



Bee highway A quick reference guide.

2023



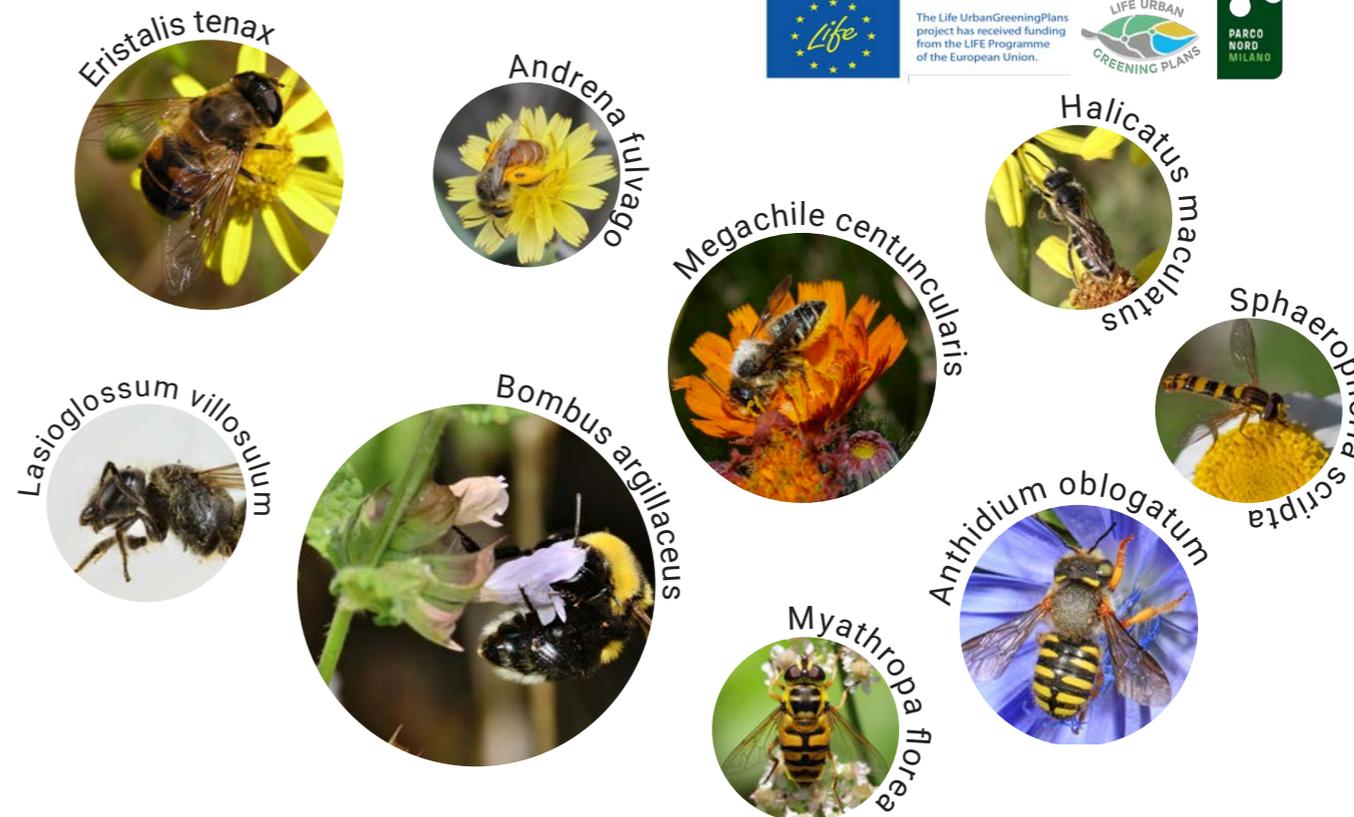
The Life UrbanGreeningPlans project has received funding from the LIFE Programme of the European Union.



Purpose.

This simple guide has been created with the purpose of facilitate the planning, design and management of a bee highway, a green infrastructure consisting of a pollinator friendly project which aim to increase and support pollinators with flower rich habitats and suitable refuges for them.

In particular, this "protocol" is designed to give simple but useful guidelines concerning different topic that range from agronomical issues such as which plant to use or their planting design to the relationship and the communication to use with people.



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Pollinators and bee highway.

