

ON SITE CATALOGUE TU DELFT CAMPUS



This TU Delft Campus ON SITE catalogue is composed by the Landscape Architecture ON SITE 2020/2021 student team:

Pjotr Boomgaard

Max Corbeek

Jonah van Delden

Aileen Hallie

Jantine van Halsema

Britt Hoornaert

Rosa de Kruif

Tom van den Wijngaard

Rosa de Wolf

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We would also like to thank Rene Hoonhout, TU Delft's head of maintenance. He helped us with the implementation of several projects and supported us along the way. Bob Ursem, scientific director of the Botanical Garden Delft provided us with lots of knowledge on habitats and ecosystems. We got a lot of enlightning lectures during the course from among others Jolanda Maas on the impact of green to the (mental) health, Pieter Aaldring on birdlife, the Campus Real Estate on the vision and future plans for the TU Delft Campus and the Dutch Waterboard on the water management on campus.

All figures are a product of the students' work, unless stated otherwise.

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INTRODUCTION

This catalogue is made by the project group Landscape Architecture ON SITE 2020/2021. The catalogue can be used as a guide during your walk around the TU Delft campus. It aims to provide students, employees and visitors with information on the biodiversity and ecology on campus. While enjoying your walk, you can learn about different species, all of which can be found on and around the TU Delft campus. You can use the guide wherever you are on campus. If you'd like, you can start your walk at the Botanical Garden and walk via several ON SITE design projects 2018/2021 towards the beautiful Art Centre Delft. On your way, you'll notice that the TU Delft Campus has more to offer than one might think.

Before we will be zooming in on several species you can find information on the different biotopes on and around the TU Delft campus. We will show the larger system of which the campus is part of. Furthermore, we'll show you some of the ON SITE designs including the vision Take the Slow Lane and several projects.

Take the catalogue with you and enjoy the trip!

ON SITE Team 2020/2021

TAKE THE SLOW LANE

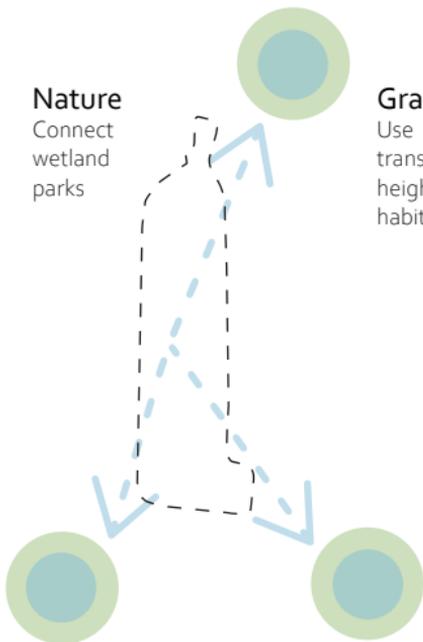
The project group Landscape Architecture ON SITE 2020/2021 developed a vision for the TU Delft Campus. This vision, named 'Take the Slow Lane', is visualised on the next page. Within the regional vision different green areas are connected to each other. The TU Delft Campus will become part of this greater green structure. Take the Slow Lane focuses on four key aspects: (mental) health, biodiversity, water and carbon storage.

With the Slow Lane, the team wants to provide students, employees and visitors with an opportunity to escape from the haste and business that the campus can bring. In addition, we will add less people-oriented green to the Campus. The Slow Lane, a new walking route based on the location of the old sea inlet, connects the Abtswoudse Bos, the Ackerdijkse Plassen, the Art Centre Delft, the TU Delft Campus, the Botanical Garden and the Delftse Hout. The route will be provided with many native and layered green to improve biodiversity and ecology of the region. Furthermore, water will be retained in the area through a Slow Lane of lush shores, ponds and wadis. By doing this, the water management becomes more future-proof.

Some of the design projects on TU Delft campus have already been made ON SITE. Those projects, the Green Walls, the BK City Garden, the Dean's Garden, the Trickling Trail, the Red Listed, the Eco Cathedral and the Peat Garden are briefly explained within this catalogue.

