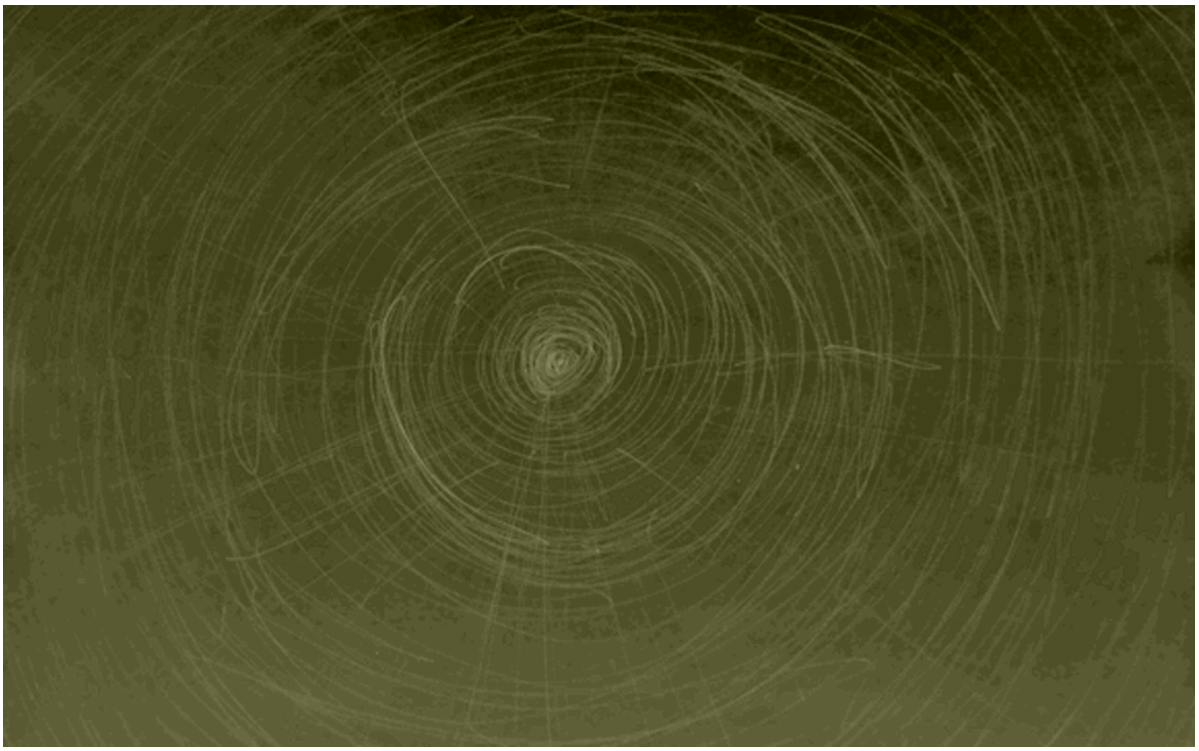
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Chair of Architecture
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Soil, Water, Labour
Fall 2020

Nature Protection

Nothing but Flowers: Design for Pollinating Insects

Gabriel Bleisch and Anna-Lea Stalder



Intensive agriculture increases the pressure on bees and other pollinators. Agricultural policy in addition to modern day nature protection is an inadequate response to tackle this problem. How does a sustainable designed landscape look like from the bee’s point of view?

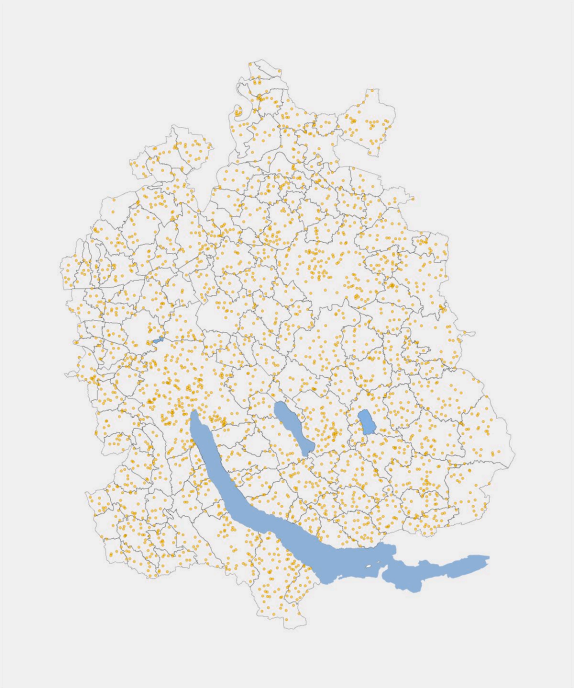
The Bee and the Beekeeper: An Unusual Relationship



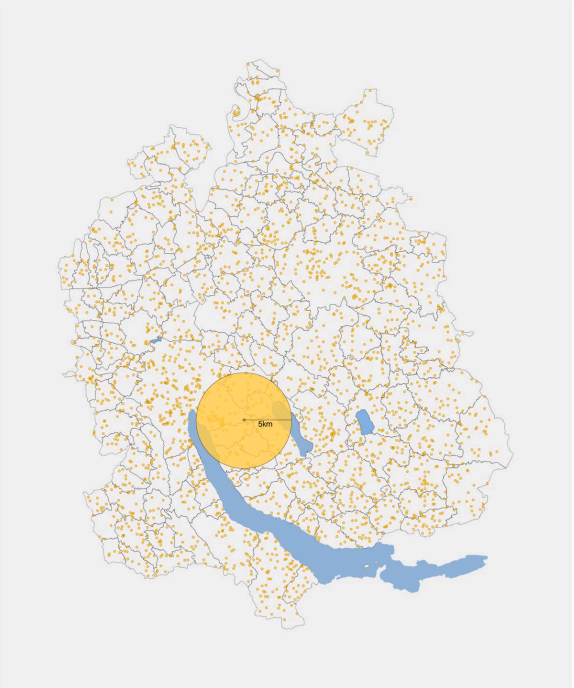
Bees have been a part of the earths ecosystem ever since its early existence around a hundred million years ago. Well adapted to the forever changing environment, they found themselves in smaller groups, big colonies, and sometimes alone in a neverending quest for survival. While gathering food for their offsprings, they all pollinate flowering plants and some of them produce the sweet honey we all spilt over the kitchen floor before.

The relationship between us and these so called honey bees dates back to the first humans to discover this viable food source after (probably) being stung a few times. Time went on and the first men and women who specialised in keeping honey bee colonies as a stable energy resource lived in Mesopotamia around 4,000 years ago. The basic skills of beekeeping have been improving ever since, but remained the same in its core. One of the most remarkable finds ever made by archeologists was a jar of honey, still liquid and still preserving its characteristic scent after 3,300 years, in an Egyptian tomb.

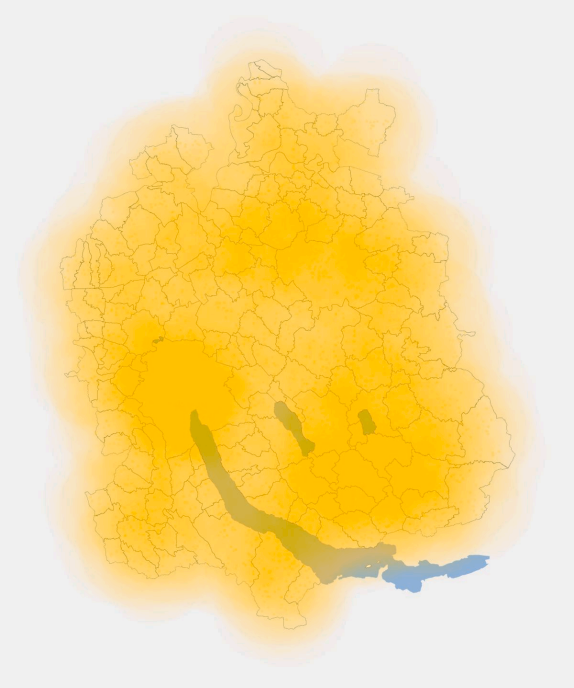
Nowadays beekeeping is split into two different groups of interest: The professionals and the amateurs. Because honey remains in great demand, the professionals focus on harvesting the sticky gold with a maximum outcome. On the other hand some farmers still keep a few colonies in sheds inherited from fathers and grandfathers alike, mostly for pollinating purposes. Many of these colourful “beesheds” belong to various friendly groups of amateur beekeepers, who share their passion and knowledge with whoever knocks on their door. In beekeeper communities it is still strongly debated if the eye-catching colours, which mark the landing strip for the different bee colonies, have any purpose at all. Purposeful or not, they symbolise Swiss tradition and replacing them seems unthinkable. Beesheds are scattered all around the Canton of Zurich, covering most of its surface. The “Western Honey Bee” (Apis mellifera) is the commonly used species of bee for beekeeping in Europe with a flight distance of an average of five kilometers (read more: bee portrait). By overlaying the flight radii with all the beesheds found in the Canton of Zurich, one discovers a dense network of honey bee traffic, even around the city of Zurich.



Beeshed distribution in the canton of Zurich. Source: GIS ZH.



Lehrbienenstand VZB in Zurich Witikon. Source: GIS ZH.



Overlay of the flight distances of 5 km around every beeshed showing the "bee coverage" in the canton of Zurich. Source: GIS ZH.

Your Average Beeshed

One of the bigger beesheds remains in the outskirts of Zurich Witikon. The Verein Zürcher Bienenfreunde, or short VZB, runs a small educational beeshed (Lehrbienenstand) and marks the starting point of this research. The buildings maintenance is equally distributed by the participants as well as the teaching of fresh-men and women. Every member cares for his/her individual hive(s), but they share the equipment and look after each other and the bees if needed.
A typical beeshed is home to ten to fifty different colonies, depending on its size and use. Most of them are built in a DIY-manner and kept very functional and simple. The Schweizerkästen is a way of keeping the bee hives in the warmth of the shed and they look back at a long tradition in Switzerland, hence the name. But the more flexibel “bee magazines” replace or complement the modern beehouses over time.



The bees access to their "Schweizerkasten" at the educational bee shed VZB.



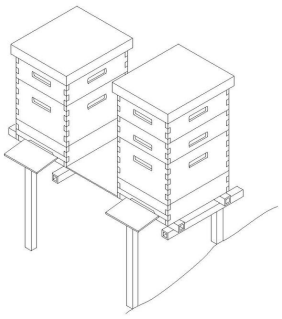
Bee magazines in front of the educational bee shed VZB.