Specaking of Europe, pollinators are mostly insects such as bees, hoverflies, butterflies, moths, beetles and other fly species (see photo in thnext page) that by feeding on pollen do pollination, a fundamental process essential to plants and to the existence of natural, rural and urban ecosystems. As for the beehighway this is a linear green infrastructure that consist of green spaces rich in melliferous herbs and

shrubs planned, implemented to be a precius support to pollinators. The need of a beehighway is justified by the fact that pollinators populations are constantly decreasing due to many factors, first of all human pressure on ecosystems (i.e. excessive use of fertilizers, intesive farming) and climate change.

+ Keep in mind!

The bee higway requires the first years few management activites that, however, have to be performed to ensure its engraftment. Also, while perfoming your project, bugs hotels should be put near the highway cause a place to rest or reproduce is essential for pollinators as much as the supply area.

+ Be carefull!

Implementing a bee higway may lead to some problems such as people's bad behaviour towards part of it (i.e. bugs hotel) or unacceptance of the entire project for the understandable but implausible fear of being attacked by the insects.

Planning and design.

In order to realize a bee highway that respond both to users and environment need and it's integrated with the landscape in which is situated, there are different topics that need to be considered careffully and all-together. This chapter aims to help you focus on the key aspcts of the whole procedure, so that your project will have a strong foundation. However, it is important to clarify that the planning and designing, and also the implementing and managing, of a bee highway gives the best results when you are working with a multidisciplinary group project (i.e. ecologist, entomolohist, agronomist, landscape architects).



Now follows a list of key actions to implement so that the main aspects of a good design and planning are considered. This list is a guide through which it can be developed a own way of making things.

- 1 Check all the policies, laws, regulations and standrads** effective in your munincipality that can guide, assist or hamper the project. If you are workng with perennials, the best result are obtained with natural planting scheme. Otherwise, shurbs give good results also with geometrical planting scheme.
- 2 Collect data about the hyphotetical area where you want to implement the bee highway** such as soil characteristics, microclimate, slope and exposure. This information is useful to indentify which will be your first actions.
- 3 Identify the correct plants and planting design.** The first topics is fundamental as it is essential to use vegetation that both help pollinators but also is adapted to local condition. Plnting design requires good plant's knowledge as each should thrive and also should not prevail on the others: as for the scheme to follow, it varies depending on the final result you wish for.
- 4 Identify the better locations for the bee higway.** In order to make the best choices, data on selected vegetation and the existing one, existing bugs hotel, site soil, site micro climate should be considered all together .
- 5 Prepare a time schedule** of all the activities required for making the urban forest. Also **estimate all the cost** you will have to sustain to see if it's econimical sustainable.
- 6 Prepare communication materials** to use for each phase of the projects that operates on public space. More elucidations will be provided the chapter «Communication».

Implementation and management.

Once planning and design activities are done, it's time to implement your project.

Soil preparation

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In general, the first operation to perform is soil work (soft digging or milling, depth of 20/30 cm) to be done between October and December: this practice is fundamental to prevent excessive growth of weeds and to ease the planting of shrubs and herbs.

Sowing and planting

As for the planting, annuals can be sowed manually by autumn or at the beginning of spring. As for shrubs and perennials, typically bought as plants, they should be planted before the end of winter.

Bulbs represent a particular case of perennials (see next photo) as there are machines created just for their planting (which can also prepare soil).

As regards for planting, there are different schemes that can be adopted: if you are looking for a more natural appearance richer

in biodiversity, you should use naturalistic planting schemes. This type of schemes gives great results especially with perennials and shrubs. However, shrubs also are suited for regular planting schemes where the planting system has fixed distances to follow (i.e. quinconx).

As for seeds, the quantity to use for 1 m² should be reported on the packaging: for very low weight (1-3 g), you should mix seeds with sand or earth so as to obtain a more uniform sowing. For more informations about these parameters, you can take a look to Annex 1.

After the sowing, it is fundamental to rake soil and perform a soil rolling, otherwise the seed won't germinate.

Management activities

Once everything is planted, management activities start.

It is important to say that the plants chosen to be in the bee highway normally do not require irrigation. However, during period of drought and



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extreme heat, you should check frequently new plantations and, if it is necessary, you have to irrigate promptly to avoid any death. Secondly, there is shrubs pruning: if they flowers from June-September, you can prune them after flowering (Summer pruning). Otherwise, if you plant flowers from July-October, you can prune them in spring (Spring pruning). It is important to note that these indications are valid for deciduous plants, if you are dealing with evergreen shrubs, the prune should be done in spring. More indications on pruning can be find in Annex 1.