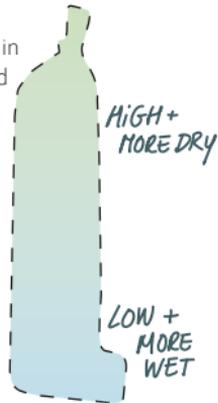
Nature

Connect wetland parks



Gradient

Use transition in height and habitat



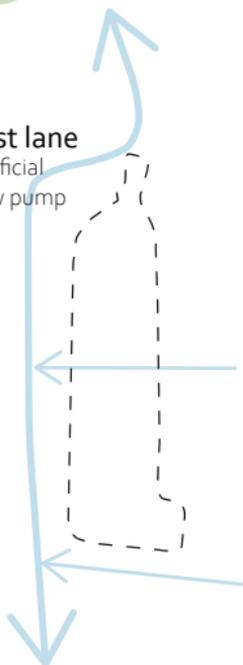
Fast lane

Transport green



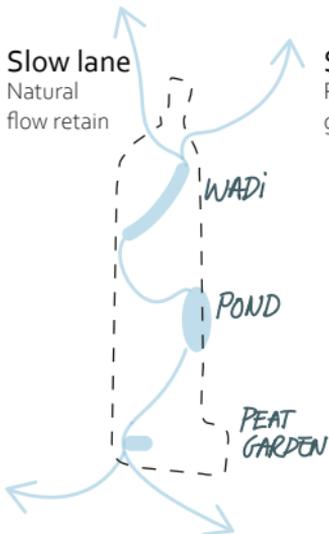
Fast lane

Artificial flow pump



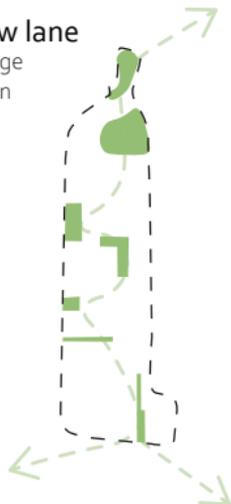
Slow lane

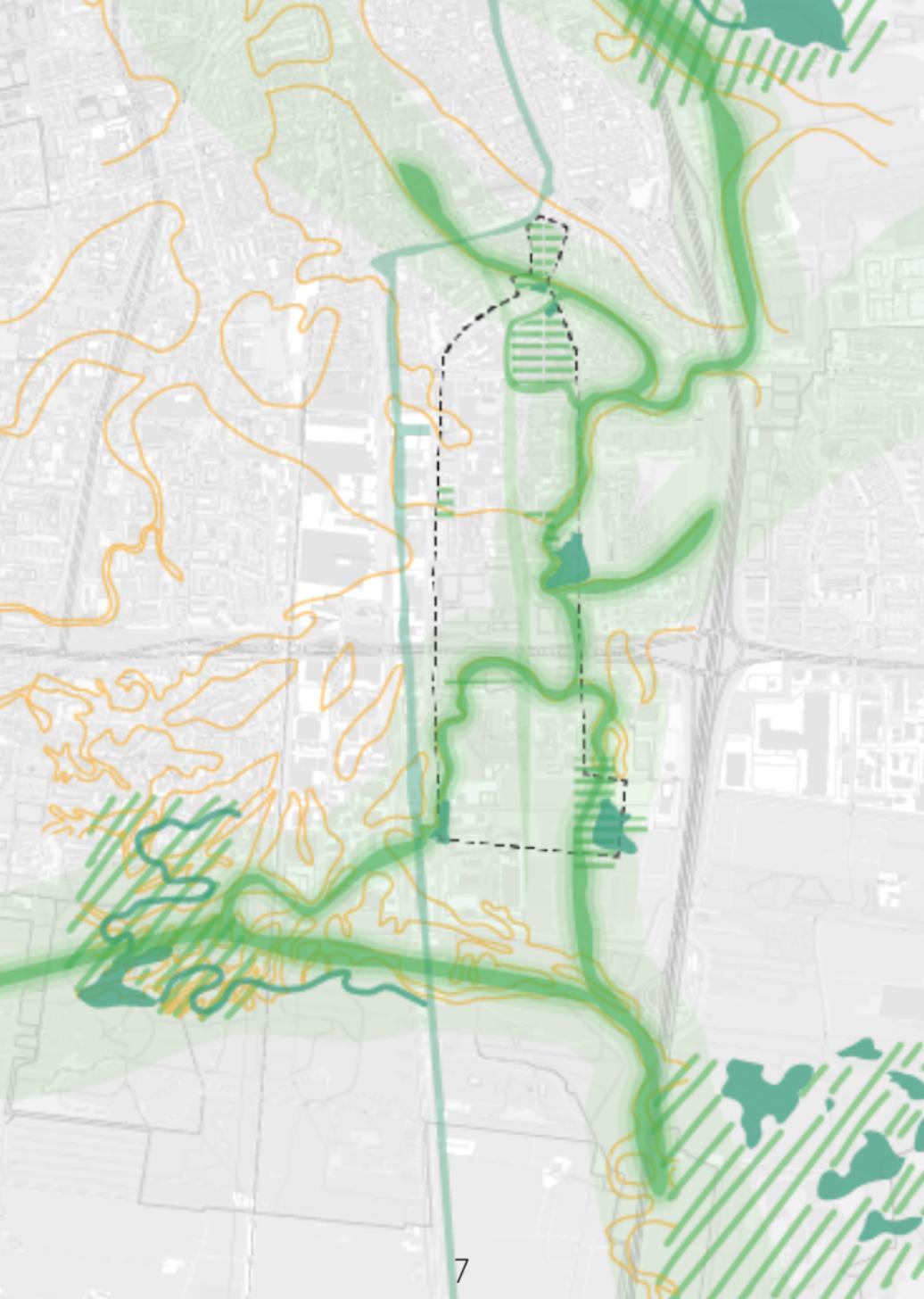
Natural flow retain



Slow lane

Refuge green





THE GREEN WALLS

Inside the faculty of Architecture and the Built Environment there are four green walls located. The ON SITE team 2020/2021 built four green walls in collaboration with graduating student Menno de Rode. The walls are movable and are supplied with a 70 liter water reservoir. The four walls grow different plant species with different goals focussing on lovely scent, smell and taste. One of the walls grow mint for students to make fresh mint tea. By this, we want to make students aware that they can grow mint themselves. We don't need to import tea from Kenya.

PLACE HOLDER: IMAGE

BK CITY GARDEN

The BK City Garden is designed by the ON SITE team 2020/2021. The Garden is located at the BK Bouwpub, near the east entrance of the Faculty of Architecture and the Built Environment. With this garden we hope to connect to the surrounding green structure: connecting the Botanical Garden Delft and the Jaffa cemetery. The BK City Garden provides a place where students, employees and visitors can come together. The corten steel raised plant beds are filled with native, layered green to attract more pollinators to the environment. The image below is a visualisation of the project.



THE DEAN'S GARDEN

The Dean's Garden is designed by the ON SITE team 2019/2020. First, this area was fully paved. With this project the team made a bold statement: pavement should make room for green. This doesn't only make the area a more pleasant place, it's also better for water management and contributes to cooling the city. Now, this place is a lovely facade garden, alongside the dean's office. Therefore, we named the garden The Dean's Garden. Within this garden you'll find beautiful flowers like the Bronze fennel, which you can use in the kitchen and the Hieracium auranthicum: a great plant to attract pollinators.



THE TRICKLING TRAIL

The Trickling Trail is designed by the ON SITE team 2018/2019. Part of this project were the floating gardens, which can be found in the artificial water basin in front of the faculty of Industrial Design Engineering. The floating gardens are covered with plants which purify the water and thus improve the living conditions of the flora and fauna. The gardens are made of PVC tubes, filled with empty plastic bottles. The photograph below is made two years after the implementation of the project. As you can see, the geese and coots are already using the gardens to breed on.



THE RED LISTED

The Red Listed is designed by the ON SITE 2018/2019. You can find The Red Listed at the back of the faculty of Applied Sciences, in its moist and shady climate. The project is named The Red Listed because endangered gardens grow here.



THE ECO CATHEDRAL

Mien Ruys park is a green oasis on the south-east part TU Delft campus. The ON SITE team 2019/2020 built an eco-structure, entitled eco cathedral within the park. The team used removed pavement to stack the 'eco-structure' that can be used as a sitting element for people. This structure will also be overgrown in time while hosting a variety of plants and insects. Parallel with the eco cathedral, an amphitheater construction and a willow gate were built.



THE PEAT GARDEN

The Peat Garden is designed by the ON SITE Team 2020/2021 and centers around a pond where inlets have been created by braiding willow twigs. These inlets are filled up with soil and covered with Sphagnum peat. This peat will grow over the course of a few years and if the area is suitable, the hope is that it will spill over to the surroundings. There are different types of peat. For this project the team chose Sphagnum, as this type makes the most demands on its environment. If this Sphagnum experiment succeeds, other peat species will most likely be able to grow on other locations on campus. Peat has the ability to store large amounts of carbon contributing to the TU Delft's goal to be CO₂ neutral by 2030.



