	shrub	
152	*Viburnum opulus*	290	180	21	6,7	shrub	

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N°	Species	Heights (cm)	Crowns (cm)	Circumferences (cm)	Diameter (cm)	Type	Comments
1	*Tilia cordata*	86	39	6	1,9	tree	chatter
2	*Tilia cordata*	84	26	6	1,9	tree	chatter
3	*Fagus sylvatica*	109	66	4	1,3	tree	
4	*Sambucus nigra*	350	200*360	20	6,4	shrub	
5	*Cornus sanguinea*	445	247	12	3,8	shrub	
6	*Betula pendula*	570	120	15	4,8	tree	
7	*Frangula alnus*	498	275	15	4,8	shrub	
8	*Quercus petraea*	520	318	13	4,1	tree	
9	*Fagus sylvatica*	279	138	7	2,2	tree	
10	*Sorbus aucuparia*	460	160	9	2,9	tree	
11	*Prunus avium*	660	290	22	7,0	tree	
12	*Acer pseudoplatanus*	458	80	7	2,2	tree	
13	*Carpinus betulus*	478	100	7	2,2	tree	
14	*Frangula alnus*	398	180	10	3,2	shrub	
15	*Cornus sanguinea*	25	20	4	1,3	shrub	chatter
16	*Crataegus monogyna*	361	150	9	2,9	shrub	
17	*Quercus petraea*	308	120	7	2,2	tree	
18	*Fagus sylvatica*	102	44	4	1,3	tree	chatter
19	*Prunus padus*	492	327	14	4,5	tree	
20	*Acer pseudoplatanus*	635	150*320	11	3,5	tree	
21	*Tilia cordata*	108	38	5	1,6	tree	chatter + roe deer rub
22	*Malus sylvestris*	223	160	10	3,2	tree	
23	*Cornus sanguinea*	90	36	3	1,0	shrub	
24	*Sambucus nigra*	404	245	21	6,7	shrub	
25	*Prunus padus*	420	200*340	9	2,9	tree	
26	*Fagus sylvatica*	212	54	5	1,6	tree	
27	*Acer pseudoplatanus*	510	247	13	4,1	tree	
28	*Acer pseudoplatanus*	680	180	14	4,5	tree	
29	*Betula pendula*	900	200	24	7,6	tree	
30	*Carpinus betulus*	283	155	5	1,6	tree	beech shoot at foot
31	*Sorbus aucuparia*	409	162	8	2,5	tree	
32	*Frangula alnus*	585	248	12	3,8	shrub	
33	*Betula pendula*	850	200	17	5,4	tree	
34	*Sorbus aucuparia*	302	150	7	2,2	tree	chatter + roe deer rub
35	*Fagus sylvatica*	114	33	4	1,3	tree	
36	*Acer pseudoplatanus*	246	63	7	2,2	tree	
37	*Alnus glutinosa*	900	300	23	7,3	tree	
38	*Mespilus germanica*	365	150*300	8	2,5	shrub	
39	*Acer pseudoplatanus*	600	200	10	3,2	tree	
40	*Prunus avium*	900	360	33	10,5	tree	
41	*Corylus avellana*	422	150	14	4,5	shrub	
42	*Acer pseudoplatanus*	132	40	4	1,3	tree	
43	*Fagus sylvatica*	110	40	5	1,6	tree	
44	*Acer pseudoplatanus*	760	225	19	6,0	tree	
45	*Fagus sylvatica*	75	34	4	1,3	tree	
46	*Sorbus aucuparia*	300	110	8	2,5	tree	chatter + roe deer rub
47	*Fraxinus excelsior*	600	240	12	3,8	tree	
48	*Acer pseudoplatanus*	700	260	15	4,8	tree	
49	*Acer pseudoplatanus*	540	245	10	3,2	tree	
50	*Sorbus aucuparia*	500	180	14	4,5	tree	
51	*Carpinus betulus*	88	52	5	1,6	tree	
52	*Acer pseudoplatanus*	488	214	9	2,9	tree	
53	*Alnus glutinosa*	800	250	20	6,4	tree	
54	*Prunus padus*	580	310	13	4,1	tree	
55	*Acer pseudoplatanus*	410	270	8	2,5	tree	
