Life is thriving in Kirchberg!

Ecological management of urban areas

LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère de l'Environnement, du Climat
et du Développement durable

Administration de la nature et des forêts

FONDS KIRCHBERG

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1. Ecological development of green spaces in Kirchberg

Today in Europe, the importance of green infrastructure continues to grow, as the environmental challenges posed by urbanization and intensive agriculture, persist. In cities and their surroundings, green spaces are connected and new habitats are created for species, which suffer from the destruction of their natural habitats.

In this context, the Fund for the Urbanization and development of the Kirchberg Plateau (Kirchberg Fund) and the Nature and Forests Administration (NFA) have decided to pursue solutions together, that address urban development and ecological management, in an increasingly coordinated and systematic fashion.

Since 2008, the Fund, in collaboration with the NFA, has discontinued all use of herbicides in the maintenance of green spaces.

Additionally, two pilot projects testing ecological approaches in managing green spaces were set up on the Avenue J.F. Kennedy and on the site of the European School bus stops.

These sites are being monitored to measure the impact of ecologically oriented development and maintenance in terms of biodiversity.

This brochure presents the means and objectives set by the Kirchberg Fund and the ANF to promote biodiversity, as well as the results of the monitoring of the flora.

Biodiversity, what do we mean?

Usually, we mean the diversity of all life forms on Earth, including their interactions at all levels. Individuals from one species (for example the human species *Homo sapiens*), interact among themselves, with other species, and with their environment. This results in “systems” or interactive networks called ecosystems. A forest, a mountain, a meadow, are examples of ecosystems.

Observing the number of species, which is a way of studying biodiversity, scientists have identified around 430 000 plant species worldwide.

Around 1360 plant species have been identified in Luxembourg. From these species, 170 have previously been found on the Avenue J.F. Kennedy flower beds in Kirchberg!

2. Our goals

Nature protection, adaptation to climate change, establishment of ecological added value

→ Through ecological development and maintenance of public surfaces:

- Increasing numbers of green spaces and planted trees;
- Development of permeable and nutrient-poor pedestrian surfaces (paths, parking lots, …);
- Maintenance limited to a small number of targeted interventions.

→ The basis of our reasoning: « ecosystem services ».

Ecosystem services, what do we mean?

The Food and Agriculture Organization of the United Nations informs us that ecosystem services are defined as « the benefits provided by ecosystems to humans ».

Example: pollination

When insects move between flowers, they transport pollen from one flower to the next, ensuring their fertilization in this way. The flowers thus "pollinated" will be able to produce seeds. These insects include bees, butterflies, flies, horseflies, midges, ladybugs, beetles, etc.

70% of plants, which means most of the fruits and vegetables we eat, are indeed fertilized by pollinating insects (pollinators) and cannot reproduce without them. Their contribution to the world food production has been valued at 153 billion euros!

Ecologically designed
and maintained green spaces
= a more harmonious view

Developing urban spaces in harmony with local nature

Between the tram rails, a seed mix from local species of the “wildflower meadow” type was employed. The chosen soil layer in which the plants take root is also nutrient-poor.

These two measures are congruent with the way the neighboring surfaces were developed (road islands and roundabouts), and target a harmonious integration with the area’s original vegetation. During development and planning the use of hard edges (or borders) is avoided whenever possible, to achieve an effect of fluid transitions between the different types of surfaces.

Improving the quality of life

→ Sport, recreation and leisure–oriented landscape designing: biking tracks, playgrounds, shaded pedestrian paths.

→ Multifunctional design conceived to favor quality of life and biodiversity: some of these surfaces permit natural vegetation to grow simultaneously to their use.

Playground harmoniously integrated in an existing wooded area.

Rediscovering the natural way in which plants cycle through changing seasons in green spaces

The ecological management of green spaces favors a natural esthetic. Where mowing is less frequently practiced, a grassland-like appearance develops. This appearance is not to be confused with a lack of maintenance.

The appearance of vegetation reflects nature's cycles with:

— the presence of dry grasses in summer, autumn and winter;

— variable shapes, heights and colors, thanks to the diversity of species.


Ecologically designed
and maintained green spaces:
a real benefit for local wildlife!
→ 170 plant species
versus 1 to 5 on traditional lawns
→ No watering requirements
→ No use of herbicides necessary
→ Minimal maintenance

Many benefits!