BIOTOPES IN DELFT



Habitats	Soil conditions
Open wet meadows	Clay
Young forest	Peat
Swamps	Polder soil
Agriculture	Sand
Urban	
Park	
Lakes	
Retention area for bosom water	

The TU Delft campus is located in a very specific place, right in between different soil conditions and habitats. This results in different species of plants, birds and other animals living on campus. The habitats and soil conditions are shown in the map above. Within the following chapters, different species captured on TU Delft campus are shown.

LEGEND

This catalogus uses symbols and colours for easy readability. We added 5 types of organisms; pollinators, butterflies, amphibians, birds, plants and trees. Each organism has its own colour. Multiple of the characteristics below are described for every species.



Food



Nesting



Safety



Habitat



Active flying time



Soil structure



Blooming period



Pollination



Lightning



Watering

COLOUR CODING OF BOOKLET



Birds



Amphibians



Pollinators



Butterflies



Plants and Trees

BIRDS

For the writing of the following pages, the student team gained a lot of knowledge from Vogelbescherming Nederland. All information is based on their website: <https://www.vogelbescherming.nl>

We would also like to thank Pieter Aaldring for his enlightning lecture on birdlife.

<i>Anas platyrhynchos</i>	I Mallard
<i>Branta canadensis</i>	I Greater Canada Goose
<i>Alopochen aegyptiaca</i>	I Egyptian Goose
<i>Gallinula chloropus</i>	I Moorhen
<i>Fulica atra</i>	I Eurasian Coot
<i>Phalacrocorax carbo</i>	I (Great) Cormorant
<i>Aythya fuligula</i>	I Tufted Duck
<i>Pica pica</i>	I Eurasian Magpie
<i>Haematopus ostralegus</i>	I Eurasian Oystercatcher
<i>Sturnus vulgaris</i>	I Common Starling
<i>Passer domesticus</i>	I House Sparrow
<i>Fringilla coelebs</i>	I Common Chaffinch
<i>Phoenicurus ochruros</i>	I Black Redstart
<i>Podiceps cristatus</i>	I Great Crested Grebe
<i>Picus viridis</i>	I European Green Woodpecker
<i>Certhia brachydactyla</i>	I Short-Toed Treecreeper
<i>Cyanistes caeruleus</i>	I Eurasian Blue Tit
<i>Erithacus rubecula</i>	I European Robin
<i>Prunella modularis</i>	I Dunnock
<i>Accipiter nisus</i>	I Eurasian Sparrowhawk

Anas platyrhynchos

Mallard, Wilde Eend

Rare on campus ●●●○○ Common on campus



In the summer months mainly herbaceous food like duckweed on the canals and towards the winter more grass, moss, small fish, snails and worms.



The females are camouflaged in brown tones to hide in soil, reed or bark.



Breeds from February to August, clutches with 7-11 eggs.



The Mallard is not a picky bird and inhabits any food rich body of water, but prefers 50/50 plants and water ratio.

The Vogelbescherming is aiming to ban hunting ducks to minimize further decline of the population. Interestingly enough it is also the only bird that is still allowed to be hunted. The Mallard is one of the most common birds that are hunted as a sport due to the large population size.



Size: 50-65 cm

Wingspan: 75-100 cm

Branta canadensis

Greater Canada Goose, Grote Canadese Gans

Rare on campus ●●●●● Common on campus



Mainly vegetarian. Most food is sought on grasslands and fields, where the geese look for crop residues.



As this species causes significant damage throughout the country, land users may control the Canada goose under strict conditions.



Breeds from mid-March/early April to May, clutches with 4-7 eggs.



Can be found in many different habitats; water is the only specific habitat requirement. In the Netherlands, the species is mainly found in fens, peat swamps and wetland grassland areas.

The expansion of the number of geese in the Netherlands is causing a social discussion. Farmers are not happy with the geese, as the geese damage their landscape. Although this damage can be compensated, unfortunately a lot of geese are being disturbed and killed. To winter, geese require rest and energy. Disruptions cost the birds a lot of energy.



Size: 55-110 cm

Wingspan: 122-183 cm

Alopochen aegyptiaca Egyptian Goose, Nijlgans

Rare on campus ●●●●● Common on campus



Eat grass and herbs on grasslands. They also eat crop residues from grasslands and fields, especially maize. They also eat aquatic plants, such as pond herbs.



As these geese are invasive exotics, their population can be actively controlled by humans.



Usually breeds from late March to late May. One or two broods per year, clutches with 6-9 eggs.



Can be found anywhere near water, in meadows, near lakes and lakes in parks of villages and towns, etc. They rest and moult in open water.

The Egyptian goose is an African species that has become a common sight in the Netherlands since the late 1960s. Escaped birds from captivity managed to survive. The numbers have increased enormously in the Netherlands, the success of this species is partly due to the long breeding season and several broods per year. The goose fiercely defends its territory.



Size: 63-73 cm

Wingspan: 134-154 cm

Gallinula chloropus Moorhen, Waterhoen

Rare on campus ●●○○○ Common on campus



Eats aquatic plants, grasses, insects, spiders, tadpoles, sometimes also eggs from other birds.



The shy Moorhen often hides, and therefore mainly lives in dense riparian vegetation.



Breeds from March-August. Has one to three clutches per year, clutches with 5-9 eggs.



The Moorhen is a common breeding bird of lakes, pools, rivers, ponds and ditches with dense riparian vegetation. They prefer nutrient-rich waters. Moorhens seek each other out in the winter months near large ponds and ditches.

Their typical paws are made for walking in swamps and floating vegetation without sinking. During swimming or walking their small tail points upwards.



Size: 27-31 cm

Wingspan: 50-55 cm

Fulica atra

Eurasian Coot, Meerkoet

Rare on campus ●●●●○ Common on campus



Coots mainly eat aquatic plants, but especially when there are young, all kinds of aquatic animals, such as snails and fish, are also fed and eaten. They also eat grass.



The Eurasian Coot often established its nest near other which leads to vicious fights for the best spots.



Breeds from March to July, clutches with 6-10 eggs



Can be found everywhere where there is fresh water. Areas with extensive bank vegetation are especially popular, although the species can also survive in waterways with a sheeting and hardly any water plants.