56	*Frangula alnus*	445	202	11	3,5	shrub	
57	*Crataegus monogyna*	315	145	8	2,5	shrub	
58	*Acer pseudoplatanus*	333	80*285	7	2,2	tree	
59	*Quercus robur*	125	60	4	1,3	tree	
60	*Prunus padus*	183	127	8	2,5	tree	

61	*Alnus glutinosa*	850	300	28	8,9	tree	
62	*Betula pendula*	650	270	21	6,7	tree	
63	*Tilia cordata*	92	38	4	1,3	tree	
64	*Prunus padus*	111	120	6	1,9	tree	
65	*Acer pseudoplatanus*	426	170	8	2,5	tree	
66	*Acer pseudoplatanus*	510	170	11	3,5	tree	
67	*Alnus glutinosa*	650	338	36	11,5	tree	
68	*Acer pseudoplatanus*	780	180*300	20	6,4	tree	
69	*Acer pseudoplatanus*	750	225	14	4,5	tree	
70	*Prunus padus*	398	200	9	2,9	tree	chatter + roe deer rub
71	*Sorbus aucuparia*	351	210	14	4,5	tree	
72	*Tilia cordata*	121	48	7	2,2	tree	
73	*Sambucus nigra*	153	170	7	2,2	shrub	
74	*Frangula alnus*	310	198	9	2,9	shrub	
75	*Alnus glutinosa*	850	230	30	9,5	tree	
76	*Prunus padus*	74	65	6	1,9	tree	chatter
77	*Frangula alnus*	402	130	7	2,2	shrub	
78	*Prunus padus*	419	260	14	4,5	tree	
79	*Cornus sanguinea*	90	25	3	1,0	shrub	
80	*Sorbus aucuparia*	670	300	14	4,5	tree	
81	*Acer pseudoplatanus*	491	250	8	2,5	tree	
82	*Corylus avellana*	400	60*100	9	2,9	shrub	
83	*Fagus sylvatica*	113	48	5	1,6	tree	
84	*Acer pseudoplatanus*	500	150	9	2,9	tree	
85	*Acer pseudoplatanus*	339	200	7	2,2	tree	
86	*Prunus padus*	497	200	15	4,8	tree	
87	*Frangula alnus*	340	80	9	2,9	shrub	
88	*Prunus padus*	398	210	14	4,5	tree	
89	*Fagus sylvatica*	176	75	7	2,2	tree	
90	*Frangula alnus*	310	120*150	8	2,5	shrub	
91	*Cornus sanguinea*	88	85	4	1,3	shrub	chatter
92	*Prunus padus*	302	235	8	2,5	tree	
93	*Fraxinus excelsior*	147	80	5	1,6	tree	
94	*Betula pendula*	720	230	16	5,1	tree	
95	*Sorbus aucuparia*	75	20	3	1,0	tree	chatter
96	*Fagus sylvatica*	140	70	4	1,3	tree	
97	*Acer pseudoplatanus*	600	200	10	3,2	tree	
98	*Sorbus aucuparia*	236	80*300	11	3,5	tree	
99	*Acer pseudoplatanus*	600	200	10	3,2	tree	
100	*Alnus glutinosa*	630	200	20	6,4	tree	
101	*Cornus sanguinea*	67	30	4	1,3	shrub	
102	*Prunus avium*	720	310	26	8,3	tree	
103	*Betula pendula*	720	200	15	4,8	tree	
104	*Alnus glutinosa*	710	250	26	8,3	tree	
105	*Tilia cordata*	182	60*100	5	1,6	tree	
106	*Betula pendula*	720	200	16	5,1	tree	
107	*Sorbus aucuparia*	620	180	12	3,8	tree	
108	*Acer pseudoplatanus*	580	350	12	3,8	tree	
109	*Betula pendula*	620	240	14	4,5	tree	
110	*Sambucus nigra*	500	250*406	28	8,9	shrub	
111	*Prunus padus*	660	270	17	5,4	tree	
112	*Sambucus nigra*	365	150*320	10	3,2	shrub	
113	*Prunus avium*	680	275	20	6,4	tree	
114	*Sambucus nigra*	600	285	23	7,3	shrub	
115	*Acer pseudoplatanus*	485	110	9	2,9	tree	