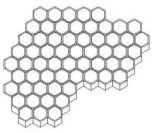


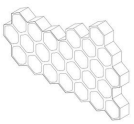
The beekeeper`s equipment

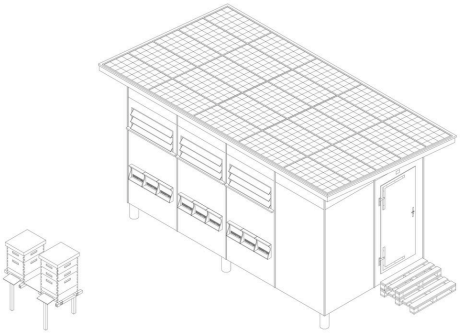


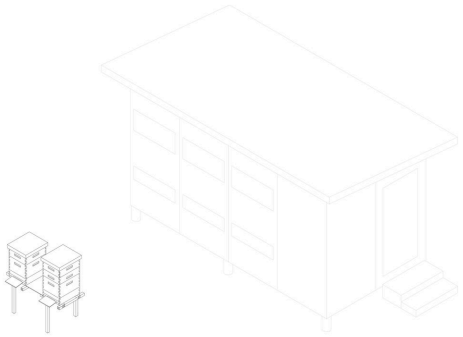
The beekeepers access to the "Schweizerkästen"

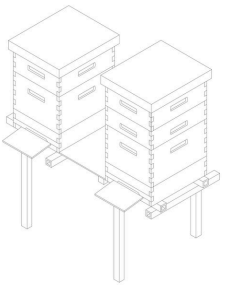


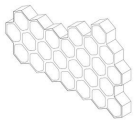






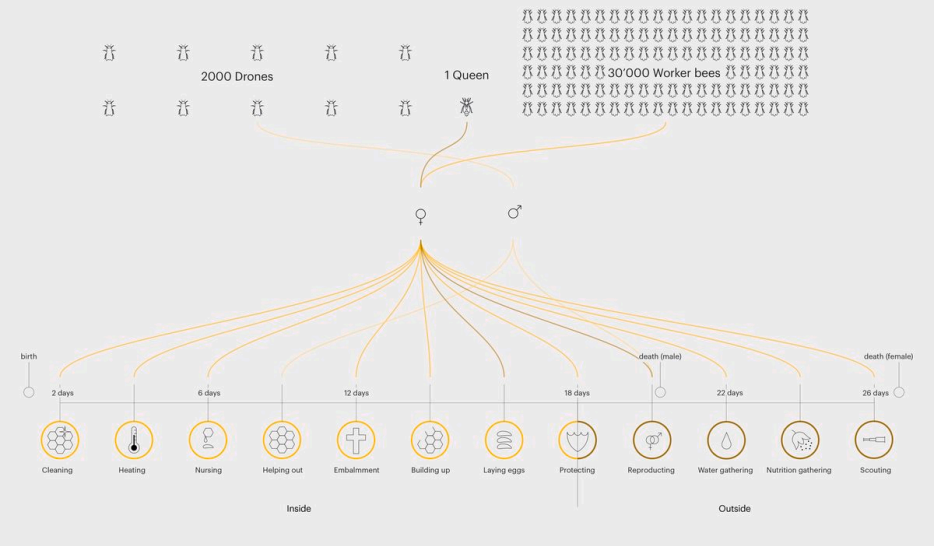






The biggest advantage of the magazines is the way the frames are arranged. By removing the lid, one can easily reach every frame without the necessity to touch anything else. The frames act like a scaffolding for the hexagonal honey combs of the bees and support the fragile structure. The symmetrical chambers are precisely built out of wax and will soon be filled with honey and larvae while being taken care of hundreds of worker bees.

The honey bee colony is best known for its rigid structure within the hive. Every single worker bee and drone always knows exactly what to do. They serve only one queen, who keeps the colony tightly together by releasing a special scent only a queen can produce. She leads by example and without having a minute off, produces dozens if not hundreds of eggs a day and has the “luxury” to live a few years. In a worker bee’s lifetime of about three to four weeks, she naturally takes on specialised tasks over time and gathers experience to leave the colony for the first time after around eighteen days. The male bees (drones) have only one major mission: Reproducting with the queen. Soon after the act, the male flies off to rest permenantly.

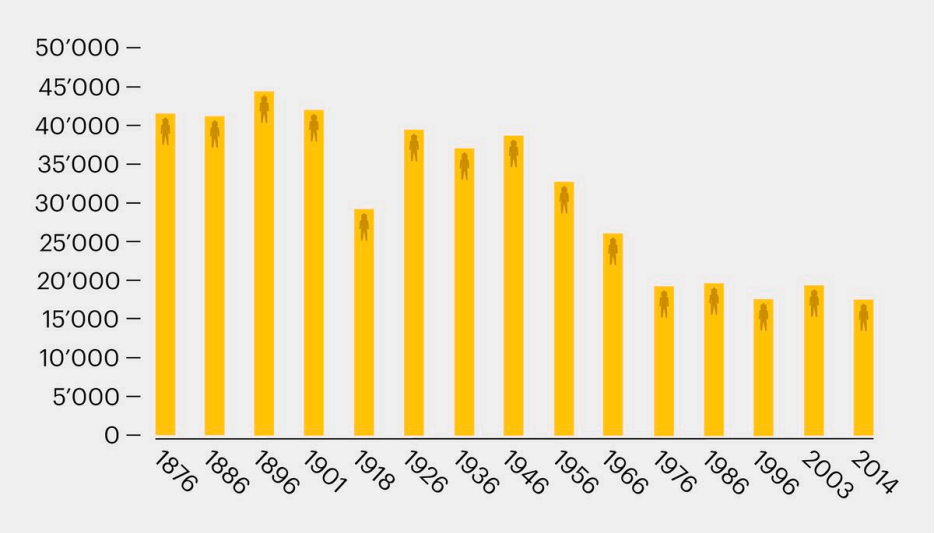


The organisation of a Western Honey Bee colony.

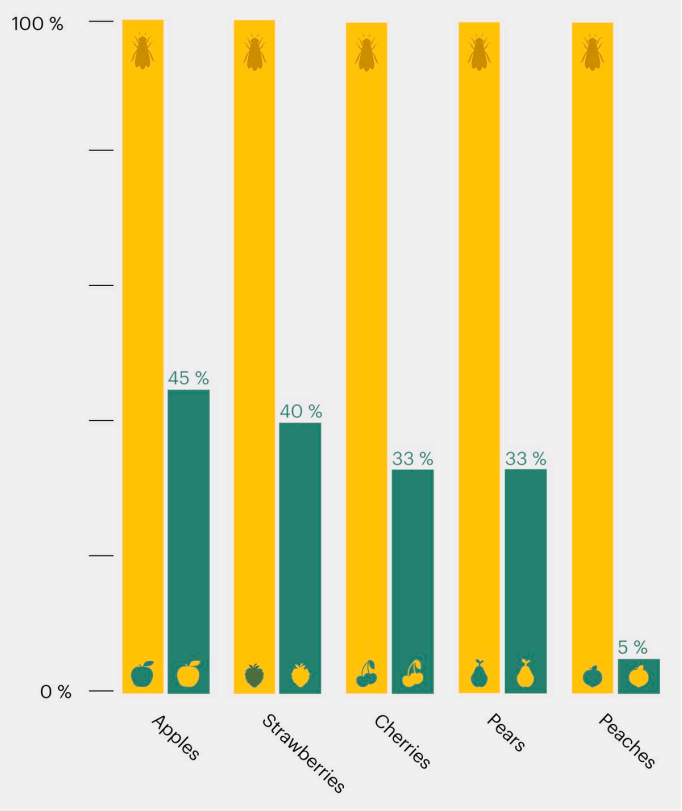
Pollination—an Underestimated Work

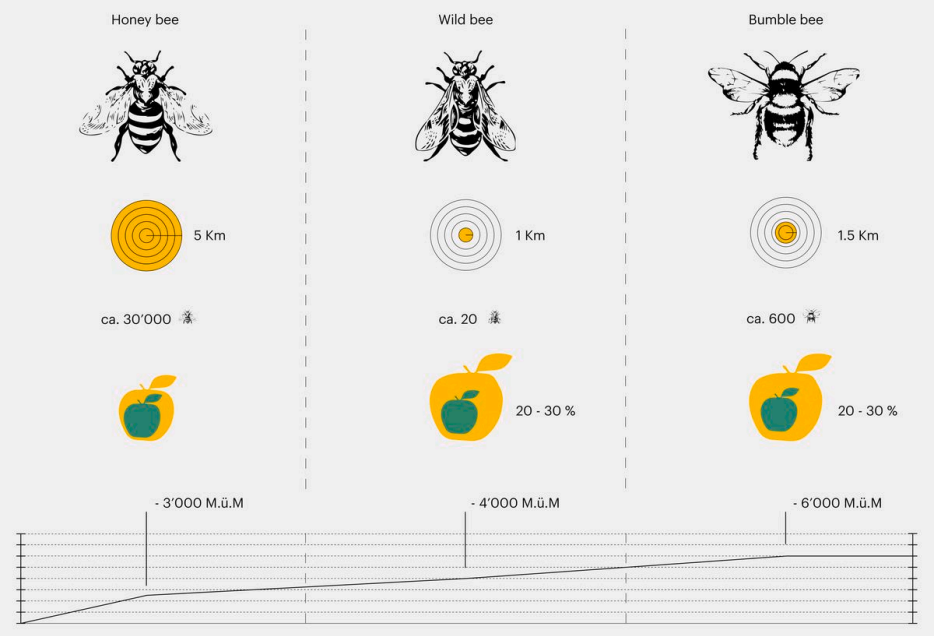
Einstein famously said “No more bees, no more pollination, no more plants, no more animals, no more humans.” That was a hundred years ago. What happened to the bees since then? Clearly, the role of the (honey) bees remains the same. They pollinate and some of them produce honey. Even though the number of beekeepers and honeybee colonies in Switzerland are slowly going down, honey bees are not at all endangered. The honey bees used for beekeeping, can be looked at from the perspective of a farm animal. If the demand rises, more honey bee queens can easily be bred and more colonies will be generated. Taking a look at the declining number of the beekeepers in Switzerland themselves, one should not be concerned about a dying work either. Not only can everyone interested take the necessary courses (for example at the Lehrbienenstand VZB) to become an amateur beekeeper, those numbers also indicate that the work is shifting towards professionals and larger businesses in foreign countries. Due to multiple reasons, the number of honey bee colonies and beekeepers in China almost tripled in the past thirty years!

Because of the proximity to the honey bees, the species remained very well documented throughout the last centuries. Only few people consider honey bees as a pest and hold them close to their hearts. But what about the honey bees wilder fellows? The honey bee is only one of many different species of bees. In the past few decades it has been discovered that wild bees play a far more important role as pollinators than expected. In Switzerland alone, there are more than 650 documented species of wild bees buzzing over our heads. Together with the wild bees sister, the bumble-bee, and the honey bee, they form the three main groups of bees.



Amount of beekeepers of the past decades in Switzerland.
Source: Eidgenössisches Departement WBF, 2014.

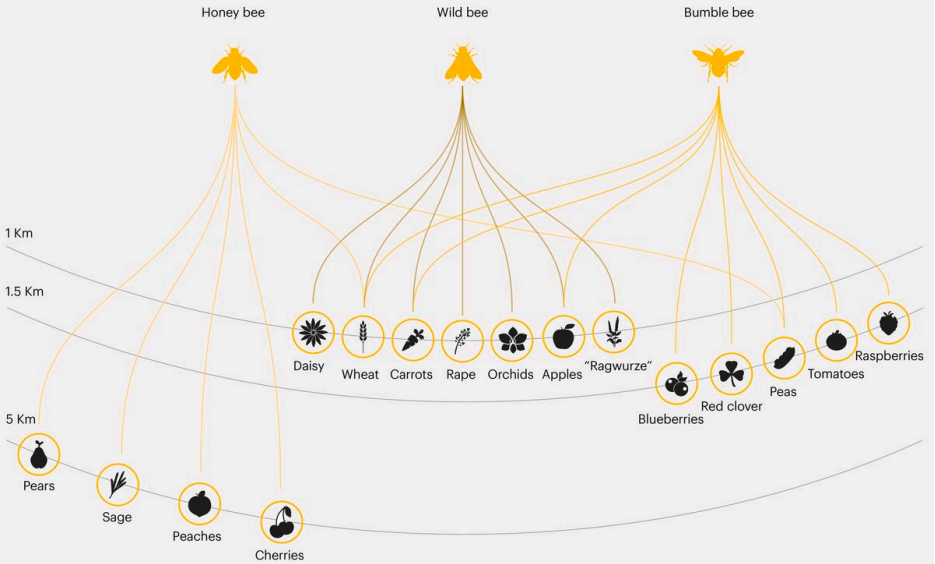




A portrait of different species of bees according to the flight distances, population sizes, harvest increase, and flight altitudes.

Wild bees and bumble-bees start being active earlier in the year and harsh weathers like rain and wind can be endured. They live in smaller groups or in solitude and have a significant smaller flight radius than honey bees. Various small wild bees will not fly further than a hundred meters from their home to reach their target plants, while some exotic honey bees fly up to ten kilometers, if they have to. Bumble-bees are considered to be rather clumsy fliers due to their shape. Completely wrongly, as scientists have now discovered. They estimate that bumble-bees could even fly over the Mount Everest—at least in theory. To cope with the low air pressure, the insects simply widen the angle of their wing flap.