Better air quality

due to the « green lung » effect of vegetation, which absorbs CO_2 and produces oxygen.

Flood prevention in case of heavy rains

with more permeable areas, that permit vegetation, water does not accumulate at the surface. Instead it is progressively absorbed by the soil to eventually reach groundwater.

Creation of alternative habitats (ecosystems)

for wild plants and pollinators which are adapted to local conditions and for which natural habitats have become increasingly rare.

Saving water

Wild plant communities, which settle, do not require watering.

Prevention of heat islands in summer

because of the cooling effect of vegetation. Plants sweat through their leaves, give water back to the air, and therefore cool their surroundings.

Improved groundwater and drinking water quality

since herbicides are no longer applied.

Increased biodiversity

with long-term presence of species on site.

Approaching original rural landscapes of the past

Kirchberg is an expression of continuity with past villages and cities in modern ecological terms: e.g. gravel paths, less frequent mowing, and vegetation between paving stones.

3. What ecological planning, development, and management measures have been taken in Kirchberg?

No more herbicides on public surfaces in Kirchberg: 11 years already!

Since 2008, herbicides are no longer applied on sidewalks, public squares, pedestrian areas and flowerbeds in Kirchberg. Wild plants and their associated fauna cannot settle where such substances are used.

Insect numbers are declining globally at an alarming speed. Recent studies reveal that, during the past thirty years, up to 75% of flying insects (bees in particular) have disappeared at several sites in German nature reserves. Intensification of agricultural practices, and especially the use of pesticides, are under scrutiny.

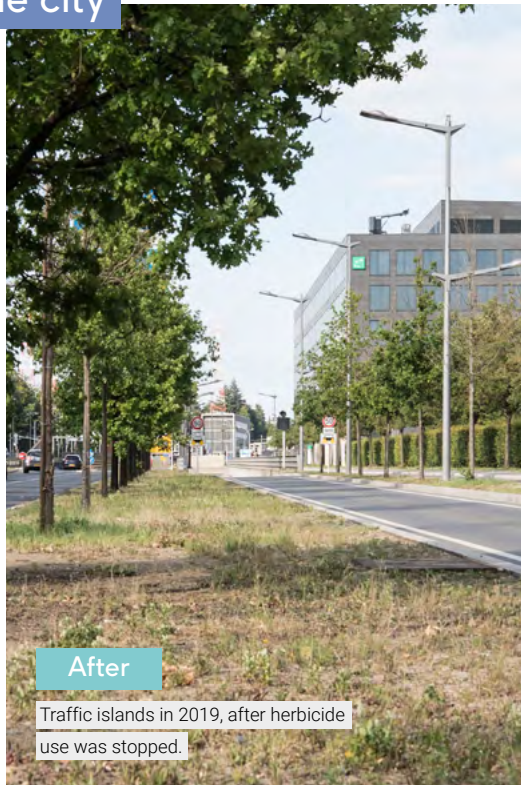
Applying this type of chemical product to destroy “weeds” on a lawn or in a flowerbed is also detrimental for the quality of groundwater. When it rains, pesticides penetrate the soil and contaminate that water.

Further, flora and fauna associated with water streams, as well as drinkable water, are contaminated as well!

No more pesticides = nature returns to the city

Before

Traffic islands along the J.F. Kennedy Avenue when herbicides were still being applied (2006).



After

Traffic islands in 2019, after herbicide use was stopped.

Lean substrate, what do we mean?

In horticulture, a substrate is the layer of soil in which plants root themselves.

A lean substrate is nutrient-poor, as opposed to naturally rich soils or soils which have been enriched using fertilizer.

Design of flowerbeds and pedestrian zones with regional lean substrates

The use of lean substrates is an essential principle of ecologically-oriented design.