116	*Acer pseudoplatanus*	525	150	9	2,9	tree	
117	*Prunus padus*	345	180*245	10	3,2	tree	
118	*Prunus padus*	610	315	16	5,1	tree	
119	*Fagus sylvatica*	151	75	5	1,6	tree	
120	*Acer pseudoplatanus*	417	170	7	2,2	tree	
121	*Prunus avium*	650	250	17	5,4	tree	

122	*Populus tremula*	950	390	25	8,0	tree	
123	*Prunus padus*	390	250	13	4,1	tree	
124	*Populus tremula*	1000	500	34	10,8	tree	
125	*Prunus avium*	540	230	15	4,8	tree	
126	*Prunus padus*	419	300	10	3,2	tree	
127	*Corylus avellana*	419	250	14	4,5	shrub	
128	*Sorbus aucuparia*	580	195	22	7,0	tree	
129	*Acer pseudoplatanus*	690	195	15	4,8	tree	
130	*Sambucus nigra*	204	180	10	3,2	shrub	

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N°	Species	Heights (cm)	Crowns (cm)	Circumferences (cm)	Diameter (cm)	Type
1	*Sorbus torminalis*	217	113	6	1,9	tree
2	*Quercus robur*	189	75	6	1,9	tree
3	*Acer platanoides*	345	60	11	3,5	tree
4	*Acer pseudoplatanus*	281	110	10	3,2	tree
5	*Corylus avellana*	126	108	9	2,9	shrub
6	*Betula pendula*	419	150	18	5,7	tree
7	*Sambucus nigra*	230	185	24	7,6	shrub
8	*Crataegus monogyna*	215	202	8	2,5	shrub
9	*Acer pseudoplatanus*	211	75	6	1,9	tree
10	*Quercus robur*	25	100	9	2,9	tree
11	*Quercus robur*	208	80	5	1,6	tree
12	*Acer pseudoplatanus*	307	120	8	2,5	tree
13	*Crataegus monogyna*	307	155	10	3,2	shrub
14	*Sambucus nigra*	212	175	11	3,5	shrub
15	*Quercus robur*	145	85	7	2,2	tree
16	*Acer pseudoplatanus*	206	75	6	1,9	tree
17	*Quercus robur*	202	60	6	1,9	tree
18	*Crataegus monogyna*	243	130	7	2,2	shrub
19	*Acer platanoides*	206	70	6	1,9	tree
20	*Acer platanoides*	206	80	6	1,9	tree
21	*Viburnum lantana*	154	55	7	2,2	shrub
22	*Viburnum lantana*	190	55	7	2,2	shrub
23	*Acer pseudoplatanus*	174	65	6	1,9	tree
24	*Populus tremula*	274	120*218	8	2,5	tree
25	*Betula pendula*	373	163	14	4,5	tree
26	*Prunus avium*	267	147	11	3,5	tree
27	*Cornus sanguinea*	213	120	9	2,9	shrub
28	*Carpinus betulus*	173	100	7	2,2	tree
29	*Sambucus nigra*	150	120	6	1,9	shrub
30	*Rosa canina*	117	60	3	1,0	shrub
31	*Carpinus betulus*	131	55	4	1,3	tree
32	*Carpinus betulus*	120	90	5	1,6	tree
33	*Betula pendula*	357	160	14	4,5	tree
34	*Crataegus monogyna*	112	90	5	1,6	shrub
35	*Betula pendula*	360	160	15	4,8	tree
36	*Quercus robur*	179	60	5	1,6	tree
37	*Carpinus betulus*	165	75	7	2,2	tree
38	*Crataegus monogyna*	223	125	9	2,9	shrub
39	*Quercus robur*	170	165	6	1,9	tree
40	*Sambucus nigra*	174	151	28	8,9	shrub
41	*Acer platanoides*	306	150	10	3,2	tree
42	*Crataegus monogyna*	240	173	9	2,9	shrub
43	*Carpinus betulus*	168	70	4	1,3	tree
44	*Quercus robur*	216	100	7	2,2	tree
45	*Acer platanoides*	300	150	11	3,5	tree
46	*Quercus robur*	209	90	9	2,9	tree