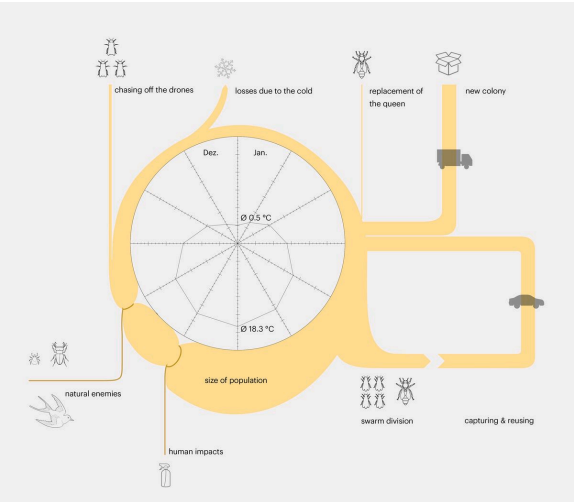
Wild bees and bumble-bees have mostly very specific target plants as a food source. Over the millenia many plants, wild and domestic, adjusted to specific wild bees and they formed an unusual dependency. It is even believed that flowering plants started to develop simultaneously with the bees. Furthermore, there are certain wild plants like the “Ragwurze” which can only be pollinated by the males of one single species of wild bees. The top of the plant not only resembles the female bee, but it emits a scent which simulates the sexual hormones produced by the females. Looking for a partner the males desperately pollinate all the lucky plants in quest for reproduction.



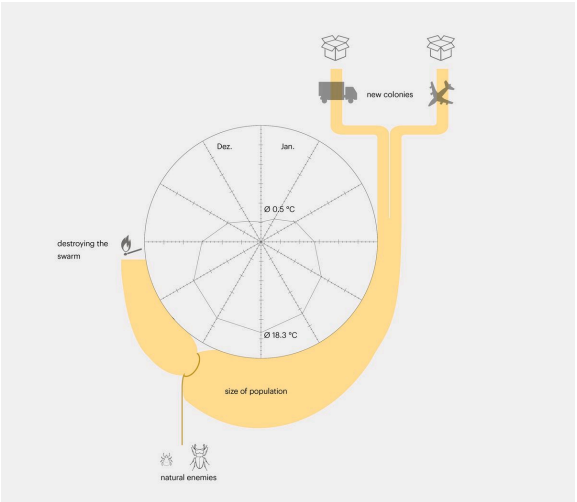
Flight distances of different bees and their target plants.

There are certain farmers who use honey bees commercially to pollinate their fields to further increase their harvest. Whole colonies, as well as just the honey bee queen can be bought simply via the internet or from professional beekeepers nearby for a small price. If the farmer cares for his bees well enough, the colony can be used for multiple years. Words of the meaningfulness of wild bees for pollination and harvest yield are spreading, but due to the fact that they are nearly impossible to breed and kept in large numbers, they have not found their way into commercial circles yet.

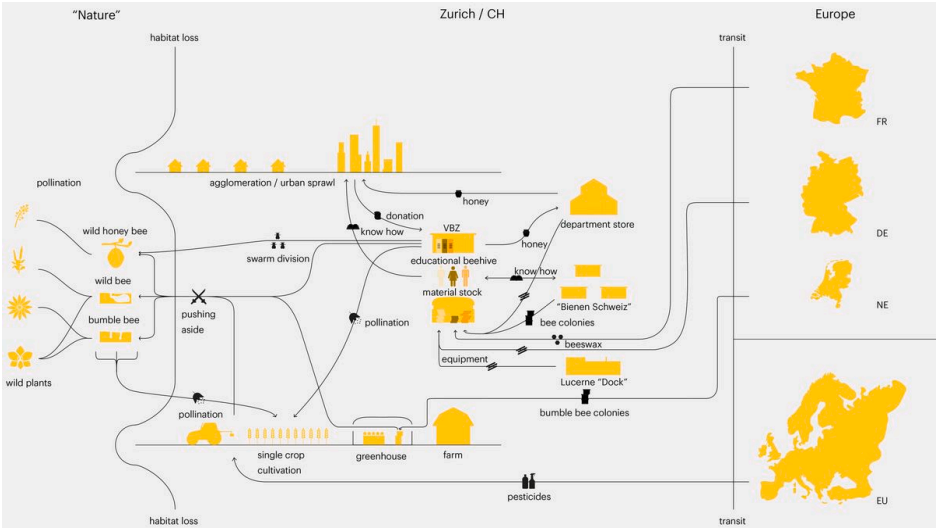
Bumble-bees have a very strong natural “buzz” which is needed to get the hidden pollon out of the (for example tomato) flower. This was discovered only around thirty years ago, but already led to a booming business with certain types of bumble-bees. Because they sometimes push aside the native wild bees, their use is restricted to greenhouses and closed environments. After the use during spring to autumn the colonies will be thrown into a giant freezer or lit on fire to stop the spread of the bumble-bee.



Sankey diagram showing the commercial use of bumble bees over a year.



Sankey diagram showing the commercial use of bumble bees over a year.



Infrastructure diagram of the Lehrbienenstand VZB.

To produce a single jar of honey, the Western Honey Bees of the Lehrbienenstand VZB need to fly up to 120,000 kilometers, which is close to three times around the world. The pollination work done for the plants while gathering pollen is only a “byproduct”. All the bees do this vital work for free, if we let them (read more: Friends and Foes). Nevertheless the honey which can be bought in every major department store is not the only food source coming from bees. It is estimated that a third of the Swiss food production is directly depending on the pollination work done by the bees. The lists of products depending on pollination of bees is seamingly endless: no bees, no coffee or cocoa in the morning, no apples or pears for breakfast, and no peas or tomatoes for lunch, just to name a few. The choice would not be just small, it would be almost non-existing. Seventy out of the hundred most important crops are pollinated by bees. These are staggering numbers and even harder to swallow if one thinks about all the wild bees who cannot be found in the wild anymore.

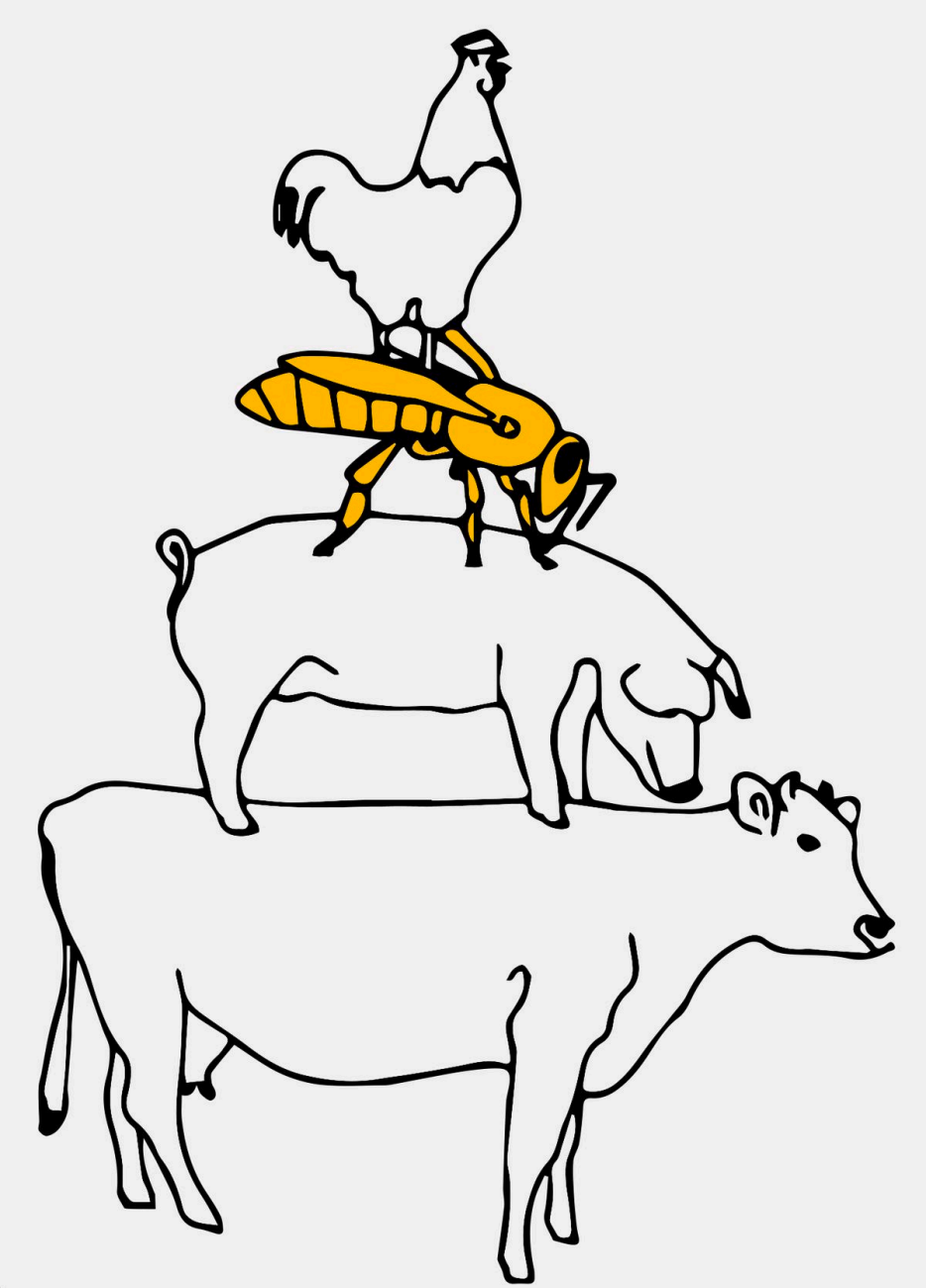


70 % of the most important crops are pollinated by bees.



33% of CH food production depend on pollination by bees

The Swiss cow is a national symbol as well as probably the most important farm animal in the world (read more here). Right after the cow, the pig stands in line, tigthly followed by the chicken. But looking beyond the meat we eat, the bee may as well be one of the most important farm animals worldwide! Not because of the produced honey, but the crucial pollination work allowing the daily, wide variety of food on our plate. A world without bees is unthinkable and its universal importance often gets lost in the depth of ethical questions of keeping the bigger farm animals on their hoofs.

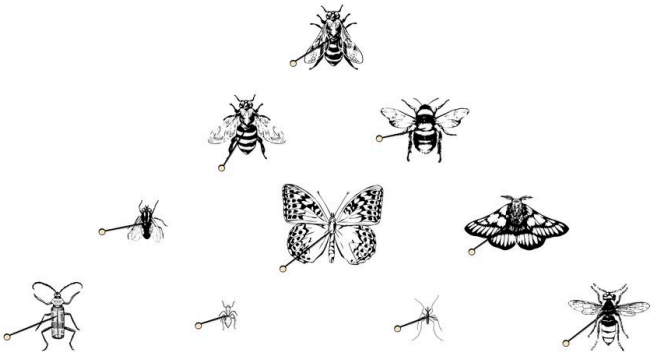


"The bee is the third most important farm animal". Source: Unknown.

Friends and Foes of Pollinating Insect



In the end, bees are not the only pollinators and even though they are considered to do up to 50 percent of the overall insect pollination work, they do get help during the day as well as the night from a variety of different species. Insects dominate the field of cross-pollination, but bats and birds are crucial in specific tropical regions. Insects are by far the largest class within the animal kingdom. Over 60 percent of all the documented animals around the world are insects and their importance can sometimes be overshadowed by their number of extremities. It does not matter if big, small, hairy, or slimy, insects play a major role in the global ecosystem and similar to the bees, they are vital for us humans.



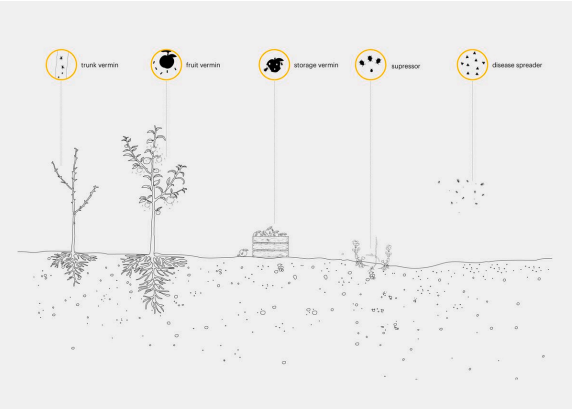
The top ten pollinators of all pollinating insects in Europe.