Coots often dive for food. Due to the large amount of air in their plumage, they have to struggle to get under water; they make a jump when diving and push off with their legs. Shortly afterwards they come up again like a big float. They use reed, roots and even trash, but they can also make a floating nest that is not sheltered at all.



Size: 36-42 cm

Wingspan: 70-80 cm

Phalacrocorax carbo

(Great) Cormorant, Aalscholver

Rare on campus ● ○ ○ ○ ○ Common on campus



The Cormorant eats locally available fish. In Dutch inland waters, they are mainly predators of species such as Ruffe, Perch, Roach and Smelt.



Breeds in colonies near great waters and often in trees, they also nests on islands and reed away from predation. This species are not bound to the colonies outside the breeding season.



Breeds from December, one or two clutches per year of 3-5 eggs.



The Cormorant lives near salt and fresh water

Cormorants can often be found standing with its wings held out to dry. This is because Cormorants do not have a water-repellent fat layer on their feathers like other water birds. This makes the feathers wet and the birds heavier when they dive, making it easier for them to hunt and maneuver underwater. When they are done fishing they let their plumage dry by spreading and flapping their wings.

Photography by Mark Kras

Height: 80-100 cm
Wingspan: 130-160 cm



Aythya fuligula Tufted Duck, Kuifeend

Rare on campus ●●○○○ Common on campus



The tufted duck is common on large freshwater lakes, reservoirs, ponds and calm, slow-flowing rivers.



They breed on islands with enough shelter.



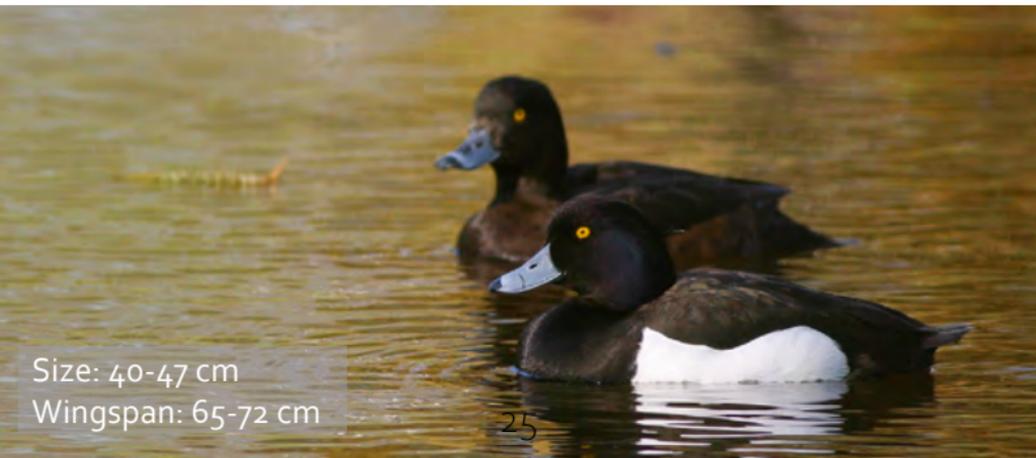
Breeds from May, clutches with 8-11 green/grey eggs.



These omnivores mainly eat shellfish such as freshwater mussels, crustaceans and other aquatic animals that live among the aquatic plants. Aquatic plants, seeds and grains are also eaten. They dive to get food.

The loss of suitable habitat and reduced breeding success due to disturbance and urban development are threatening this species. The tufted duck is sensitive to disturbance even though they live close to humans. If you spot one, try to avoid disturbance as much as possible and admire them from a distance.

Photography by Mark Kras



Size: 40-47 cm
Wingspan: 65-72 cm

Pica pica

Eurasian Magpie, Ekster

Rare on campus ●●●●○ Common on campus



Mainly eat beetles and other insects. Sometimes small mammals (mice), eggs of smaller bird species, young birds, lizards, berries and seeds.



Nests are built in branches of tall trees. The nests are covered from above against predators and have a hidden entrance.



Breeds from March until June, clutches with 5-7 eggs.



Open areas, preferably with scattered trees. They avoid treeless areas and dense forests.

Magpies can almost always be found close to people in gardens, city parks and agricultural areas. In the early morning, mates search for traffic victims along roads. Magpies benefit from extra food supply generated by people (waste) here. Magpies mostly live monogamous. When a Magpie female 'cheats', this results in aggressive confrontations when the current partner notices.



Height: 46-52 cm
Wingspan: 52-60 cm

Haematopus ostralegus

Eurasian Oystercatcher, Scholekster

Rare on campus ●●●●○ Common on campus



In coastal areas they mostly feed on bivalves, crabs, and worms. Inland they forage on herb-rich grasslands and open (wet) meadows with short vegetation where they feed on worms and insects.



Long grasses and flat roofs provide shelter from predators. Shade and water are needed on roofs prevent the youngsters from trying to leave the roof.



Breeds from halfway April till the end of June. Clutches 3-4 eggs on a pit in the ground.



Lives in rocky coastal areas, (wet)polders and agricultural grassland. Stays in wadden- or delta areas during winter, or leaves to south-west Europe or Africa.

There are 11 recognized species of Oystercatcher in the world still living today. The Eurasian Oystercatcher is the lightest species with an average weight of 526 grams.

Photography by Mark Kras



Size: 39-44 cm
Wingspan: 72-83 cm

Sturnus vulgaris

Common Starling, Spreeuw

Rare on campus ●●○○○ Common on campus



Soil invertebrates like earthworms and leatherjackets and in summer, autumn and winter also many berries and fruits.



Starlings nest in the hollows of trees, in nest boxes and in holes and cracks in buildings.



They breed from mid-April until June and has one, sometimes two, clutches with usually 4-6 eggs.



Short grassland with a rich soil life, as close to the nest as possible is important, provide berry-bearing shrubs.

In winter, they have black plumage with a purplish-green glow and conspicuous white speckles. In breeding plumage, starlings are black with a glow of purple, blue and green. They live in groups, sometimes very large groups after the breeding season and they are quite noisy.

Photography by Mark Kras



Size: 19-22 cm

Passer domesticus

House Sparrow, Huismus

Rare on campus



Common on campus



Grain, seeds, insects, flower buds, bread, berries and peanuts.



The bird likes a chaotic human environment and is generally liked by humans, so they won't hide from us all the time. But they also like bushes, barns, grasslands and so on.



Breeds between April and the end of June. It lays eggs two times a year, clutches with 5-6 eggs.



Wilded bushes, barns, open grasslands with stock, spilled grain and old factories.