47	*Crataegus monogyna*	214	80*130	8	2,5	shrub
48	*Acer pseudoplatanus*	221	75	6	1,9	tree
49	*Quercus robur*	235	140	8	2,5	tree
50	*Salix caprea*	309	100*160	14	4,5	tree
51	*Acer pseudoplatanus*	165	60	6	1,9	tree

52	*Betula pendula*	308	130	11	3,5	tree
53	*Betula pendula*	308	150	14	4,5	tree
54	*Quercus robur*	149	90	4	1,3	tree
55	*Salix caprea*	336	150	12	3,8	tree
56	*Salix caprea*	330	130	12	3,8	tree
57	*Prunus avium*	351	140	14	4,5	tree
58	*Prunus avium*	281	150	10	3,2	tree
59	*Prunus avium*	320	190	13	4,1	tree
60	*Quercus robur*	292	70	7	2,2	tree
61	*Prunus avium*	318	140	12	3,8	tree
62	*Betula pendula*	391	150	17	5,4	tree
63	*Salix caprea*	352	250	14	4,5	tree
64	*Acer pseudoplatanus*	52	35	2	0,6	tree
65	*Cornus sanguinea*	138	68	4	1,3	shrub
66	*Sorbus aucuparia*	185	115	6	1,9	tree
67	*Quercus robur*	202	115	9	2,9	tree
68	*Quercus petraea*	38	18	2	0,6	tree
69	*Cornus mas*	154	60	6	1,9	shrub
70	*Acer pseudoplatanus*	276	100	7	2,2	tree
71	*Acer pseudoplatanus*	287	70	9	2,9	tree
72	*Cornus sanguinea*	128	80*140	8	2,5	shrub
73	*Acer platanoides*	312	80*116	11	3,5	tree
74	*Corylus avellana*	123	65	5	1,6	shrub
75	*Acer platanoides*	291	110*165	11	3,5	tree
76	*Quercus robur*	118	55	4	1,3	tree
77	*Prunus spinosa*	180	115	8	2,5	shrub
78	*Acer platanoides*	337	120	8	2,5	tree
79	*Ligustrum vulgare*	200	70	7	2,2	shrub
80	*Corylus avellana*	142	100	12	3,8	shrub
81	*Prunus avium*	268	160	10	3,2	tree
82	*Acer platanoides*	328	155	11	3,5	tree
83	*Corylus avellana*	92	60	3	1,0	shrub
84	*Corylus avellana*	75	70	5	1,6	shrub
85	*Salix caprea*	356	100*190	17	5,4	tree
86	*Acer pseudoplatanus*	140	80	4	1,3	tree
87	*Fraxinus excelsior*	45	15	2	0,6	tree
88	*Viburnum lantana*	40	20	2	0,6	shrub
89	*Cornus sanguinea*	40	40	2	0,6	shrub
90	*Cornus sanguinea*	156	180	17	5,4	shrub
91	*Betula pendula*	287	193	12	3,8	tree
92	*Quercus robur*	45	20	3	1,0	tree
93	*Malus sylvestris*	279	140	12	3,8	tree
94	*Acer platanoides*	323	122	10	3,2	tree
95	*Prunus spinosa*	140	100	9	2,9	shrub
96	*Ligustrum vulgare*	49	46	3	1,0	shrub
97	*Prunus avium*	279	160	11	3,5	tree
98	*Ligustrum vulgare*	104	115	9	2,9	shrub
99	*Sorbus torminalis*	68	40	3	1,0	tree
100	*Prunus spinosa*	96	80	2	0,6	shrub
101	*Ulmus campestre*	288	215	16	5,1	tree
102	*Prunus spinosa*	96	65	2	0,6	shrub
103	*Prunus spinosa*	213	142	12	3,8	shrub

104	*Crataegus monogyna*	169	120	5	1,6	shrub
105	*Acer pseudoplatanus*	358	120	12	3,8	tree
106	*Quercus robur*	209	115	8	2,5	tree
107	*Prunus spinosa*	138	115	6	1,9	shrub
108	*Ulmus campestre*	243	214	21	6,7	tree
109	*Ulmus campestre*	170	96	10	3,2	tree
110	*Corylus avellana*	79	80	6	1,9	shrub