Insects not only serve as popular pollinators, they function as excellent waste processors, pest exterminators, and soil conditioners to mention just a few. They form a main food source for various animals on land and thanks to their protein-rich qualities, they do find their way into high-class restaurants after all.

But we cannot forget that some of these tiny crawlers are the main reason why pesticides are widely used in agriculture. Three of the biblical plagues were supposedly insects who devestated the harvest and spread disease and disaster. But stories of disease-spreading mosquitos and crop-destroying grasshoppers are not a myth of the past, but harsh reality in many parts of the world. Switzerland is not spared from this fate and farmers have to fight off vermins on a daily base. The fight can be tiring and pesticides are an easy and effective solution to the problem at hand, but come at a great risk.



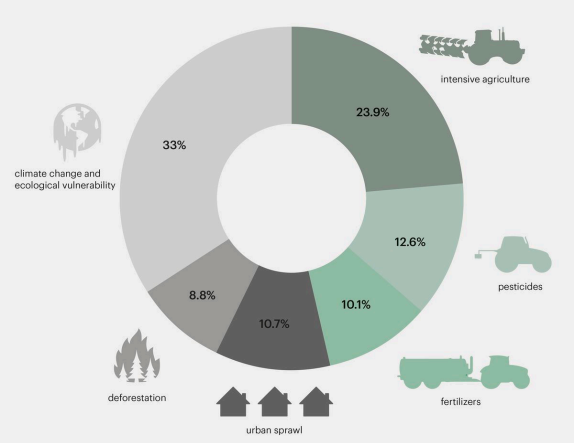
The beneficial effects of insects.



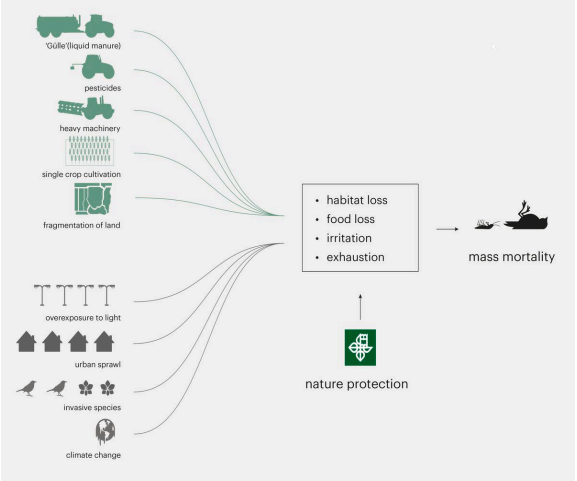
Insects as pets.

A Matter of Life and Death

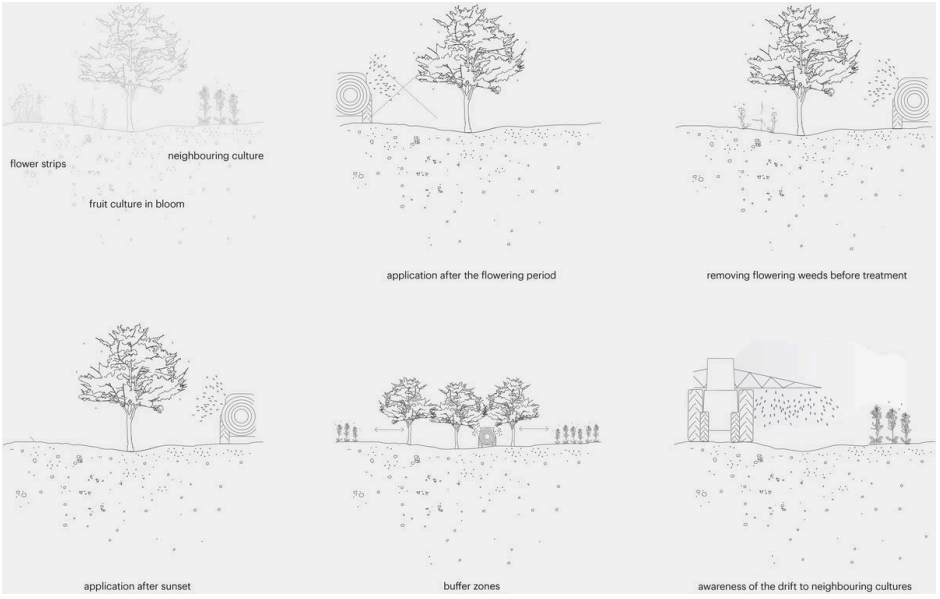
Exterminating the pest to protect the precious crops and stock seems a good idea at first. Nevertheless, pesticides are, together with intensive agriculture and excessive use of fertilisers, according to some entomologists, the leading cause for a rapid decrease of the insect world. But even if a farmer decides to use pesticides, certain measures can be taken into account to reduce the harm on the useful insects.
The rapid developement in agriculture led to a massive progress regarding efficiency and harvest yield. It enabled a never imaginable food supply. From the perspective of a bee or an insect, the last two centuries had devastating consequences. Stacking desert-like environments of monocultures and single crop cultivation on top of deforestation and climate change, the burden weighs heavy on useful insects and gets heavier every year.



Leading causes of mass mortality of different species.

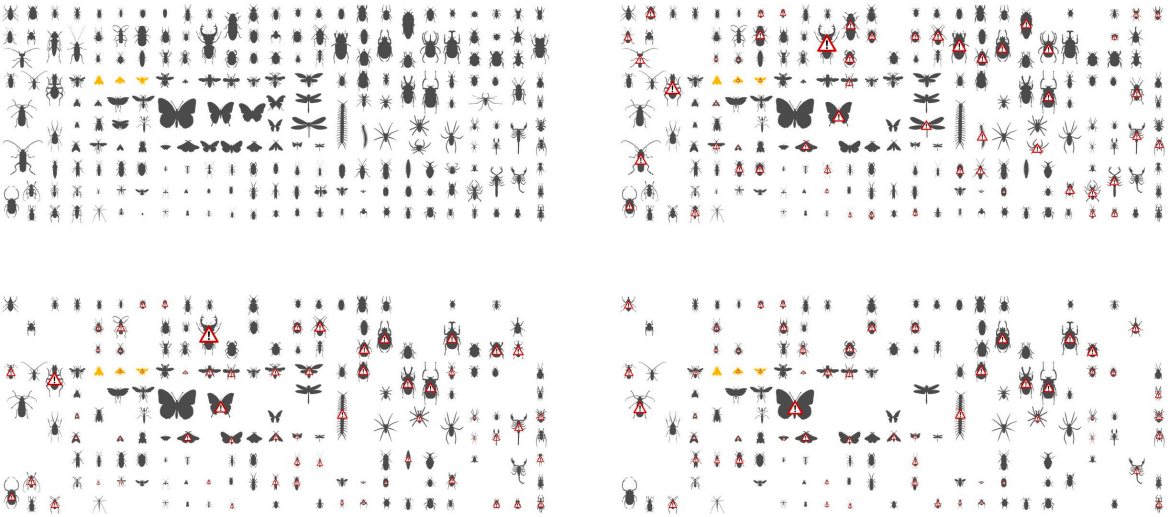


Leading causes of mass mortality of different species.

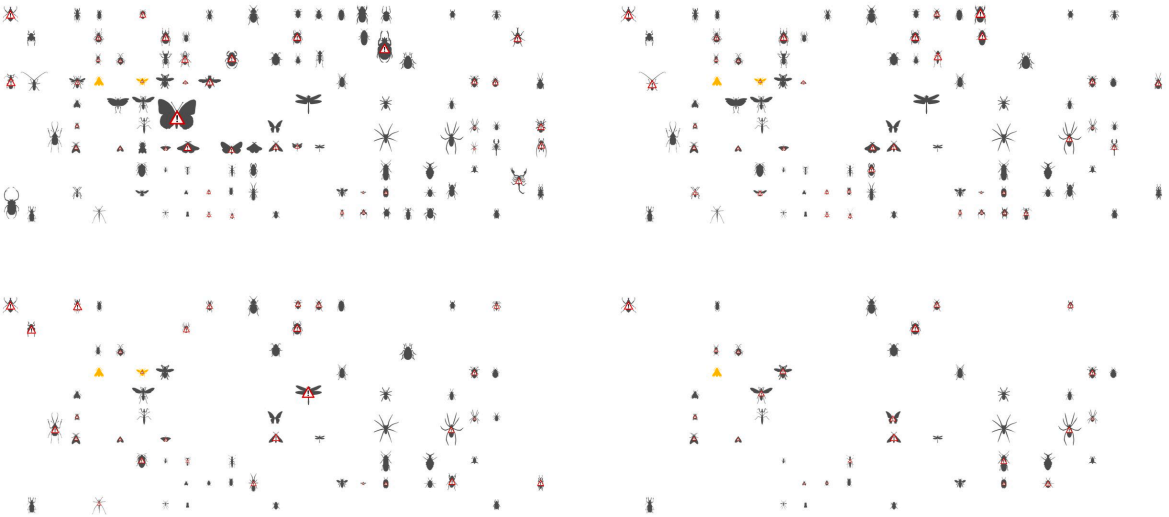


Examples careful application of pesticides. Source: Schutz der Bienen bei der Anwendung von Pflanzenschutzmitteln, Agridea, 2018.

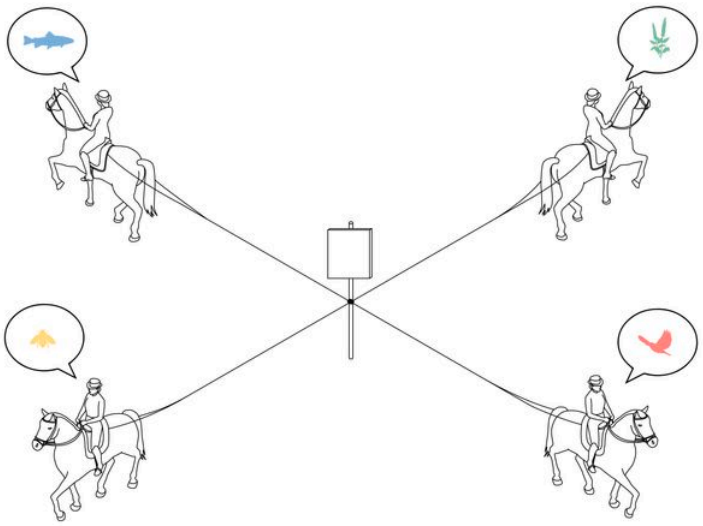
Modern-day agriculture is an undisputed driver in the so-called Holocene extinction. Otherwise refferred to as the sixth mass extinction, it is an ongoing event as a result of human activities. The current rate of extinction of species is estimated at 100 to 1,000 times higher than natural background extinction rates. Although there is debate regarding how much human predation affected their decline, certain population declines have been directly correlated with human activity. Pollinating insects share a sad fate with many big and small organisms. Certain scientists and entomologists struggle over the exact number of extinct species and their precise decline, but nearly everyone agrees it is time for a change. Does it really matter that much, if it is a 70 or 80 percent decline rate in insect-biomass? Is it not enough proof that we do not have to clean the windshields of our cars after a long ride anymore, like we did only half a generation ago? Are there still 40 percent of all insects endangered or has it risen even higher? One of many questions remains the same: Who pollinates our fields if not the insects…would it be you?



Showing the increasing extinction and endangerment of species.