The house sparrow is a friendly and relative tame bird that has a long history with humans. They are already mentioned in the bible, chinese poetry and old British literature. The house sparrow likes to live around the same spots and is a likable bird that hops around looking for food and leftovers on tables.

Photography by Mark Kras

Size: 14-16 cm



Fringilla coelebs

Common Chaffinch, Vink

Rare on campus ●●○○○ Common on campus



In the summer, the Common chaffinch mainly eats insects, and in the winter almost only seeds.



Chaffinches will choose a fork in a tree or a shrubby area to make their nests. They will use moss, grass and feathers as nesting material which is bound with spiders' webs.



Breeds between mid-March and mid-July. The number of eggs varies from 3 to 5. Incubation time is 10-14 days.



The Common Chaffinch will reside in areas of woodland, fields, hedgerows and parklands.

The number of Finches increased sharply in the early 20th century due to large-scale forest planting. The development of forests in the Flevo-polder has also resulted in a sharp increase in the number of finches in the Netherlands. The Common chaffinch is a very common breeding bird in the Netherlands.

Photography by Mark Kras

Size: 14-16 cm
wingspan 25-28 cm



Phoenicurus ochruros

Black Redstart, Zwarte Roodstaart

Rare on campus ●●○○○ Common on campus



Insects, caterpillars and in autumn also seeds, berries and other fruit.



In industrial estates and large-scale new construction in particular, they find cavities in walls and numerous other places to breed.



Breeds beginning in mid-April and usually has two clutches a year which consists of 4 to 7 eggs.



Open grassland, low vegetation, fallow earth patches in urban areas.

The Black Redstart lives in urban areas that replicate the mountain ranges. They feed themselves with insects and caterpillars. From August to October they migrate to South-west Europe and North Africa. They fly during the night and come back around March.

Photography by Mark Kras



Size: 13-14,5 cm

Podiceps cristatus

Great Crested Grebe, Fuut

Rare on campus ●●●○○ Common on campus



The Great Crested grebe feeds mainly on fish by diving under water, but also small crustaceans, insects small frogs and newts.



The Great Crested Grebe will build its nest on the edge of the water with sticks and twigs. Nests are made by both sexes.



The clutch averages four chalky white eggs, incubation is by both parents and begins as soon as the first egg is laid.



The Great Crested Grebe will mostly be found in the water of small pools and lakes

After the built of the Deltawerken big numbers of great crested grebes have settled at the grevelingen lake in Zeeland, The Netherlands.

Photography by Mark Kras



Size: 46–51 cm

Wingspan: 59–73 cm

Picus viridis

European Green Woodpecker, Groene Specht

Rare on campus ●●○○○ Common on campus



Mainly ants, other insects and small reptiles.



The green woodpecker will place its nest inside treeholes.



Between April and half May there is a single brood of four to six white eggs. After the last egg is laid, they are incubated for 19–20 days by both parents taking shifts of between 1,5 and 2,5 hours



Landscape with a combination of old deciduous trees for nesting, and nearby feeding grounds with plenty of ants.

The population of green woodpeckers is increasing almost everywhere in Europe. The Green Woodpecker uses his big tongue to eat the ants. Therefore, it spends much of its time foraging on the ground. They mostly use old nest of other woodpeckers, when he builds his own nest he does this mostly in rotten woods

Photography by Mark Kras



Size: 30–36 cm

Wingspan: 45–51 cm

Certhia brachydactyla

Short-Toed Treecreeper, Boomkruiper

Rare on campus ● ○ ○ ○ ○ Common on campus



Typically seeks invertebrate food on tree trunks, starting near the tree base and spiralling its way up using its stiff tail feathers for support.



The Short-Toed Treecreeper nests in tree crevices or behind bark flakes. Old woodpecker nests, crevices in buildings or walls are also possibilities.



The eggs are laid between April and mid June, a typical clutch contains 5-7 eggs.



The Short-Toed Treecreeper spends lots of time on the tree trunk. It prefers well-grown trees.

In contradiction to the wood nuthatch the Short Toed Treecreeper only climbs the tree up and never down.

Photography by Mark Kras



Size: 12 - 13,5 cm

Cyanistes caeruleus

Eurasian Blue Tit, Pimpelmees

Rare on campus ●●●○○ Common on campus



In the breeding season, it feeds mainly on insects and their larvae, spiders and other arthropods. In winter, also seeds and peanuts.



No special requirements on their habitat and can therefore often be found in gardens and parks.



Breeds from March until July. It has one or two clutches with 7-13 eggs each.



In woody areas with many old deciduous trees where it breeds in tree cavities. Also common in cities, where it nests in nesting boxes. Can often be found in parks and gardens. In winter, they can also be found in reed beds.

The national numbers are gradually increasing. The ageing of forests (more nesting opportunities) plays a role, as does urbanisation (with greenery in its wake) in previously open areas in the western and northern Netherlands.

Photography by Mark Kras



Size: 10,5 - 12 cm

Erithacus rubecula

European Robin, Roodborst

Rare on campus ● ○ ○ ○ ○ Common on campus



Eats terrestrial insects like slugs or spiders in summer, in winter they mostly eat fruit, seeds and worms.



Lives solitary and both males and females are aggressively territorial to each other and even sometimes their own reflection.



Breeds between April and July. They will lay eggs twice and the number of eggs varies from 5 to 7 each time. Incubation time is 12-15 days.



Resides in areas with trees like old woodland, parks, landscape gardens and in the winter in the city gardens as well.

In the winter the European Robin flies south to warmer areas like Spain and Portugal. Some stay in the Netherlands and will get company from Robins flying from Scandinavia, Germany and Poland.

Photography by Mark Kras



Size: 12,5-14 cm

Wingspan: 20-22 cm

Prunella modularis

Dunnock, Heggenmus

Rare on campus ●●○○○ Common on campus



Insects, spiders and other small animals from the ground, which they scavenge from the ground. In winter, they supplement this with small seeds.



Frequently hides in and under bushes and hedges.



Breeds from April until August. They lay multiple times a year and the number of eggs varies from 3-6 eggs.



Bound to places with shrubs and hedges. Hedge sparrows are most numerous in cities and villages, where they are found in many gardens.

The Dunnock benefits from urbanisation, especially from the number of gardens this phenomenon has created. A century ago, the Dunnock was a scarce species, mainly living in forests and (second-growth) woodlands. However, the trend of petrifying gardens has not done the Dunnock any good.