111	*Crataegus monogyna*	291	143	11	3,5	shrub
112	*Betula pendula*	352	150	12	3,8	tree
113	*Betula pendula*	287	157	10	3,2	tree
114	*Viburnum lantana*	167	75	13	4,1	shrub
115	*Crataegus monogyna*	266	170	10	3,2	shrub
116	*Cornus sanguinea*	178	145	9	2,9	shrub

WILLEMEAU - Données brutes

N°	Species	Heights (cm)	Crowns (cm)	ren	Diameter (cm)	Type	Comments
1	*Sambucus nigra*	337	282	21	6,7	shrub	
2	*Sambucus nigra*	215	160	16	5,1	shrub	
3	*Cornus sanguinea*	222	100	5	1,6	shrub	
4	*Ulmus campestre*	520	273	22	7,0	tree	
5	*Prunus padus*	322	135	12	3,8	shrub	
6	*Corylus avellana*	230	115	8	2,5	shrub	
7	*Corylus avellana*	243	160	9	2,9	shrub	
8	*Corylus avellana*	286	140	6	1,9	shrub	
9	*Quercus robur*	139	105	5	1,6	tree	
10	*Alnus glutinosa*	402	150	9	2,9	tree	
11	*Ulmus campestre*	575	213	25	8,0	tree	
12	*Acer pseudoplatanus*	286	80	6	1,9	tree	
13	*Sambucus nigra*	304	100*339	20	6,4	shrub	
14	*Prunus avium*	386	152	12	3,8	tree	
15	*Acer pseudoplatanus*	448	268	13	4,1	tree	
16	*Corylus avellana*	307	157	16	5,1	shrub	
17	*Prunus padus*	458	170	15	4,8	shrub	
18	*Prunus padus*	575	180*352	26	8,3	shrub	
19	*Fraxinus excelsior*	384	200	9	2,9	tree	
20	*Carpinus betulus*	249	175	8	2,5	tree	
21	*Quercus robur*	214	110	4	1,3	tree	
22	*Alnus glutinosa*	580	205	16	5,1	tree	
23	*Fraxinus excelsior*	473	190	11	3,5	tree	
24	*Sambucus nigra*	348	100*292	51	16,2	shrub	
25	*Quercus robur*	201	60	5	1,6	tree	
26	*Carpinus betulus*	183	100	5	1,6	tree	
27	*Carpinus betulus*	186	50	7	2,2	tree	
28	*Sambucus nigra*	338	189	17	5,4	shrub	
29	*Viburnum opulus*	127	27	20	6,4	shrub	
30	*Acer pseudoplatanus*	348	160	9	2,9	tree	
31	*Carpinus betulus*	343	130	7	2,2	tree	
32	*Ulmus campestre*	457	222	30	9,5	tree	
33	*Crataegus monogyna*	189	132	6	1,9	shrub	
34	*Prunus padus*	458	215	14	4,5	shrub	
35	*Acer pseudoplatanus*	419	115	9	2,9	tree	
36	*Prunus padus*	461	238	22	7,0	shrub	
37	*Prunus padus*	470	220	17	5,4	shrub	
38	*Quercus petraea*	171	100	5	1,6	tree	
39	*Salix caprea*	412	210	13	4,1	tree	
40	*Prunus padus*	463	180	14	4,5	shrub	
41	*Corylus avellana*	334	160	11	3,5	shrub	
42	*Viburnum opulus*	210	130	12	3,8	shrub	
43	*Fagus sylvatica*	170	60*120	6	1,9	tree	
44	*Ulmus campestre*	500	171	20	6,4	tree	
45	*Corylus avellana*	320	150	11	3,5	shrub	
46	*Corylus avellana*	281	100*180	9	2,9	shrub	
47	*Prunus padus*	480	216	16	5,1	shrub	
48	*Quercus petraea*	258	130	8	2,5	tree	
49	*Quercus robur*	170	83	5	1,6	tree	
50	*Tilia cordata*	212	125	7	2,2	tree	
51	*Acer pseudoplatanus*	444	232	18	5,7	tree	
52	*Carpinus betulus*	69	57	4	1,3	tree	

53	*Carpinus betulus*	288	125	8	2,5	tree	