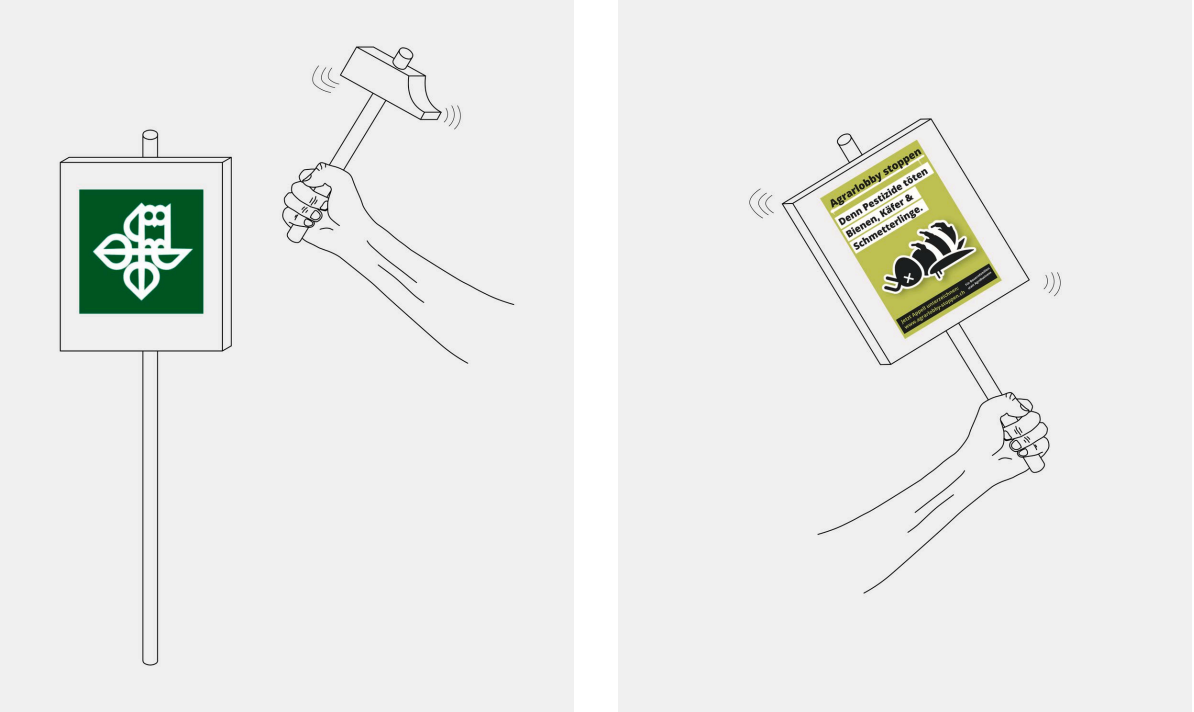


Tools of Nature Protection: Case Study Glatt Valley



First Steps towards Sustainability

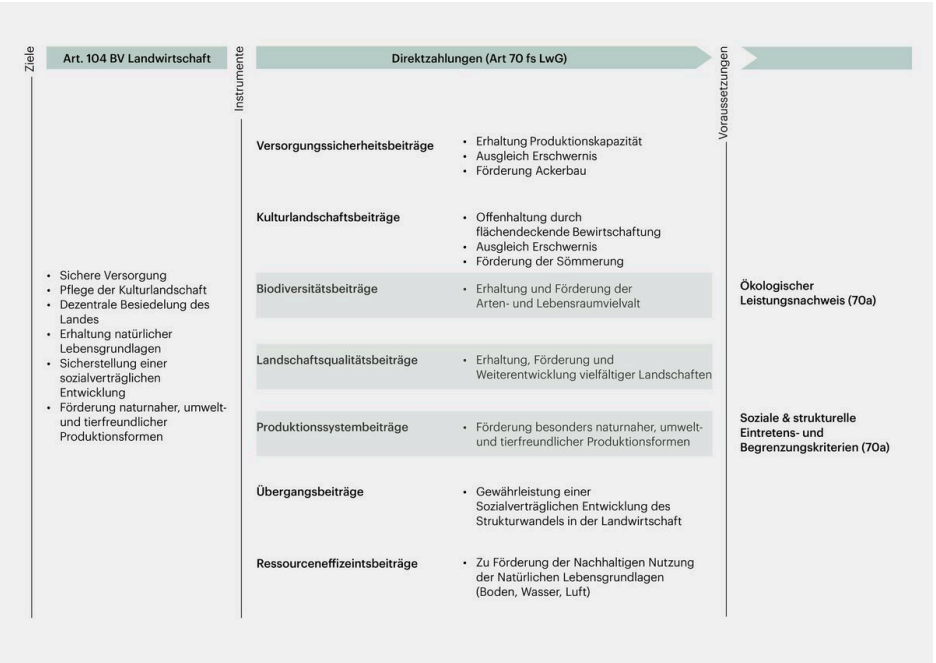
Nature protection activists rang the alarm clock years ago and fight an ongoing battle towards a more sustainable world. As a reaction to the decrease of biodiversity and the ongoing extinction of species, nature protection associations were founded to fight this development and stop further interventions if possible. In Switzerland, there are over thirty legally “approved” Non-Governmental-Organisations, such as the BirdLife Switzerland, WWF Switzerland, or Pronatura. They have the formal right to intervene against decisions of local, cantonal, or federal authorities (such as. concessions and operation licenses, building permits, contribution approvals), if they come to the conclusion something needs to be done differently in terms of environmental (particularly concerning nature conservation or water-protection and river conservation). Moreover, their opinion has to be taken formally into account in the respective legislation procedures, for example when issuing lists of species should to be protected. In Switzerland, the organisation of the nature conservation policy in general and especially the state run nature protection in particular areas is very complex, due to the federalist structure and legal competences. One risks to loose itself in dozens of neverending official papers which try to explain the terminology, the progress and the goals of nature protection. That certainly does not mean nothing happens when it comes to nature protection, it is just a manifest for the confusing bureaucracy when it comes to nature protection. Another issue is the conflict of interests and objectives—even in concrete implementation fulfillment. Should the objective of a conrete measure be for example the nature in its fullest, beautiful, and manifold, or who gets to choose which animal should be protected and gets priority A, when their habitats have different needs? Is it the trout this week and the bee the week after that? Or the following, in Switzerland frequent example: should a floodplain with its river dynamics be restored, when this measure endangers the function of the aquifer as the drinking water resource of thousands of inhabitants? Who gets to decide? On top of that, nature is close to most peoples hearts and a recurring subject in politics. Sharing similar goals, but coming from different origins, nature protection and politics often walk next to each other instead of together.



Clash between stakeholders.

Incentive System—Direct Payments

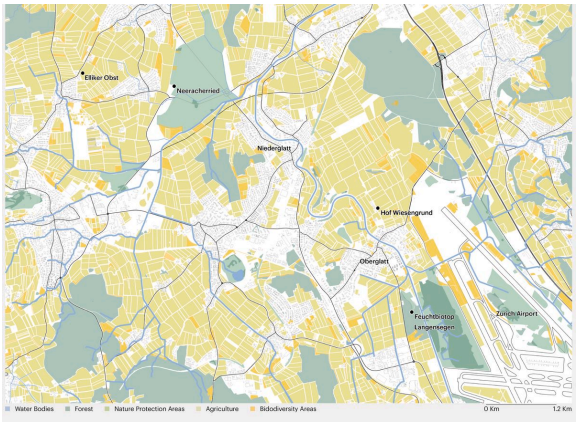
Biodiversity promotion is already imbedded in the Swiss agriculture policy. Certain standarts have to be reached. The creation of biodiversity promotion areas (Biodiversitätsförderflächen, BFF) is part of the Ecological Performance Certificate (Ökologischer Leistungsnachweis, ÖLN) in accordance with the Direct Payments Ordinance (Direktzahlungsverordnung, DZV). Compliance with the ecological performance certificate is a prerequisite for receiving direct payments.



Direct payments are part of the Art 104 BV Landwirtschaft. Source: Agrarbericht, 2018

The federal government's direct payment procedure includes the compulsory portion of seven percent of agricultural land that must be allocated to biodiversity promotion. The choice of the area lies with the farmer him- or herself. Almost all biodiversity areas are eligible for contributions, but there are different quality levels to be attained, which determine the amount of the contribution, as well as the possible registration for a networking project.

Hence the problem is that the 7 percent biodiversity promotion areas are met but their quality leaves much to be desired. Despite this form of agricultural policy, the general situation has not improved significantly. If the agricultural land is intensively farmed, a share of thirty to fifty percent biodiversity areas is needed. With extensive and therefore sustainable farming, this requirement would be reduced to around 15 percent. The proportion allocated for biodiversity is comparatively small, at only about one third. Most of the contributions are awarded for security of supply and the cultural landscape contributions.



Analysis of the region Oberglatt.



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Caption: Property of the Hof Wiesengrund.



(Screenshot): Field research
in the region of Oberglatt.

Oberglatt—Entering the Field

Along the Glatt River, there are many fens of national importance, floodplains, and other valuable habitats. Originally, the region around Zurich Airport was a marshland. During and after the Second World War, large parts have been drained and ameliorated to build the Airport to allow intensive agricultural use. Since the seventies, a large number of the remaining areas have been placed under nature protection because the importance of wetlands for nature has been identified. Similar to the wetland biotope Langensegen, many other replacement areas had to be created by the Zurich airport. They were formally demanded and had to be fixed replacement measures to compensate new impacts by new infrastructres as runways, taxiways, or other spatial and ecological impacts. These replacement measures should not be confused with other, more genereally focussed ecological compensation measures (demanded by the Nature Protection Law) on the one side or with the forementionned ecological compensation areas (due to Agricultural Legislation) as a condition for agricultural subsidies on the other side. Most of the biodiversity areas in the region consist of extensive or less intensively managed meadows and pastures. These are probably relatively undemanding and thrive on less fertile soils.



Feuchtbiotop Langensegen next to Zurich Airport.



BirdLife education and
research center Neeracherried.



The straightened River Glatt.



Wildlife corridor along the Zurich airport.
(two pictures are missing, did not find them)



Protecting local plants in the Feuchtbiotop Langensegen



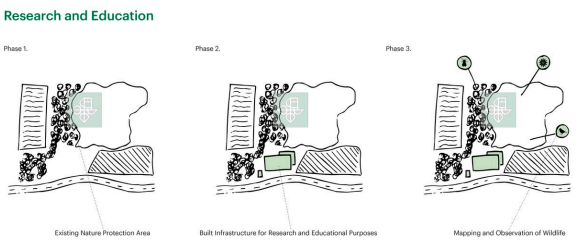
Bee colonies on top of the Mariott Hotel

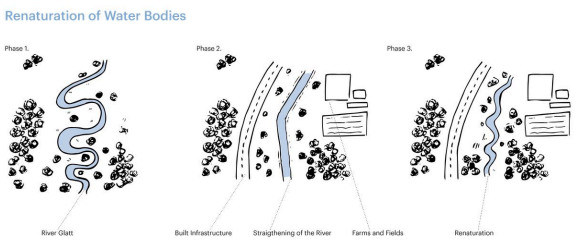
Common Tools of Nature Protection

Guarding vulnerable species of plants and animals is a major priority of nature protection. Over the years the following methods proved to be the most succesful throughout Switzerland. Most of them remain unrecognised in the eyes of the public even though they may be found right across the street.

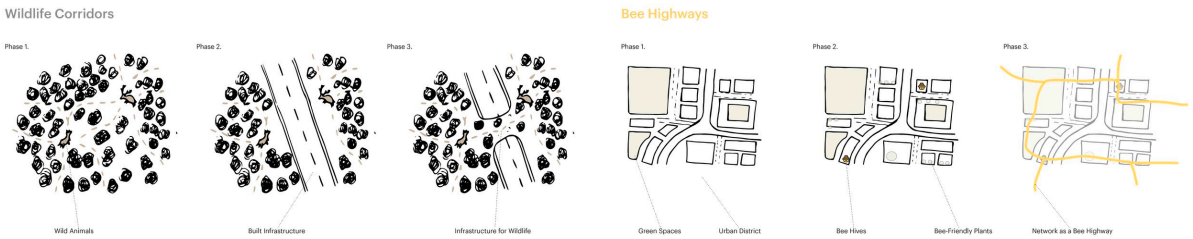
The first tool of nature reservation is subject to clear and strict regulations. However, these do not exclude the possibility of maintenance by human hand—also in the agricultural sense of management. The human intervention in these areas is necessary, otherwise uncontrolled growth takes over and the form and its intention disappears over time.
Another tool is the mapping and control of invasive neophytes. In many cases invasive species of plants dominate the native flora. Some of them are harmful to health, destabilise the terrain, or damage buildings. In Switzerland, about 10 percent of neophytes are problematic and need to be taken care of.