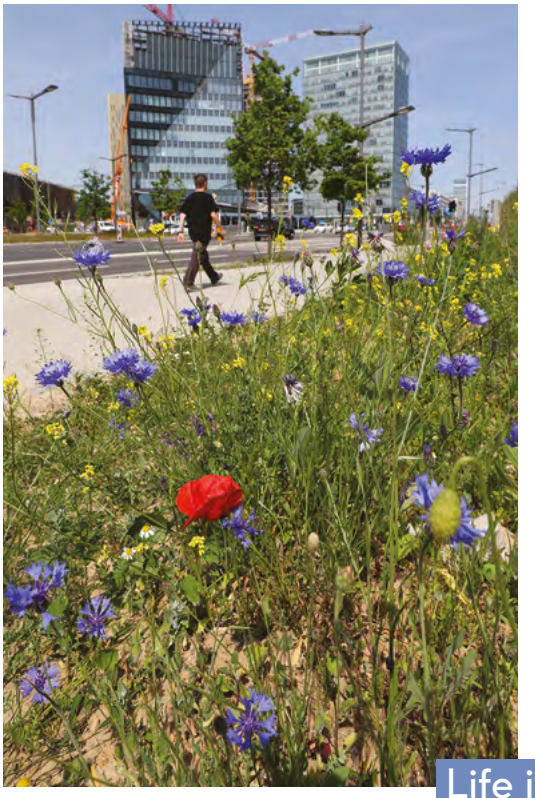
They allow surfaces to be permeable.

→ vegetation can settle and grow.

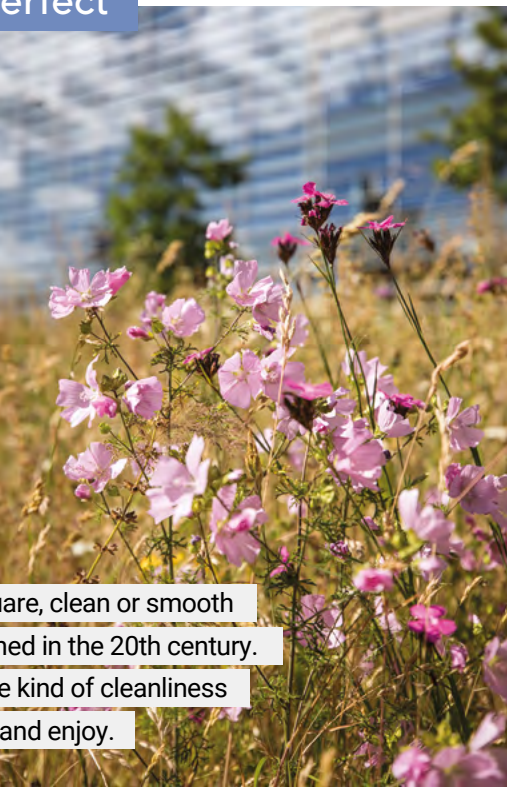
They are naturally poor in nutrients.

→ Furthering the development of a type of vegetation which is characteristic for urban settings; associated with dry and nutrient-poor environments and often rich in flowers.

This particular vegetation requires neither watering nor fertilizer.



Life is thriving.
Everything
isn't always "perfect"



A natural and prosperous environment is never as square, clean or smooth as real estate, buildings, cities, and urban areas designed in the 20th century. What we propose here is a new kind of cleanliness; the kind of cleanliness that future generations will also be able to appreciate and enjoy.

Extensive mowing: respecting plants' natural cycles

The Fonds Kirchberg promotes the practice of extensive mowing in green spaces, which means mowing less often (maximum once to twice a year) to allow plants to complete their natural cycles, from seed germination until fruiting and decomposition.

Since herbicide use was discontinued, plants that are too dominant (such as certain thistles for example) are removed by hand, if necessary.