Photography by Mark Kras

Size: 13 - 14,5 cm



Accipiter nisus

Eurasian Sparrowhawk, Sperwer

Rare on campus ● ○ ○ ○ ○ Common on campus



Hunts for small songbirds like sparrows, finches and tits.



Nests are made in trees each year and often in the same tree that has old nests.



Breeds between late-April to late-June. The number of eggs varies from 3 to 4 each time. Incubation time is 32-34 days.



The Eurasian Sparrowhawk lives in half open forested areas where it hunts from trees. Can sometimes be found in the city or gardens. Females can also be found in open fields.

Photography by Mark Kras

The females are actually larger than the males and can also hunt for bigger prey like pigeons or redshanks in open wetland areas.



Size: 28-40 cm
Wingspan: 56-78 cm

AMPHIBIANS

All information included in the following page is based on <https://www.ivn.nl/afdeling/voorne-putten-rozenburg/bruine-kikker> and <https://www.ravon.nl/Soorten/Soortinformatie/bruine-kikker>

Rana temporaria

I Common Frog

Rana temporaria

Common Frog, Bruine Kikker

Rare on campus ●●●●● Common on campus



The frog eats any invertebrate of a small size. Preferred foods are insects (especially flies), snails, slugs and worms.



The common frog is often brown in the Netherlands but can vary in color from Abrown, grey, and yellowish. It can lighten and darken its skin to match its surroundings.



Spawning commences sometime between March and late June, but generally in April.



The frog inhabits a water pond with a variety in flora suitable for insects and slugs and snails

The brown frog is probably the most widely distributed amphibian in the Netherlands. Frogs absorb water through their skin so they don't need to drink.



Body length: 6-9 cm

POLLINATORS

For the writing of the following pages, the student team gained a lot of knowledge from <https://www.wildebijen.nl> en <https://www.imkersnederland.nl>. All information is based on their website.

There are a little under 400 wild bee species in the Netherlands. Almost half of them are listed on the red list of threatened species. This is caused by habitat loss, food inavailability and unfair competition by for example honeybees.

<i>Bombus pascuorum</i>	I Akkerhommel
<i>Bombus terrestris</i>	I Aardhommel
<i>Apis mellifera</i>	I Western Honey Bee

Within this chapter, we also included a hoverfly, as it's frequently mistaken for a bee species.

<i>Eristalis tenax</i>	I Common Drone Fly
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Bombus pascuorum

Common Carder Bee, Akkerhommel

Rare on campus ●●●●● Common on campus



It nests on the ground between moss and/or grass clumps.



The field bumblebee can extract nectar from deep calyces, the tongue length is 8.6 mm on average.



In and above ground, nests up to 200 bees.



Half April until the beginning of October.

It's the most common bumblebee in the Netherlands, recognizable by the reddish brown hairs on the thorax and tip of the abdomen.

This bumblebee is more darker in the west of the Netherlands than those in the east of the country.

Length 9-15 mm



Bombus terrestris

Aardhommel

Rare on campus ●●●●● Common on campus



Almost in all flowery habitats within and outside urban areas, but often lacking in the intensive agricultural landscape.



Almost all nectar and pollen.



Nests in the ground and in cavity walls.



The end of February until October.

One of the most common bumblebees. Looks very much like the *Bombus lucorum* (the White-tailed bumblebee). The ochre yellow color is the characteristic difference with this lighter yellow colored bumblebee.

Length: 13 - 28 mm

Apis mellifera

Western Honey Bee, Honingbij

Rare on campus ●●●○○ Common on campus



Originally probably in forests, nowadays it is mostly kept in captivity and therefore can be found in all kinds of biotopes.



Almost all nectar and pollen.



From origin in large cavities, trees, rock walls and walls. The queen can lay up to 1500 eggs a day.



February until October

Honey bees are very beneficial insects due to their activities. First of all, by collecting pollen, they ensure the pollination of flowers, plants and crops. They also collect honey for the winter, which we humans eat.

Length: 12-16 mm

Eristalis tenax

Common Drone Fly, Blinde Bij

Rare on campus ●●●●● Common on campus



The species makes few demands on its biotope.



Flies on almost all flower species where the nectar source is not too deep within the flower.



The blind bee lays 100-150 eggs in spring, in pools heavily contaminated by manure.



June until November.

This hoverfly is in Dutch called the 'blind bee' because it looks very much like a honey bee. As its a hoverfly, it of course cannot sting.



Length: 14-16 mm

BUTTERFLIES

For the writing of the following pages, the student team gained a lot of knowledge from De Vlinderstichting. All information is based on their website: <http://vlinderstichting.nl>

Thymelicus lineola

I Essex Skipper

Vanessa atalanta

I Red Admiral

Polyommatus icarus

I Common Blue

Thymelicus lineola

Essex Skipper, Zwartsprietdikkopje

Rare on campus ● ○ ○ ○ ○ Common on campus



Grasslands and brushwoods with perennial grasses and nectar-rich herbs. Often along forest edges, on roadsides and on dikes.



Important nectar plants are *Echium vulgare*, *Cirsium arvense* and *Lotus pedunculatus*.



The flat, white eggs are deposited in small groups in leaf sheaths of broadleaf grasses. The species overwinters as an egg.



June - the end of August

Since a female usually mates only once, males try to get to the females before the competition does. A male that can fly in less favorable weather conditions has a greater chance of finding a female. Therefore, males already fly at lower temperatures than females. Females that have already mated refuse to mate again.

Wing length: 12-14 mm

Vanessa atalanta Red Admiral, Atalanta

Rare on campus ●●●●○ Common on campus



Wandering Atalantas can be seen almost everywhere, often in large numbers in places with many nectar-rich plants.



In addition to nectar plants, the Atalanta is often found in autumn on rotting fruit and bleeding trees.



The female deposits the eggs individually on the top of the leaves.



This migratory butterfly can be observed in the Netherlands between April and November.

Males feed during the day and defend a territory from late afternoon to early evening. Every day they occupy a different area, the borders of which are demarcated by patrol flights. In the autumn some of the butterflies move south again, some try to hibernate here. The majority of both groups die without reproducing.

Wing length: 26-32 mm

Polyommatus icarus

Common Blue, Icarusblauwtje

Rare on campus ●●●○○○ Common on campus



The common blue likes herby grasslands, often less mowed spaces rich in flowers.



Nectar from legume flowers and sometimes other herbs.



The female deposits the eggs individually on top of the leaves



March - September

Male blues are totally blue on the upside, female blues are a little to a lot of brown. On the image below, a female is shown.