One of the most common tools in nature protection is renaturation, also known as revitalisation. Renaturation is the restoration of former natural habitats. Cultivated or used soil surfaces can be transformed into new potential biodiverse domains. The object of these tasks can be agricultural areas, areas of amelioration, abandoned industrial and traffic facilities, or post-mining landscapes. Such measures can be easily found in the region of Oberglatt.
On the other hand nature conservation is characterised by many smaller interest groups, which come together in centers such as Neeracherried. Serving the intention to sensitise and inform the public, they offer a unique infrastructure for everyone interested.





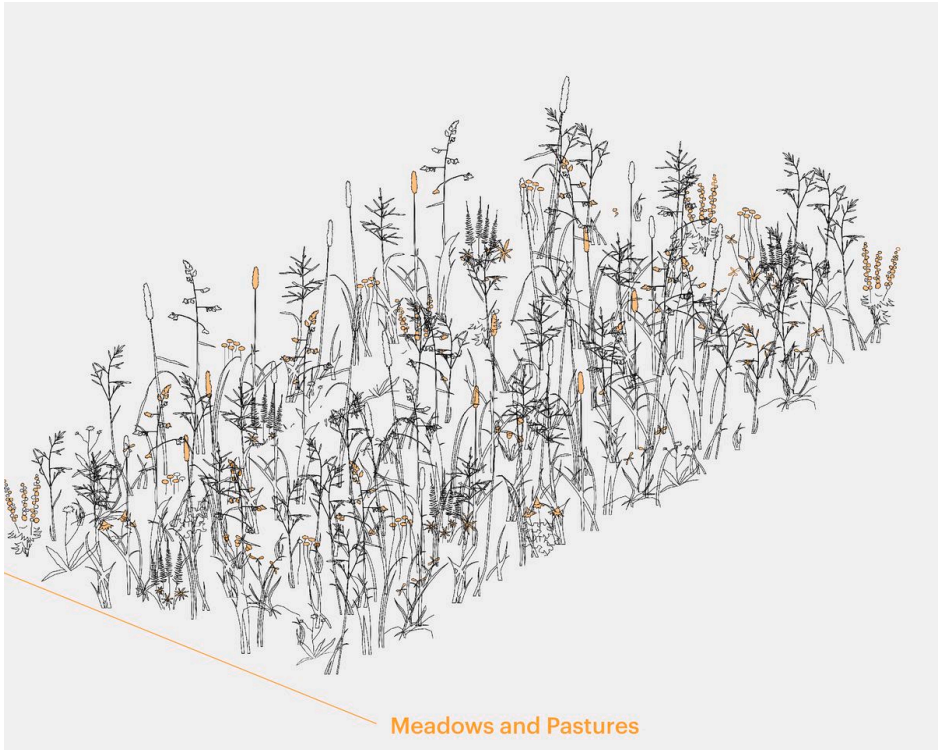
Wildlife corridors are especially important to maintain a healthy mixture of the gene pool in the animal kingdom. Big entities such as the airport are largely closed-off zones, which makes it all the more important to plan wildlife corridors carefully and with the intention to tie them together.
Urban tools have been invented in global cities like London and Oslo. The “Bee Highway” is a reaction to the extinction of various species of insects, especially bees. The “Bee Highway” consists of carefully planned, small-scale interventions which form a large-scale network. In order to create an adequate habitat for bees in the city, the help of the citizens is needed. Special seed mixtures are planted on public and private roofs and beesheds and bee magazines are implemented throughout the city.



Biodiversity Enhancing Measures in Agriculture

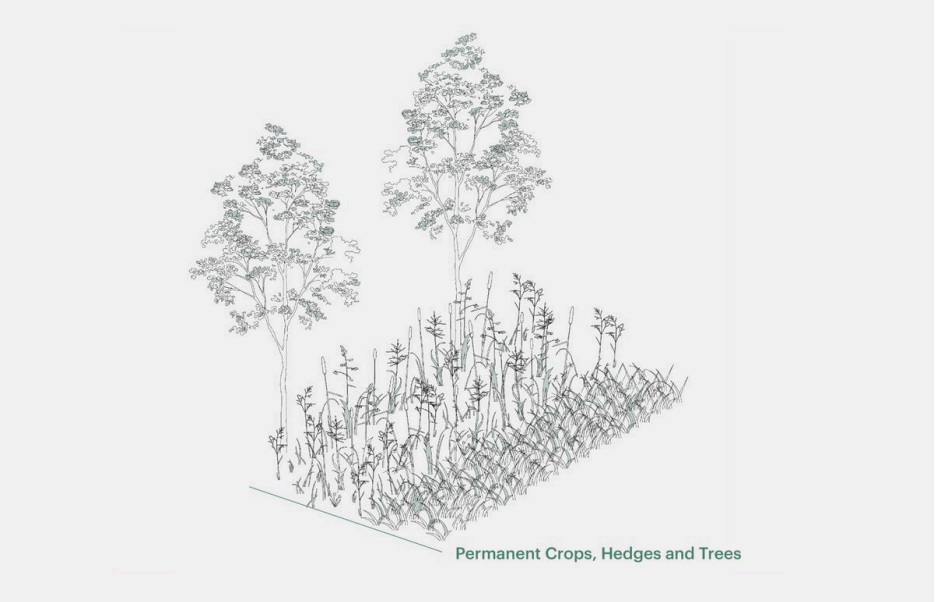
More than a third of the area of Switzerland—thus the largest part—is agricultural land. The remaining areas are mostly forests and settlement areas, as well as patches of unproductive land. Therefore it is obvious that agriculture is one of the most important drivers in terms of nature conservation. In order not to put the land under further pressure, the importance of spatial planning is rising and it is in particular important that zoning conformity is strictly observed and regulated. This applies in particular to agricultural buildings and infrastructures that require a lot of built and transformed terrain. Due to the fact that agricultural buildings are generally conform to zoning regulations, they enjoy some leeway regarding that matter. Therefore buildings, infrastructures, access roads, and shelters are continuously getting larger. This leads to the need and use of more agricultural land or the cultivation of less productive, but ecologically precious soil. Grief, the drive to grow and the lack of awareness in the agricultural milieu worsen an already tense status quo.

Modern-day agriculture in Switzerland needs a shift towards long term biodiverse land use. There are numerous existing and effective measures to support and maintain a more sustainable management of agricultural land. The following tools are designed to promote biodiversity. They have been divided into four upper categories corresponding to areas of application.

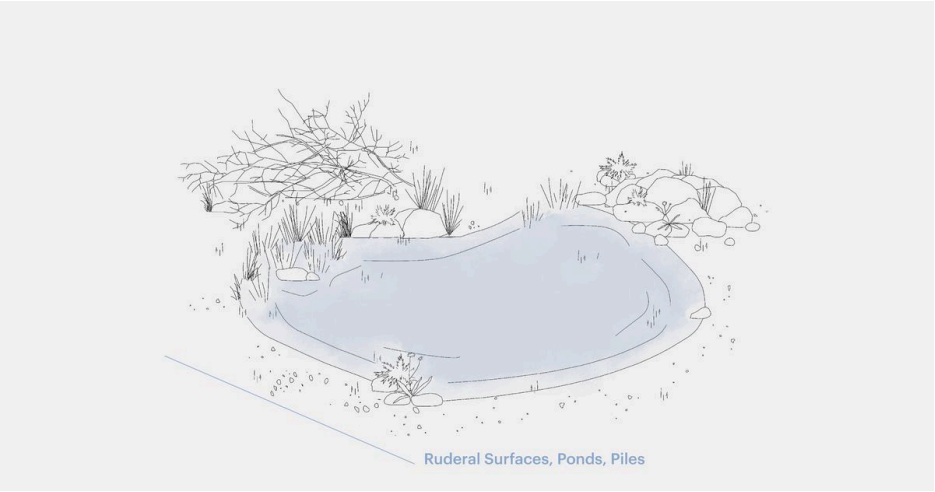


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There are many ways to integrate biodiversity areas in the management of arable land. Field margins are strips sown or planted with arable crops which are farmed extensively (without fertilisers or pesticides). They are part of the main crop and are harvested simultaneously. Flower(ing) strips for pollinators and other beneficial organisms are biodiversity-enhancing areas in arable farming. They consist of a small number of mostly native plant species which are particularly attractive to pollinators and/or crop-specific beneficial insects. They are also intended to close the food gap for pollen and nectar-seeking insects in the summer days. Flower strips exist for less than a year, so they provide only limited habitat for the development and overwintering of pollinators and beneficial insects. The wildflower strips are managed on a perennial basis. Native wild herbs are sown on arable land and from time to time after the permanent crop. In cleared valley areas, they serve not only as wintering areas but also as resettlement areas for insects and smaller animals. Opposite to the flowering strips, the rotational fallow is integrated into the crop rotation and sown with native wild field herbs. Like wildflower strips, rotational fallow is used to house many animal species, including beneficial insects.
Field margins are perennial strips sown or overgrown with native wild herbs. The seeds consist mainly of various types of grasses. They are intended as permanent structures and serve as a source of food, retreat and wintering place for many organisms. As a linear element, the seam is important for the networking of natural habitats.



Large orchards in combination with other near-natural habitats (for example other orchards, hedges, or extensive pastures) are of great ecological value. This management is commonly known as agroforestry. They create valuable habitats for all sorts of species. Single trees and specific avenues as solitary elements in the landscape not only characterise the landscape, but also contribute to the preservation of biodiversity by providing shelter for animals in need. In combination with other measures, the solitary elements can be easily integrated into smaller or large scale networks. Hedges, field, and riparian woodlands structure the landscape and, as a biotope network, facilitate the mobility of species. In agriculture, they provide shade for grazing animals and protect against winds and erosion. Vineyards are generally cultivated on site with high biological potential. In combination with other measures, they become an attractive habitat while maintaining the cultivation conditions.



Finally, ditches and ponds are open water areas that provide drinking opportunities for bees. They can be created through costly interventions, but sometimes originate naturally or by pure chance. In the former military exercise base near Oberglatt, the remaining artillery pitches form important food and drinking sources.
Ruderal areas are embankments, rubble heaps, and slopes that are often overgrown with herbaceous species. Dry stone walls have few joints and thus provide additional habitat.

The benefits of each tool are enhanced when complemented by others to provide diverse and interconnected habitats. The more may sometimes be better, but through conciously implementing the right tools for the right location, it is fairly simple to support wildlife in all its beauty.

Hof Wiesengrund: A Common Farm

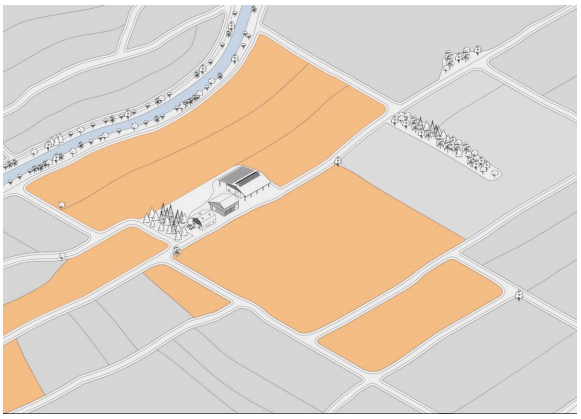


Analysis

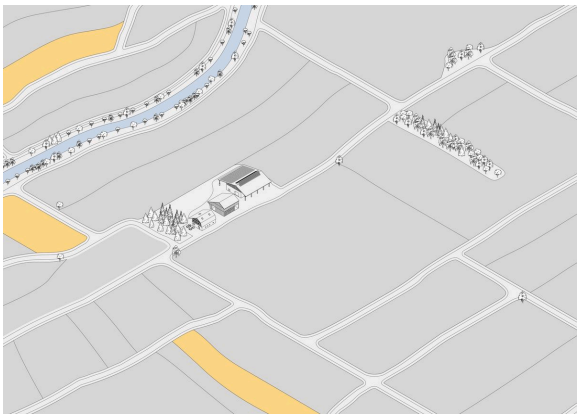
The Hof Wiesengrund is a typical Swiss farm near the village of Oberglatt. For generations It has been a family run business and the management of the farm is subject to the label “Bio”. On a scale of forty hectares of land forty cows, a small herd of goats, a few rabbits, and some chickens find their home. The biggest part of the agricultural land is seasonally cultivated crops. Agriculture only makes up for a third of the overall income. To ensure rentability other businesses such as event venues have been established.