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As for herbs management activities, it is possible to leave dead stems on plants during winter: apart from their beauty when they are covered with hoarfrost, they provide protection for the plants, offer food and habitat and nesting materials for wildlife, prevent weed seeds from germinating and increase the organic matter. Lastly, all herbs should be shredded at least one time at the end of the growing season (autumn/winter).

Bugs hotel.

Bugs hotels are a fundamental aspects of a bee highway as refuges and hibernating areas are essential for pollinators to thrive.

In particular, there are few base guidelines that need to be followed in order to ensure the success of the hotel. Though simple, these aspects must be followed otherwise the structure won't be used by wild pollinator and all the efforts done for it will be for nothing.

First thing first, it is important that the raw material used are all natural so that the structure will be as sustainable as possible and won't harm the pollinators by chance (e.g. with toxic chemical compounds).

While composing the entire structure, it can be useful to use different type of materials (also change shape) in order to create different type of refuges so that a higher number of pollinators can find refuge in them.

Then, the hotel must be placed in a warm area (facing South is better) and also it need to be sheltered against the rain.

It is suitable to place lots and small bugs hotel instead of few and big ones as in the latter case there is a higher risk that pests and maladies can diffuse among the pollinators who are inhabiting it.



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Communication.

In order to guarantee the success of the project, a complete and correct communication has to be carried out. In particular, three are the main aspects to be taken into account:

- People tend to have fear of pollinators, in particular of bees or similar insects as they think they could attack them, especially if they have children. Communications must be done as wild pollinators have quiet behaviour as they do not have a queen to defend so they more peaceful creatures compared to honey bees.
- A complete communication can ensure that people may grow affection towards the bee highway leading to a more respectful and protective approach towards it. This is fundamental to avoid act of vandalism against the highway or accidental (or voluntary) detrimental actions such as the collection of seed and bulbs used for the project or their destruction by dogs or other domestic animals.
- If you want to pursue bottom-up projects communication is the best way to engage people in support it both economically but also socially. To do so, you can organize workshops (see example beside), fundraisings, meetings ecc.

Effects assessment.

In order to understand the effects of the bee highway, a campaign for collecting data should be carried out spacing from the effects on pollinators in qualitative and quantitative terms to what people think about bee highway and its tenants.

For example, it is possible to create some questionnaires to submit to a group of volunteers or it is possible to invite them to write few words about it by email to send to the official account of the project's owner.

The methodology that should be used in the case of pollinators refers to the assessment of abundance of bee and hoverflies or other methodologies which can describe in qualitative and quantitative terms the pollinators.

To perform a good assessment you need to keep in mind few points:

- Perform the monitoring before, during and after the project realisation. This is crucial point to understand the real impact of it.
- The planning, design and implementation of the campaign to collect the data has to be carefully carried out and it should be done by experts (i.e. ecologist, entomologist).
- The methodologies to analyze and process all the collected data should be scientifically proven.

As far as the effect on people of the bee highway is concerned, different ways of assessing what they think about it can be followed.



Benefits.

Creating a bee highway has numerous outputs that makes it a complete multifunctional green infrastructure. Benefits can be described considering the park, nature ecosystem and park users:

Park benefits

- Enhancement of pollinators in qualitative and quantitative terms ;
- More resilience of the rural landscape and also of the vegetable garden or the food forest;
- Enhancement of the aesthetic aspects of different areas with beautiful, different and abundant blossoming vegetation;
- Possibility to develop conferences, lessons or other type of learning activities concerning with pollinators.

Natural ecosystems benefits

- Better prative ecosystems inside the protected area due to an increase in the natural capital;
- Engagement of people in activities like plantation help to get more respect of environment and nature;
- Increment of pollinators population and, by doing so, of the resilience and resistance of natural habitats.

Park users benefits

- Possibility to know pollinators;
- Presence of beautiful and fragrant blooming along different seasons (approximately from March to November).

+ Bee highway

Constraints.