Wingspan: 30 mm

PLANTS & TREES

All information on the following pages is based on the websites: <https://www.ecopedia.be>, <https://floravannederland.nl>, <https://www.ebben.nl/nl/>, <https://www.vdberk.nl>

<i>Phragmites australis</i>	I Common Reed
<i>Hieracium aurantiacum</i>	I Fox-And-Cubs
<i>Verbascum olympicum</i>	I Olympic Mullein
<i>Iris pseudacorus</i>	I Yellow Flag
<i>Nuphar lutea</i>	I Yellow Water-Lily
<i>Foeniculum vulgare</i> 'Purpureum'	I Bronze Fennel
<i>Ulmus x hollandica</i> 'Groeneveld'	I Elm
<i>Platanus x hispanica</i>	I Plane
<i>Prunus avium</i> 'Plena'	I Cherry Tree
<i>Populus canadensis</i>	I Poplar
<i>Alnus glutinosa</i>	I Common Alder
<i>Salix alba</i>	I Silver Poplar
<i>Fraxinus ornus</i>	I Ash
<i>Carpinus betulus</i>	I Common Hornbeam
<i>Acer platanoides</i>	I Norway Maple
<i>Tilia x europaea</i>	I Common Lime

Phragmites australis

Common Reed, Riet

Rare on campus



Common on campus



Wet until about 0,5m depth of water, soil indifferent, nutrient-rich and non-acidic areas



July-October



Wind pollination



Min: half shade. Max: fully sunny.



Wet to aquatic conditions.

The indentation in the leaf is also called a devil's bite to show his jealousy of god's creativity.

The reed is cut above the water level, because this prevents the hollow cavities from filling with water and dying off.



Height: 1-3 m

Leaves 1-4 cm broad and up to 50 cm long

Hieracium aurantiacum

Fox-And-Cubs, Oranje Havikskruid

Rare on campus ●●○○○ Common on campus



well-draining soil in chalk, loam or sand soil, ph acid to neutral



June-September



Propagation by seeding, can self seed



Full sun to partial shade.



Well drained to dry soil

Provides nectar and pollen for bees. The name Fox-and-Cubs refers to the way that the unopened flower buds hide beneath those that have opened



Height: 40 cm

Verbascum olympicum

Olympic Mullein, Toorts

Rare on campus ● ○ ○ ○ ○ Common on campus



Best grown in an alkaline (chalky) well-drained light soil



July-August



Propagation by seeding, can self seed



Prefers sun



Well drained soil

Verbascums are labelled 'Perfect for Pollinators'. Can resist drought, is a tough plant

Height: 2-4 m

Iris pseudacorus

Yellow Flag, Gele Lis

Rare on campus ●●●○○ Common on campus



Wet until about 0,2m depth of water, soil indifferent, nutrient-rich and ph-indifferent areas



May-July



Pollination by bees, bumblebees etc. or by rhizomes



Min: half shade. Max: fully sunny



Wet to aquatic conditions

Bumblebees crawl into the large flower to get the nectar. In this process the pollen sticks to their back and will pollinate other flowers.



Height: 40 - 120 cm

Leaf length: 70 cm

Nuphar lutea

Yellow Water-Lily, Gele Plomp

Rare on campus



Common on campus



Wet from 0,25m until about 3m depth of water, soil indifferent, nutrient-rich and ph-indifferent areas



May-August



Pollination by flies, hoverflies etc. or by natural cuttings



Min: light shade. Max: fully sunny



Aquatic conditions

This plant has special tunnels to transport air through the plant but also into the water which enriches it for wildlife.



Flower height: 10-15 cm

Leaf length: 10-30 cm

Foeniculum vulgare 'Purpureum'

Bronze Fennel, Rode venkel

Rare on campus ● ○ ○ ○ ○ Common on campus



Neutral soil.



June - August



Propagation by seeding.



The plant prefers a fully sunny and warm location.



Dry conditions.

This plant species is frequently used in the kitchen. Both the leaves and seeds can be used.

You can tear off the top of the leaves and enjoy the wonderful smell of this plant. The plant can be found in the Dean's Garden.

Flower height: 1-1,5 m

Ulmus x hollandica 'Groeneveld'

Elm, lep

Rare on campus ● ● ● ● ● Common on campus



Ulmus grows on both dry and moist soils, it can grow on loess, sablon, light clay and loamy soil. It is able to cope with strong winds.



March



Propagation by seeding and grafting.



The tree prefers a sunny or slightly shaded location.



Both wet and temporary dry conditions.

'Groeneveld' translates as 'green field', and was named for the eponymous de Dorschkamp trial site at Wageningen. The cultivar was derived from a crossing of Dutch clones. Also in shaded areas the crown will turn towards the light which can lead to crooked growth. It can cope with temperatures down to minus 25 degrees.



Height: 12 - 15 m

Leaf length: 9 cm

Platanus x hispanica

Plane, Plataan

Rare on campus



Common on campus



The tree can grow on loess, sablon, sand, zlight clay and loamy soil. but prefers not too acidic soils, the soil must also be sufficiently airy.



May



The flowers are fertilised by the air.

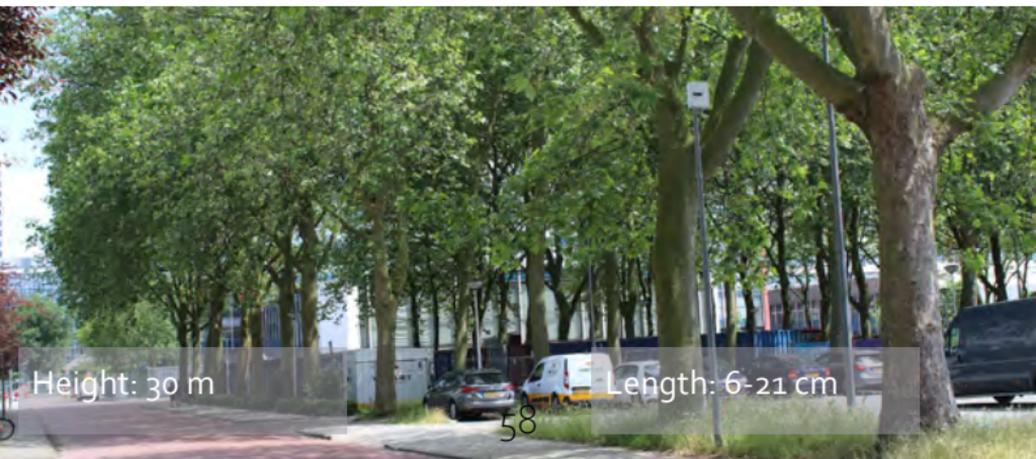


Requires a spot in the full sun.