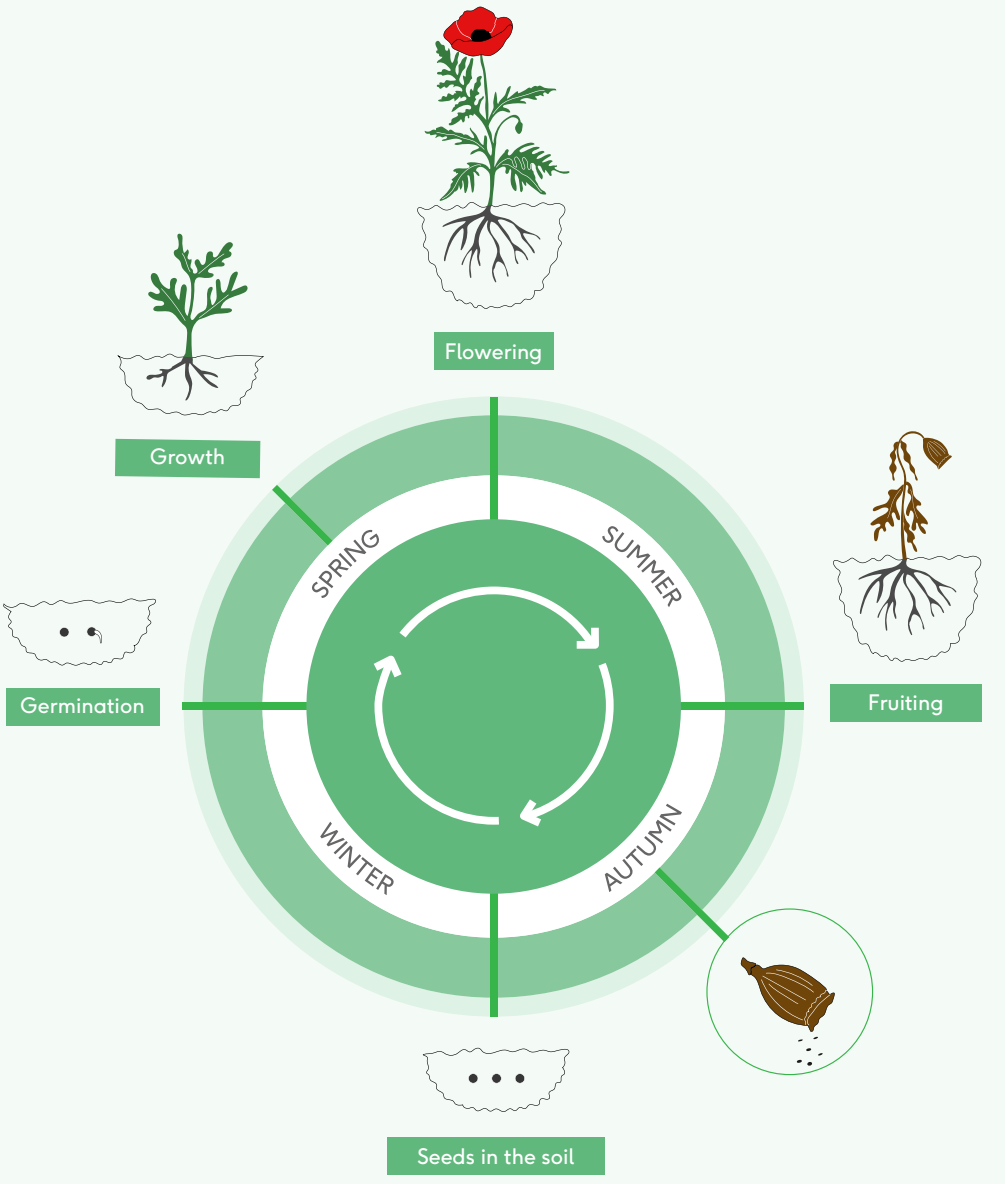
These measures allow the development of vegetation as well as the emergence of micro-habitats for wild plants and animals, while maintaining a structured appearance.

Medicinal plants in Kirchberg!

Did you know?

Plants with medicinal properties also thrive in Kirchberg. A collection of these is listed and described in another publication by the Fonds Kirchberg entitled "Medicinal Flora of Kirchberg".

It is available upon request from the Kirchberg Fund in French, English, and German.



Example of the Common poppy's cycle,
an annual plant.

The best prevention measure is to avoid introducing invasive plant species when planting and developing green spaces (because they are very difficult to remove)

Management of invasive alien species

Often voluntarily introduced, exotic invasive plants threaten indigenous plants. Indigenous plants are unable to compete with invasive plants. The regression of certain indigenous plants also directly impacts the animals which depend on them.

Some invasive plants can also cause serious allergies in humans. .

A list of species, which can be problematic, can be consulted on www.neobiota.lu.

The South African ragwort was introduced in Europe in the 1930s via its seeds, which were attached to sheeps' whool imported from South Africa. This plant, which often colonizes roadsides, blooms all year. It can self-fertilize and produce large quantities of seeds.