54	*Acer pseudoplatanus*	520	130	16	5,1	tree	
55	*Viburnum opulus*	207	130	11	3,5	shrub	
56	*Ulmus campestre*	530	330	21	6,7	tree	
57	*Betula pendula*	525	150	18	5,7	tree	
58	*Ulmus campestre*	500	210*250	26	8,3	tree	
59	*Acer pseudoplatanus*	412	80*175	9	2,9	tree	
60	*Quercus robur*	120	57	3	1,0	tree	
61	*Acer pseudoplatanus*	237	180	6	1,9	tree	
62	*Ulmus campestre*	520	275	24	7,6	tree	
63	*Corylus avellana*	203	120	5	1,6	shrub	
64	*Cornus sanguinea*	217	142	6	1,9	shrub	
65	*Cornus sanguinea*	137	80*120	3	1,0	shrub	
66	*Mespilus germanica*	212	129	7	2,2	shrub	
67	*Acer pseudoplatanus*	348	164	10	3,2	tree	
68	*Carpinus betulus*	277	124	7	2,2	tree	
69	*Carpinus betulus*	122	150	4	1,3	tree	
70	*Quercus petraea*	216	105	7	2,2	tree	
71	*Tilia cordata*	234	60	8	2,5	tree	
72	*Corylus avellana*	170	95	8	2,5	shrub	
73	*Sambucus nigra*	364	270	24	7,6	shrub	
74	*Alnus glutinosa*	416	140	9	2,9	tree	
75	*Sambucus nigra*	425	150*358	37	11,8	shrub	
76	*Alnus glutinosa*	419	150	14	4,5	tree	
77	*Betula pendula*	407	140*150	10	3,2	tree	
78	*Carpinus betulus*	232	125	6	1,9	tree	
79	*Betula pendula*	309	160	6	1,9	tree	
80	*Acer pseudoplatanus*	355	265	13	4,1	tree	
81	*Salix caprea*	408	150	16	5,1	tree	
82	*Ulmus campestre*	500	280	30	9,5	tree	
83	*Carpinus betulus*	137	85	4	1,3	tree	
84	*Viburnum opulus*	227	148	8	2,5	shrub	
85	*Corylus avellana*	175	120	5	1,6	shrub	
86	*Carpinus betulus*	277	160	6	1,9	tree	
87	*Tilia cordata*	137	85	6	1,9	tree	
88	*Prunus padus*	520	220	21	6,7	shrub	
89	*Cornus sanguinea*	232	100	5	1,6	shrub	
90	*Prunus padus*	315	150	10	3,2	shrub	
91	*Quercus petraea*	130	70	3	1,0	tree	
92	*Salix caprea*	447	120*200	17	5,4	tree	
93	*Viburnum opulus*	172	210	7	2,2	shrub	
94	*Betula pendula*	485	150	14	4,5	tree	
95	*Viburnum opulus*	68	80	6	1,9	shrub	
96	*Prunus padus*	337	164	12	3,8	shrub	
97	*Viburnum opulus*	266	100*180	5	1,6	shrub	
98	*Acer pseudoplatanus*	398	210	12	3,8	tree	
99	*Acer pseudoplatanus*	203	50	6	1,9	tree	
100	*Prunus padus*	456	254	19	6,0	shrub	
101	*Corylus avellana*	204	160	26	8,3	shrub	
102	*Acer pseudoplatanus*	448	200	16	5,1	tree	
103	*Quercus robur*	181	75	5	1,6	tree	
104	*Corylus avellana*	301	220	23	7,3	shrub	
105	*Carpinus betulus*	158	70*140	6	1,9	tree	

106	*Acer pseudoplatanus*	465	160	12	3,8	tree	
107	*Corylus avellana*	290	160	7	2,2	shrub	
108	*Crataegus monogyna*	179	150	7	2,2	tree	
109	*Corylus avellana*	244	80*107	7	2,2	shrub	
110	*Acer pseudoplatanus*	550	180	18	5,7	tree	
111	*Acer pseudoplatanus*	235	125	7	2,2	tree	
112	*Tilia cordata*	152	130	5	1,6	tree	
113	*Salix caprea*	425	190	22	7,0	tree	
114	*Ilex aquifolium*	100	80	5	1,6	shrub	