The location, size, and management of the Hof Wiesengrund offer an interesting foundation for further investigations. To highlight certain aspects regarding nature protection various changes were made and do not correspond to reality.

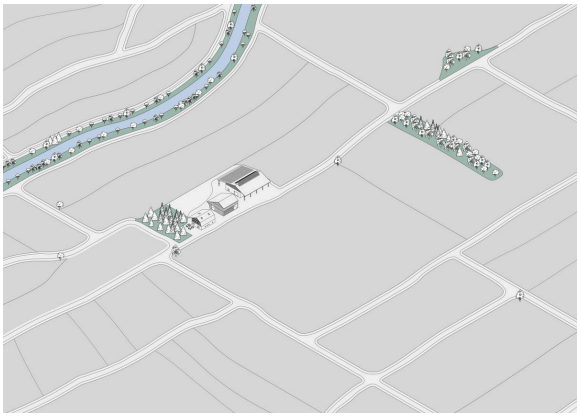
According to the daily experience of the farmer on the field, more insects and birds occur during harvesting season. Although his priority remains in feeding the people, he supports biodiversity enhancing measures. The 7 percent of required compensation areas are provided, but they are placed on remaining and less fertile soil. Regarding biodiversity they do not present adequate quality. Considering that the Hof Wiesengrund is situated next to the River Glatt with its shore meadow and tree clusters there lies a great potential for improvements.



Property of Hof Wiesengrund.



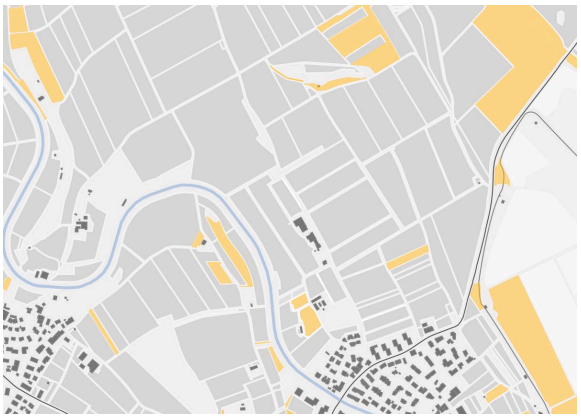
Biodiverstity promotion
areas of Hof Wiesengrund.



Remaining non-agricultrual
areas around Hof Wiesengrund.



Property of Hof Wiesengrund

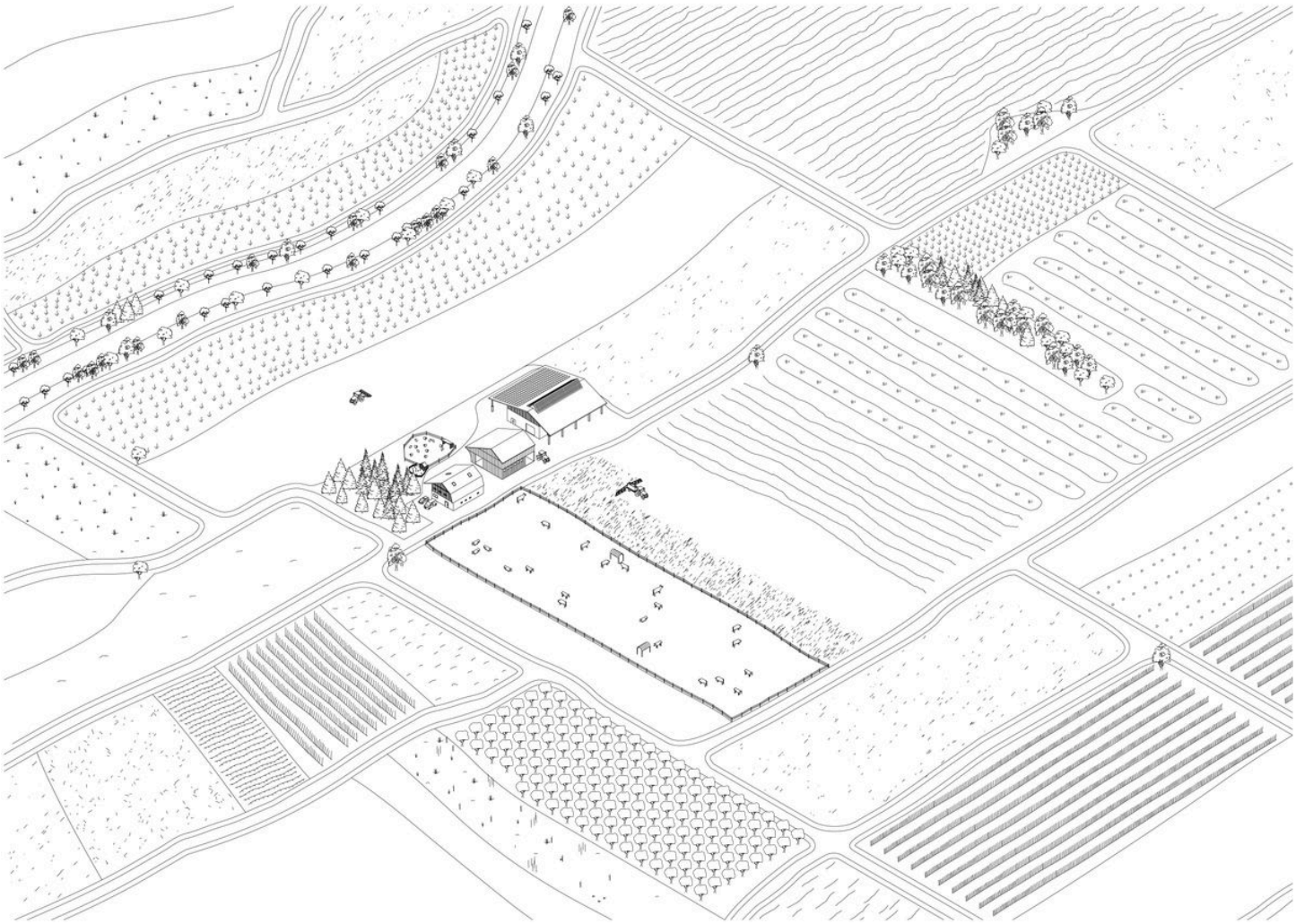


Biodiverstity promotion
areas of Hof Wiesengrund.



Remaining, Remaining non-agricultrual
areas around Hof Wiesengrund.

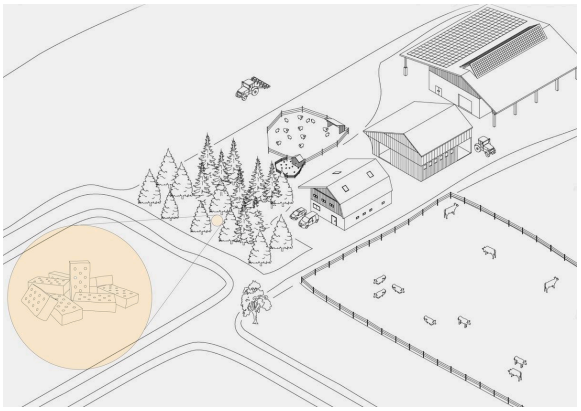
Hof Wiesengrund Revised:
The Bee's Perspective



In order to understand the current situation for pollinating insects the perspective will be changed. Based on an existing shelter for small animals, the area of the Hof Wiesengrund is analysed by means of the perception of a wild bee. The introduced bee radar examines the elements of food supply, habitats and acute threats.
A bees perception is highly different to the humans. The sight of a bee through faceted eyes and using a different light spectrum can only be assumed. The following representations mimic the bees perception playfully with a humble scientific background.

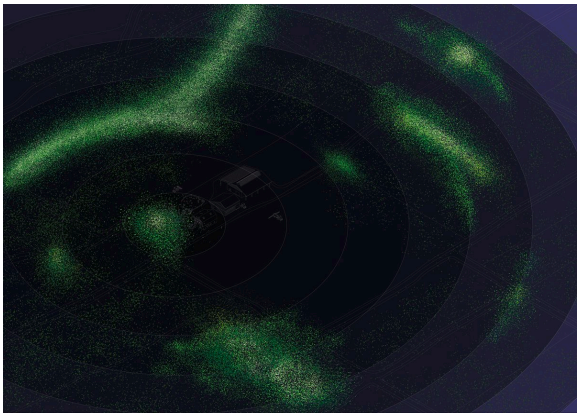


The bee radar.

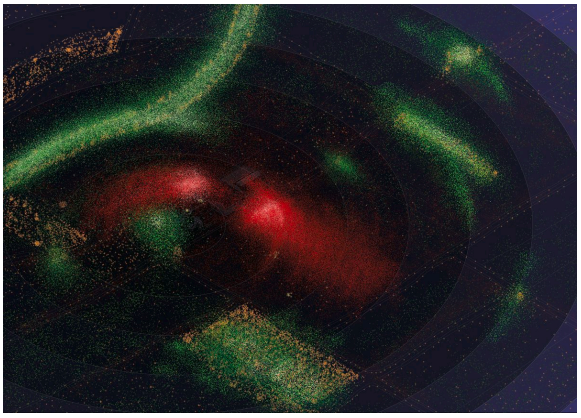


A pile of bricks as the starting point for the bee radar.

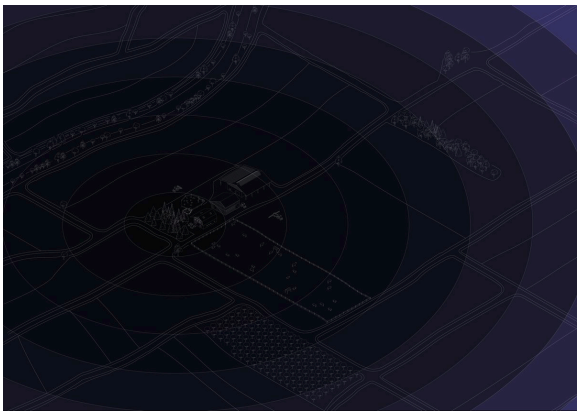
The exessive use of pesticides and liquid manure poses a massive threat for the bee. The poison often stands for exhaustion, confusion, or immediate death. Recognising and avoiding the danger is almost impossible for the pollinator. Cultivated fields do not provide appropriate habitat especially for hibernation. Remnants of nature, such as patches of trees, hedges, and untouched strips of uncultivated fields offer places to inhabit. Along water bodies such as the Glatt natural living environments are still preserved. Food sources are often correlating with shelters. Paradigmatic for this stands for example a plantation, which can be a great food source but may not provide a place to live. Single crop cultivation does not offer a diverse food choice whereas certain polinators have troubles finding the right food source.