Native shrubs were planted on the flowerbeds along the bike path

A local selection of trees and seed mixes

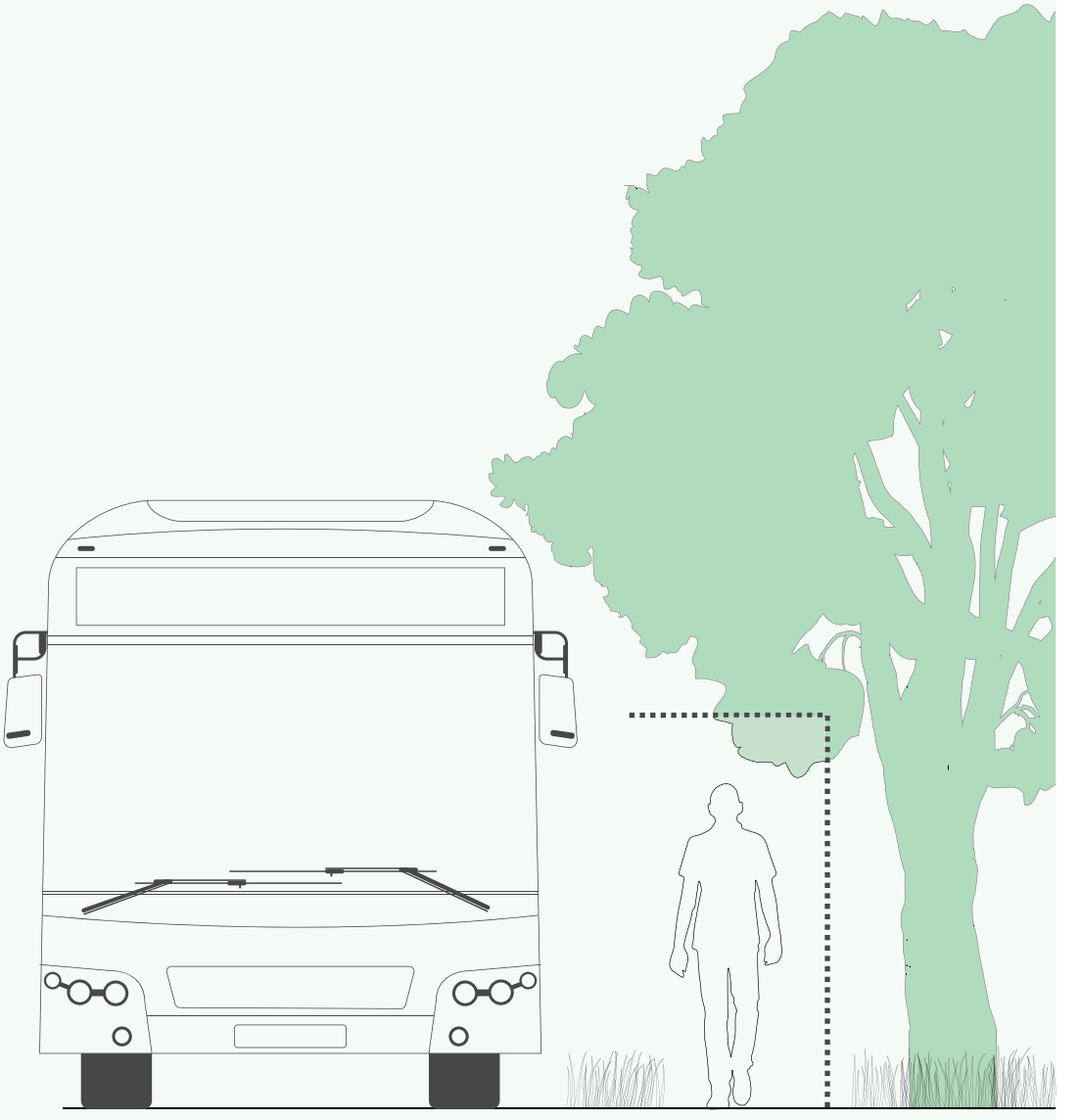
In order for vegetation to spread more rapidly than through natural propagation alone, seeding can be used. The choice of seed mixes from local species that are appropriate (in terms of soil composition, climate / drought, road traffic, trampling) is critically observed and studied for each site. This vegetation, which may seem "weed-filled" or “neglected” to untrained observers, actually corresponds to a mix of wild plants perfectly adapted to this environment.