A sufficiently humid site, but a groundwater level that is too high is not advisable.

The tree is often planted for shade and for its ornamental value in city streets and squares. The tree can tolerate air pollution in the city well, as well as the limited space available for the roots. The tree can also take a lot of pruning.



Height: 30 m

Length: 6-21 cm

Prunus avium 'Plena'

Cherry Tree, Kersenboom

Rare on campus ●●●●● Common on campus



Grows on more or less nutrient-rich soil and it does not tolerate compact clay soils or acid, dry, poor sandy soils.



April - May



Propagation by seeding and grafting.

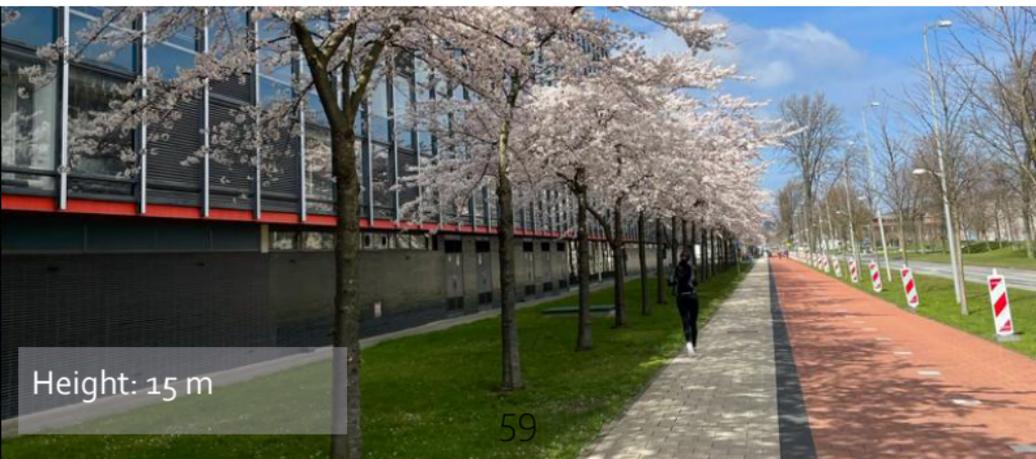


Requires a spot in the sun or light shade and tolerates summer heat reasonably well.



The tree naturally grows on moist and nutrient-rich soils

'Plena' is sterile and therefore bears no fruit. It is mainly used as a park and avenue tree. In order to grow well, the tree requires a moist, fertile sandy soil. It originated in France around 1700



Height: 15 m

Populus canadensis

Poplar, Populier

Rare on campus ●●●●● Common on campus



Poplars are suitable for planting in open landscapes and on young soils, along rivers and canals, in forests and on industrial estates and are wind and sometimes sea wind resistant.



March - April



Pollination of the unisexual flowers is done by the wind.



They require a sunny spot.



Poplars naturally grow on moist and nutrient-rich soils, but there are also species that prefer drier soils and tolerate poorer soils.

The Canada poplar is a cross between *Populus nigra*, the black poplar, and *Populus deltoides*, the American poplar. This originated in France around 1750

Height: 33-41 m

Leaf length: 5-13 cm

Alnus glutinosa

Common Alder, Zwarte Els

Rare on campus ●●●○○ Common on campus



Wet, soil indifferent, nutrient-rich and non-acidic areas



January-April



Wind pollination



Min: half shade, Max: fully sunny
The seedlings need a bright and open spot in order to germinate and establish a carr (broekbos).



Their roots require little oxygen so it can tolerate wet conditions with stagnating water levels during flooding, but are also susceptible to drought.

The fruit is a nut that is partially filled with air, so it will float on the water and reach another nutrient-rich waterfront.



Height: 10-20 m

Leaf length: 4-11 cm

Salix alba

Silver Poplar, Schietwilg

Rare on campus ●●●○○○ Common on campus



Grows on all moist soils but prefers wet areas such as alongside river beds and soil that contains lime.



April - May



Seeding and cutting



Half-shaded areas are best



Thrives in wet soil and can be flooded for a few days

Silver poplars and pollard willows are the same species, to obtain a pollard willow the branches are cut at the trunk every year.

Height: 15-25m

Leaf length: 6-12 cm

Fraxinus ornus

Ash, Es

Rare on campus ●●●○○○ Common on campus



Grows on all types of soil, with a preference for rich wet soils



March - April



Seeding and cutting



Prefers sun



Both wet and temporary dry conditions, does not like flooding

Ash dieback: In the Netherlands since 2016, ash dieback is a fungus that attacks ash tree leaves ultimately killing the tree. This is the reason that many ash trees have been and will be replaced over the coming years.

Height: 8-15 m

Length: composed leaf of 25 cm

Carpinus betulus

Common Hornbeam, Haagbeuk

Rare on campus ●●○○○ Common on campus



Grows on all types of soil, with a preference for loam



April - May



Wind Pollination



Half-shaded to shaded area



Dry and humid conditions, avoid areas that are wet for a long period of time.

As the Dutch name suggests: this tree is often used as a hedge because of its high tolerance of fluctuating water tables and clay soil compared to the *Fagus Sylvatica* (Beuk). The common hornbeam is almost completely bare for the winter and shoots up very early.



Height: 15-20 m

Leaf length: 6-10 cm

Acer platanoides

Norway Maple, Noorse Esdoorn

Rare on campus ●●●●○ Common on campus



Moist, soil indifferent, nutrient poor to rich, pH-indifferent and airy soil rich in lime. Tolerant of polluted urban soil.



April-June



Pollination by insects or wind



Shade to partial shade



Light moist to moist conditions

This family of trees delivers the famous maple syrup and is on the national flag of Canada.

Stradivarius used the wood of this tree on the back of his violins.



Height: 20-30 m

Leaf length: 10-20 cm

Tilia x europaea

Common Lime, Hollandse Linde

Rare on campus ●●○○○ Common on campus



It grows in every soiltype and prefers to be kept moist. Nutrient and ph-indifferent



June - July



Propagation by seed



Partial shade



Moist conditons, avoid wet areas

The oldest living tree in the Netherlands is a more than 500 year old common lime in Sambeek.

A lot of statues were made from this wood considering its soft and easy to manipulate.

Height: 30-40 m

Leaf length: 5-12 cm

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