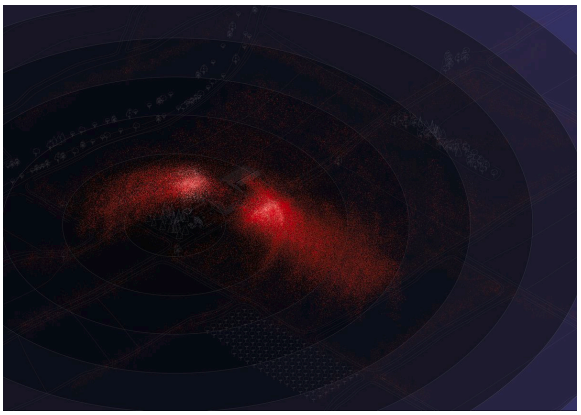
Bee radar showing possible habitat



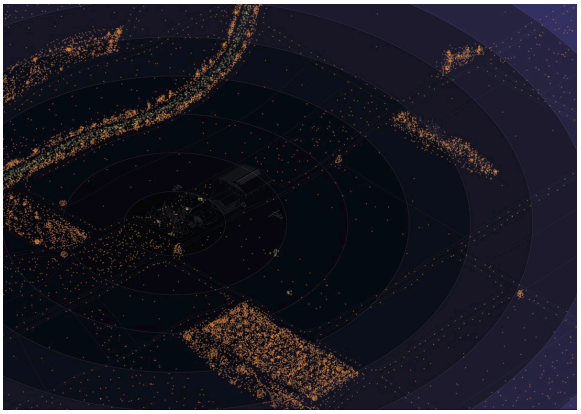
Bee radar showing acute dangers, food and drinking sources and possible habitats



Bee radar before Interventions



Bee radar showing acute dangers

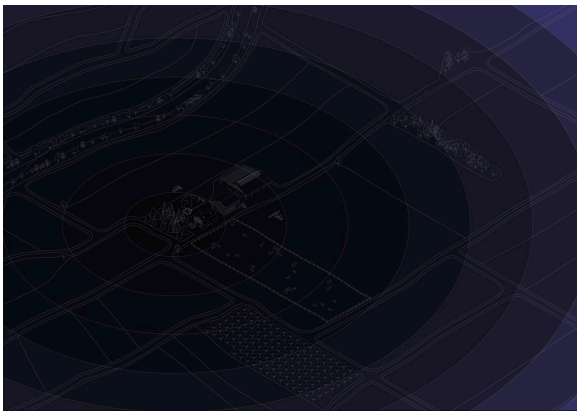


Bee radar showing food and drinking supplies

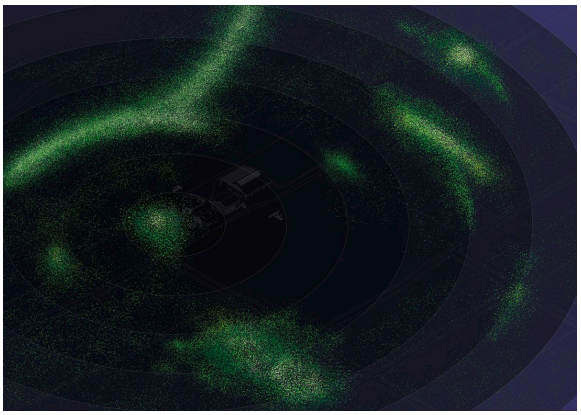
Implementing Tools in Favor of Biodiversity Networks

Recognising the problems at hand, solutions have to be found. Through the bees perspective the above mentioned tools can be implemented in a new design of the agricultural land. Apart from enhancing the quality of the biodiversial promotion areas, the goal is to link the newly created and already exsiting biodiversity fields.

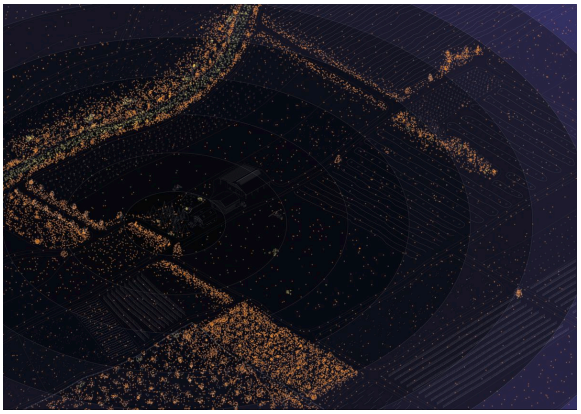
The acute dangers of poisoning can be significantly reduced by avoiding and replacing liquid manure and pesticides through more sustainable alternatives. In order to close gaps between biodiverse fields, additional food sources and possible habitats were imbedded. The applied tools create a dense network which then acts as a wildlife corridor. This simple and fundamental design can be adapted to a bigger scale and guarantees long term sustainability.



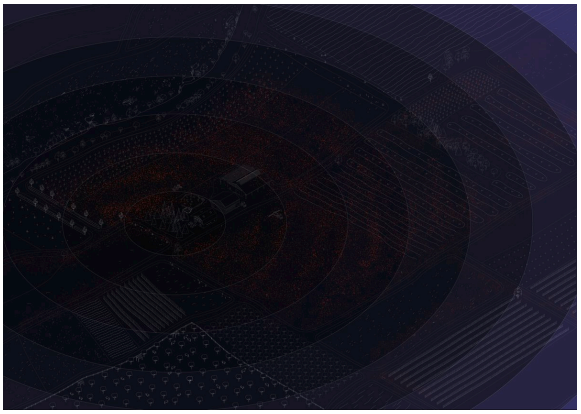
Bee radar after interventions.



Bee radar showing additional habitats.

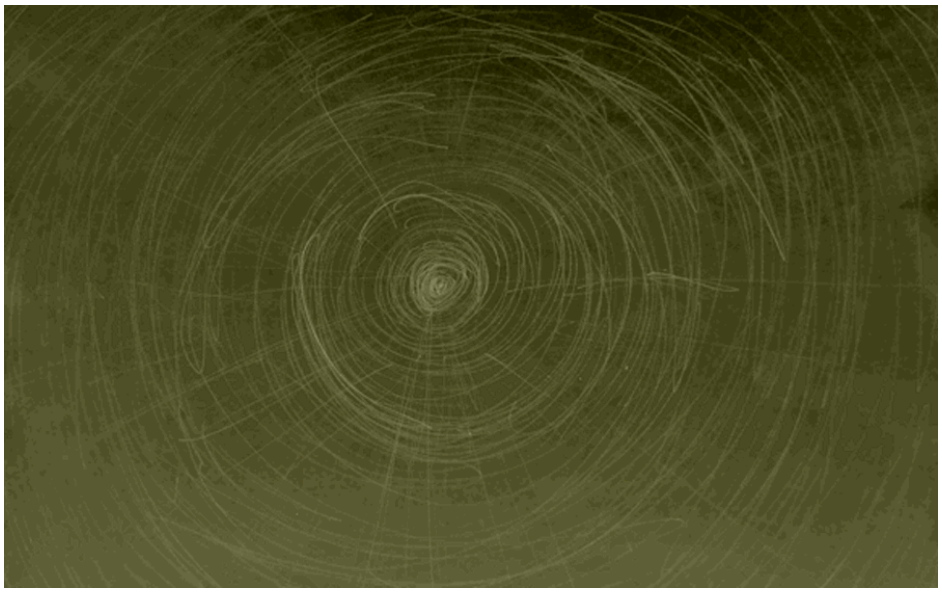


Bee radar showing increased food and water supplies.



Bee radar showing the reduced dangers.

A world without bees remains unthinkable. Over the course of more than a hundred million years, they learned to improvise and adapted well to the forever changing enivornment. Being one of the most important players in the global ecosystem, the various species of bees manage to secure a huge variety of viable food sources for animals, including humans. It is evident that modern-day agriculture poses an unprecedented threat for the pollinating insects and the need for a massive change is evergrowing. The unique story of the bee is only one of nine siginificant narratives tackling this vast field, covered in this unique framework. Scientists alongside activists praised the importance of the bee for centuries. It has become a symbol for the forty percent of endangered insects worldwide and they stay close to the hearts of most people around the globe. The measures to stop further endangerment in the field of agriculture are known, simple, and effective, but scarcley implemented. A brief gaze through the eyes of a bee helps to understand the elementary benefits of flowering strips and biodiversity fields, among other tools. In the end, it’s nothing but flowers.



Nothing but flowers.

The Last Bee

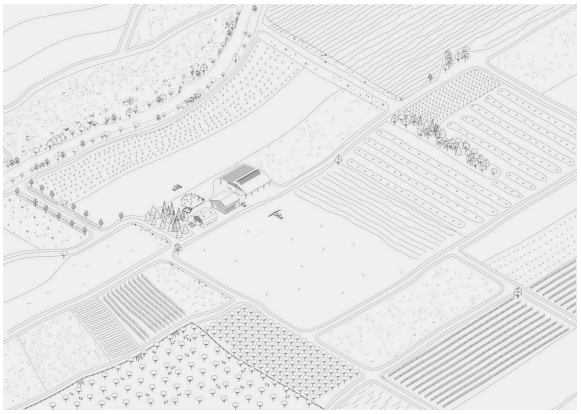
“After the last bee
had buzzed its last buzz,

the birds and the butterflies
did what they could.

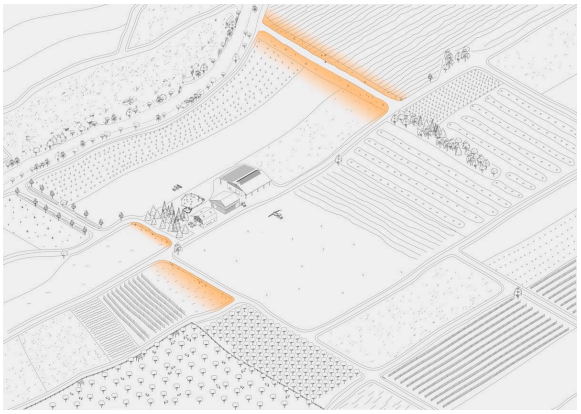
But soon the fields lay bare
few flowers were left,

nature was broken,
and the planet bereft.”

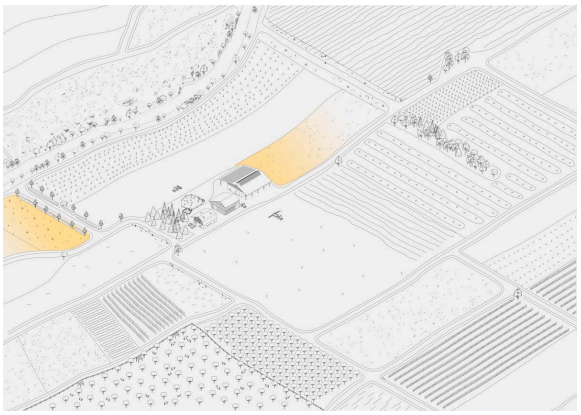
-Brian Bilston



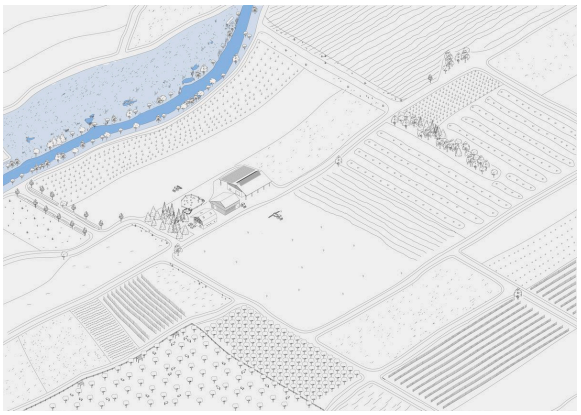
Hof Wiesengrund reorganised.



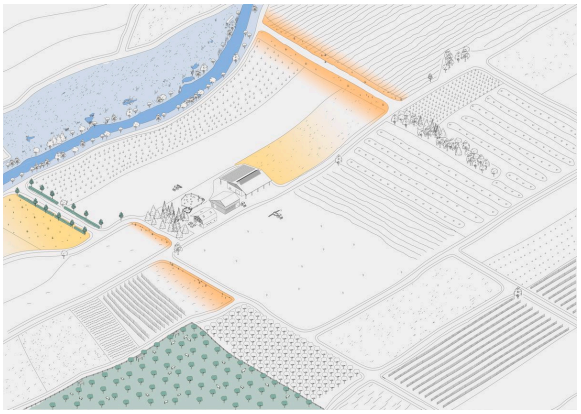
Insertion of flowering strips, seams
and brownfields on the arable land.



Repurposing meadows and pastures for more biodiversity.



Partial renaturation of the river Glatt.



The implemented tools form a network

ACKNOWLEDGEMENTS

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…and of course we would like to thank the teaching team of the chair Topalovic for accompanying us through this challenging semester!

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