On the grass strips between the tramway’s rails, a local seed mix was sown. The composition of the vegetation mirrors the vegetation of flower rich and nutrient poor grasslands which used to be found on the Kirchberg Plateau.

Maintenance of trees and hedges: letting them grow!

Respecting the natural shape of crowns results in healthier trees with a more natural look. This kind of maintenance is also less costly.

Branches are cut at human height along the footpaths. Above human height, the crown adapts to passing vehicles without the need for a particular cut.



No cutting needed, the shape of the crown
adapts to passing vehicles.

4. Results from the pilot projects

Project 1: Avenue J.F. Kennedy flowerbeds

Substrates used:
Local and regional lean substrates (Luxembourg Sandstone, Dolomite from Mesenich)

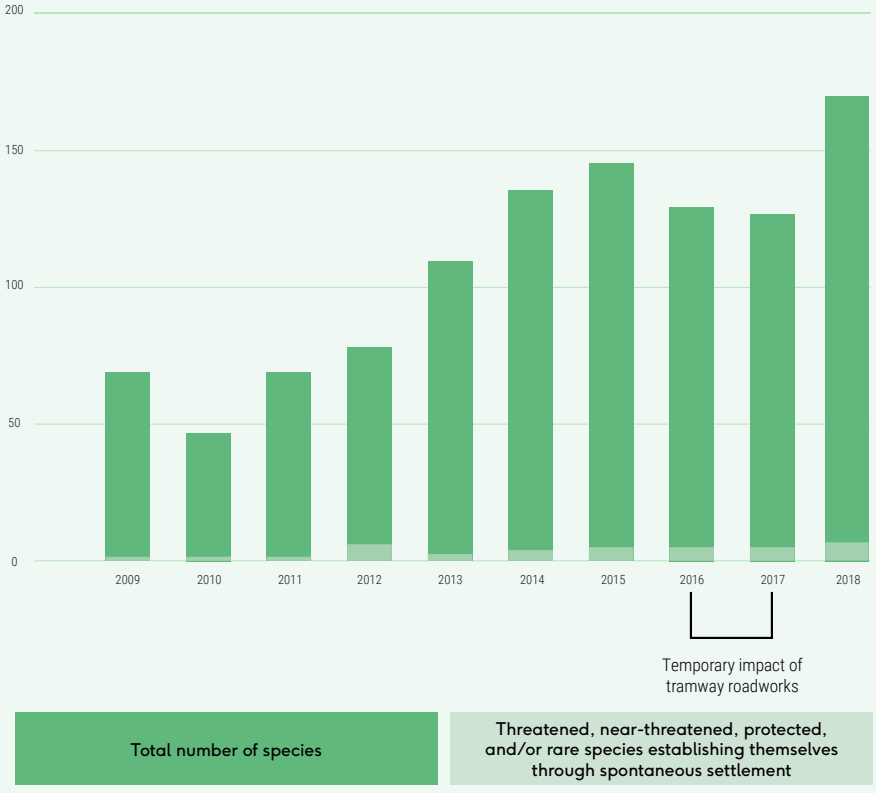
Herbicides no longer applied since: 2008

Function:
Flower beds with pedestrian traffic

Initial seeding to accelerate vegetation development: Yes

Limited mowing:
Yes, only if necessary and maximum 1-2 times per year

Implementation date of the monitoring:
2009



Results

- The number of species has more than doubled: from 69 species in 2009 to 170 in 2018.
- Six threatened, near-threatened, protected or/and rare species have naturally settled and remain on site.
- Distinct plant communities have settled since 2009 and remain on site. These plants have found a habitat which replaces their primary habitats (dry grasslands, meadow, rocky site, ...).
- In pedestrian areas, the density of the vegetation cover varies according to trampling intensity. The plants in these areas are of the same varieties as those commonly found on trampled sites.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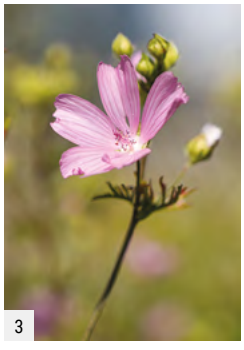
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1. Deptford pink (*Dianthus armeria*), a vulnerable species, was sown here. It adapts very well to the most arid and poor soils.
2. Cornflower (*Centaurea cyanus*) was once common in cultivated fields where no pesticides or fertilizers were used.
3. The Musk mallow (*Malva moschata*) likes dry sites too.
4. The Common poppy (*Papaver rhoeas*), is near threatened.