115	*Acer pseudoplatanus*	230	90	5	1,6	tree	
116	*Euonymus europaeus*	265	100	6	1,9	shrub	attacked by a caterpillar
117	*Quercus robur*	180	115	5	1,6	tree	large scabs on stems
118	*Cornus sanguinea*	246	230	8	2,5	shrub	
119	*Carpinus betulus*	247	95	6	1,9	tree	
120	*Crataegus monogyna*	135	120*230	8	2,5	shrub	
121	*Salix caprea*	500	160*400	27	8,6	tree	
122	*Cornus sanguinea*	68	80	2	0,6	shrub	
123	*Acer pseudoplatanus*	428	135	11	3,5	tree	
124	*Carpinus betulus*	206	120	5	1,6	tree	
125	*Ulmus campestre*	467	205	25	8,0	tree	
126	*Prunus spinosa*	136	90	4	1,3	shrub	
127	*Corylus avellana*	232	120*180	8	2,5	shrub	
128	*Prunus padus*	150	45	4	1,3	shrub	
129	*Ulmus campestre*	497	220	24	7,6	tree	
130	*Fagus sylvatica*	112	82	5	1,6	tree	
131	*Fagus sylvatica*	180	155	6	1,9	tree	
132	*Acer pseudoplatanus*	382	190	14	4,5	tree	
133	*Cornus sanguinea*	30	30	4	1,3	shrub	
134	*Acer pseudoplatanus*	453	145	16	5,1	tree	
135	*Quercus robur*	102	45	2	0,6	tree	

ORMEIGNIES - Données brutes

N°	Species	Heights (cm)	Crowns (cm)	Circumferences (cm)	Diameter (cm)	Type
1	*Crataegus monogyna*	316	90*172	11	3,5	shrub
2	*Acer pseudoplatanus*	364	90*190	13	4,1	tree
3	*Corylus avellana*	257	110*240	23	7,3	shrub
4	*Betula pendula*	600	282	27	8,6	tree
5	*Crataegus monogyna*	246	160	10	3,2	shrub
6	*Tilia cordata*	232	160	10	3,2	tree
7	*Acer pseudoplatanus*	468	200	15	4,8	tree
8	*Crataegus monogyna*	248	275	8	2,5	shrub
9	*Carpinus betulus*	262	120	8	2,5	tree
10	*Tilia cordata*	203	120	5	1,6	tree
11	*Carpinus betulus*	137	60*130	6	1,9	tree
12	*Acer platanoides*	478	80*120	19	6,0	tree
13	*Carpinus betulus*	139	50*75	7	2,2	tree
14	*Fraxinus excelsior*	378	175	17	5,4	tree
15	*Fagus sylvatica*	145	75	5	1,6	tree
16	*Crataegus monogyna*	239	70*125	7	2,2	shrub
17	*Corylus avellana*	180	112	19	6,0	shrub
18	*Quercus robur*	308	135	7	2,2	tree
19	*Salix caprea*	259	130	22	7,0	tree
20	*Quercus robur*	210	120	7	2,2	tree
21	*Acer platanoides*	413	120	12	3,8	tree
22	*Quercus robur*	407	218	16	5,1	tree
23	*Prunus spinosa*	73	40	2	0,6	shrub
24	*Salix caprea*	235	169	17	5,4	tree
25	*Populus tremula*	468	267	13	4,1	tree
26	*Sambucus nigra*	339	393	84	26,7	shrub
27	*Prunus spinosa*	94	70	3	1,0	shrub
28	*Quercus robur*	261	143	11	3,5	tree
29	*Corylus avellana*	275	222	30	9,5	shrub
30	*Quercus robur*	263	125	7	2,2	tree
31	*Quercus robur*	243	60	8	2,5	tree
32	*Acer pseudoplatanus*	550	240	23	7,3	tree
33	*Quercus robur*	458	170*240	25	8,0	tree
34	*Sorbus aucuparia*	259	125	7	2,2	tree
35	*Sambucus nigra*	435	410	64	20,4	shrub
36	*Prunus spinosa*	35	70	2	0,6	shrub
37	*Acer pseudoplatanus*	515	250	22	7,0	tree