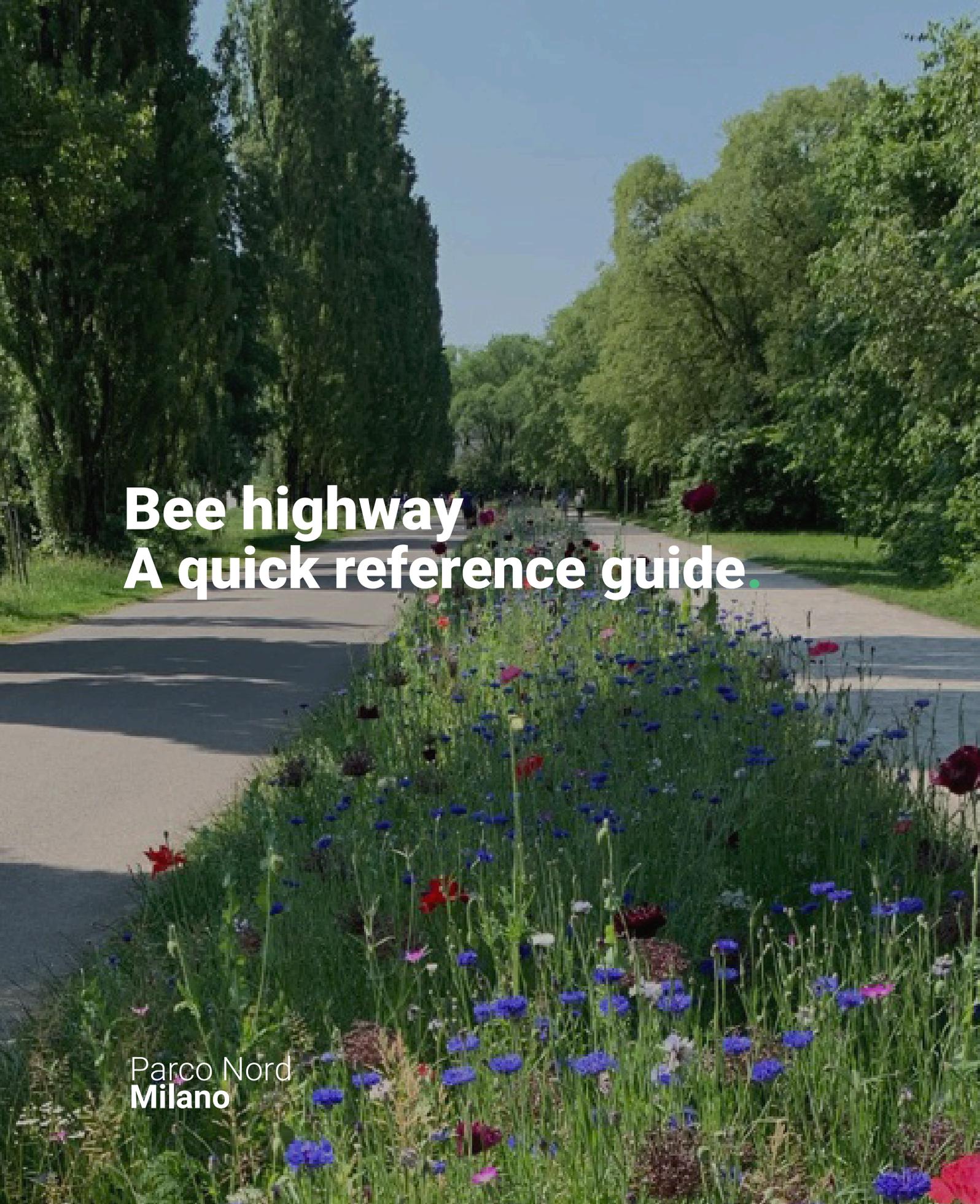
Making the bee highway may include some difficult points that have to be considered carefully in order to reduce slowdowns of the project. In particular, the main aspects to keep in mind are:

- Be sure to engage all the stakeholders that are interested by law or by will (i.e. municipalities, non profit organizations) especially if the projects is realized among different territories;
- Assesment activities on pollinator presence must be carried out, otherwise the effects of the project cannot be detected and possible positive change of it can't be done (adaptive management);
- In time of climate change, in case of a hot and dry seasons, plants water need is a key aspctet to satisfy at least for the first years so that to ensure plants survival.



A map of the bee highway inside Parco Nord Milano





Bee highway **A quick reference guide.**

Parco Nord
Milano