Project 2: European School bus stops, Konrad Adenauer Boulevard

Substrate used:
Lean substrate, natural cobbles without joints

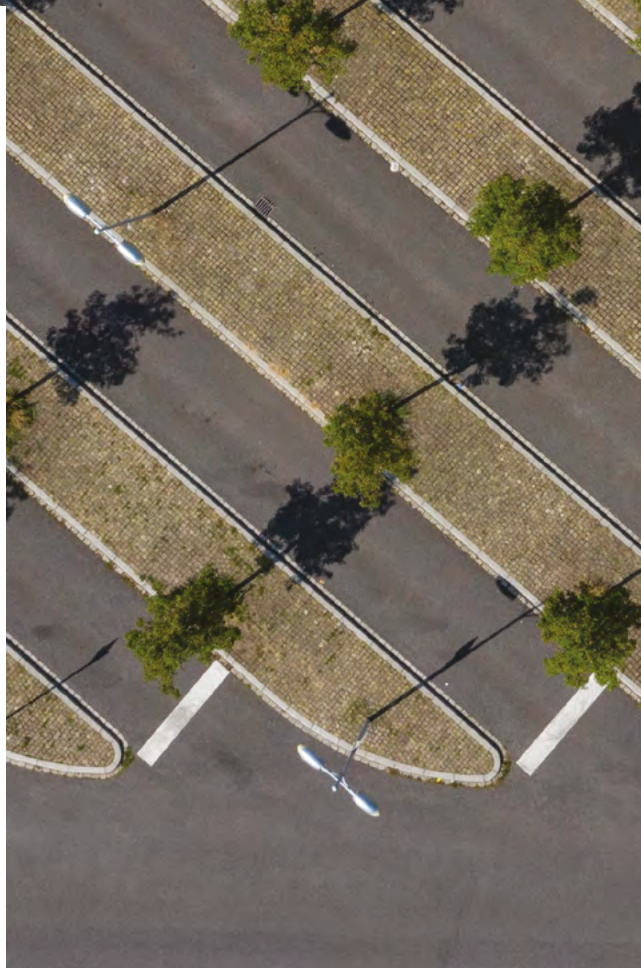
Herbicides application: Never practiced

Function:
Bus stop, pedestrian traffic, waiting area

Initial seeding to accelerate vegetation development: No

Mowing: None

Monitoring:
2011 and 2016 to document the spontaneous installation of vegetation adapted to trampling



Results

- Spontaneous settlement of vegetation adapted to dry, warm, rocky, and trampled sites.
- 3 endangered, near threatened, protected and/or rare species.
- Vegetation has diversified. Species both typical of grasslands and pastures, characteristic of the rural landscape of origin, and species reflecting human activity and disturbance (e.g. tilling soil due to construction), clearly dominate.
- Creation of an alternative habitat in urban areas, for species whose primary habitats have become scarce (rocky sites, dry grasslands).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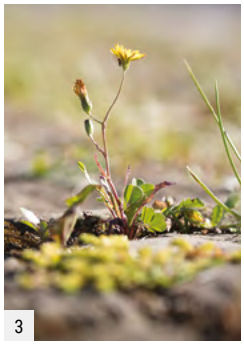
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1. The Lesser hawkbit (*Leontodon saxatilis*), near threatened.
2. The Smooth Rupturewort (*Herniaria glabra*), characteristic of rocky sites and near threatened.
3. The Hop trefoil (*Trifolium campestre*) develops well on very dry sites.
4. The Birdsfoot trefoil (*Lotus corniculatus*) is typical of the meadows which used to be on site.

5. A successful experiment

The experiment conducted in Kirchberg through these two pilot projects, proves that ecological management of green spaces is compatible with common urban use of these spaces (pedestrian traffic, or waiting area subject to regular trampling, in particular). In both projects presented, alternative habitats have been created for threatened species whose natural habitats have become scarce.

This type of planning, development and maintenance can also be implemented on private property. It is possible to take measures that help protect and preserve nature in gardens or green spaces of business premises.

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