38	*Prunus spinosa*	229	100	7	2,2	shrub
39	*Acer pseudoplatanus*	351	160	15	4,8	tree
40	*Fraxinus excelsior*	264	215	6	1,9	tree
41	*Fraxinus excelsior*	500	120*240	26	8,3	tree
42	*Quercus robur*	419	130*270	19	6,0	tree
43	*Fraxinus excelsior*	338	100*180	8	2,5	tree
44	*Ulmus campestre*	550	222	30	9,5	tree
45	*Prunus avium*	443	320	19	6,0	tree
46	*Fraxinus excelsior*	315	204	9	2,9	tree
47	*Sambucus nigra*	231	165	12	3,8	shrub

48	*Carpinus betulus*	213	145	5	1,6	tree
49	*Populus tremula*	650	330	30	9,5	tree
50	*Acer pseudoplatanus*	448	190	14	4,5	tree
51	*Fraxinus excelsior*	341	195	7	2,2	tree
52	*Sorbus aucuparia*	261	85	14	4,5	tree
53	*Carpinus betulus*	208	152	6	1,9	tree
54	*Quercus robur*	248	135	12	3,8	tree
55	*Cornus sanguinea*	289	239	30	9,5	shrub
56	*Cornus sanguinea*	165	140	5	1,6	shrub
57	*Cornus sanguinea*	290	120*245	13	4,1	shrub
58	*Tilia cordata*	133	120	5	1,6	tree
59	*Cornus sanguinea*	56	40*80	2	0,6	shrub
60	*Quercus robur*	150	110	6	1,9	tree
61	*Acer pseudoplatanus*	600	250	18	5,7	tree
62	*Carpinus betulus*	350	180	13	4,1	tree
63	*Carpinus betulus*	258	125	8	2,5	tree
64	*Sambucus nigra*	308	222	42	13,4	shrub
65	*Acer pseudoplatanus*	600	280	32	10,2	tree
66	*Quercus robur*	160	102	5	1,6	tree
67	*Prunus avium*	472	240	33	10,5	tree
68	*Ulmus campestre*	680	370	48	15,3	tree
69	*Fagus sylvatica*	126	90	5	1,6	tree
70	*Acer pseudoplatanus*	422	270	32	10,2	tree
71	*Quercus robur*	196	110	6	1,9	tree
72	*Quercus robur*	204	120	8	2,5	tree
73	*Tilia cordata*	113	150	6	1,9	tree
74	*Salix caprea*	181	193	23	7,3	tree
75	*Populus tremula*	82	60	6	1,9	tree
76	*Quercus robur*	122	80	5	1,6	tree
77	*Acer pseudoplatanus*	448	140	13	4,1	tree
78	*Corylus avellana*	228	223	19	6,0	shrub
79	*Acer platanoides*	418	245	16	5,1	tree
80	*Prunus avium*	515	240	20	6,4	tree
81	*Fraxinus excelsior*	138	130	17	5,4	tree
82	*Cornus sanguinea*	150	150	17	5,4	shrub
83	*Quercus robur*	234	95	7	2,2	tree
84	*Crataegus monogyna*	180	100	15	4,8	shrub
85	*Tilia cordata*	234	110	12	3,8	tree
86	*Tilia cordata*	234	120	9	2,9	tree
87	*Acer platanoides*	470	281	22	7,0	tree
88	*Crataegus monogyna*	120	110	5	1,6	shrub
89	*Acer pseudoplatanus*	470	280	16	5,1	tree
90	*Crataegus monogyna*	153	85	6	1,9	shrub
91	*Sambucus nigra*	374	370	63	20,1	shrub
92	*Crataegus monogyna*	217	130	6	1,9	shrub
93	*Sambucus nigra*	477	365	53	16,9	shrub
94	*Quercus robur*	160	70	4	1,3	tree
95	*Fraxinus excelsior*	530	220	16	5,1	tree
96	*Acer pseudoplatanus*	500	190	16	5,1	tree

97	*Salix caprea*	283	300	25	8,0	tree
98	*Sambucus nigra*	435	305	56	17,8	shrub
99	*Acer pseudoplatanus*	361	270	14	4,5	tree
100	*Quercus robur*	124	110	6	1,9	tree