Sustainable food production for the future

Bekeeping in the premises of the bees? What is the bee collapse telling us?

1. The situation of bees and beekeeping

How are the bees? How are the beekeepers? What is the condition of the bees and what is this telling us about the bees, nature and ourselves?

Bees are very specific and precise indicators. One bee colony collects honey and pollen in the surroundings, they visit blossoms in a square of about 100qkms. So the bees show directly how the condition of life and of nature is in this region. If you are able to read in a beehive, you directly see it connected with the health and the condition of these bees.
Since about 6 or 7 years people are very interested and I may say passionate interested in the fate of the bees. In many reports in TV or the newspapers was written about the dying of the bees, the disease of the bees, in Europe and especially the colony collapse disorder in America.
I think the term “dying of the bees” is a very severe expression, and thank to god: not a correct expression.
Instead of speaking about the dying of the bees, it would be better to say, that the situation, the condition and the health of the bees, in many regions of the world is precär and threatened. Especially in these countries, where modern agriculture and modern beekeeping is practicised. Bees live under critical circumstances and their future is threatened. It is difficult for the bees there to live a good and healthy life, and for the beekeepers to held the bees alive. There are many collapses of singular bee colonies, but not yet the collapse of beekeeping at all.
But this should be a strong and clear signal to us!

What is the expression of this crisis? The bee colonies suffer under diseases and parasites, especially the varroa mite. They need medicamental support, they are weak and the percentage of the losses of colonies increased clearly. When I started beekeeping 32 years ago, it was normal, to loose about 10% of the colonies during winter. There also happened catastrophical years with losses of 20 or 30% too, but very rarely. One time in 15 years. Today a loss of colonies during the winter in a rate of 20% is normal. In the USA it is 30%. And very often, we occur losses of 30% or more in Europe. And we have many problems

also in late summer: many varroa mites, many diseases like Sackbrood, and also many empty colonies at that time.
For example in Germany we expect this winter 30% dead colonies until spring: That means in absolute numbers; 300000 of 1 Mio colonies will die. That's very bad.
The rate of losses is double as high than in former years.
Beekeeping today is more difficult than I former times. It is much more difficult to keep the colonies alive and the beekeeper has to work hard to achieve this. But he cannot be sure.
We may say, the bees are much more susceptible now.
We suffer under Varroa, imported from Asia, since more than 25 years. 15 years ago it was sufficient to treat varroa one time in winter. At that time with chemicals. Then it was necessary to treat varroa one more time in late summer, to protect the winter bees. It was not necessary to treat young colonies in late summer. Now we treat Varroa 2 times in late summer, also the young colonies, one time also in winter. Many beekeepers treat more often and use biotechnical practises in spring too.
It is now necessary to treat more, earlier in the summer and more exactly. Every fault is punished hardly. The line of damage decreased. In former times the bees survived with a parasitic growth of 5000-10000 Varroa mites in one hive. Today the situation will become dangerous, if there are more than 1000 Varroa mites in one colony.

2. What are the reasons for this weakness of the bees and their susceptibility?

I am sure, modern, intensive agriculture is one of the main reasons for this susceptibility.

A. One point is the use of pesticides or the modern insectizides, especially the use of neonicotinoides, like Imidacloprid. With a superficial view it seems that the farmers reduced the use of chemics on their fields. But the character of insecticides changed totally. Today already the seed is stained whith the active agent. And it fluids into the plant the whole life of the plant.And if an insect sucks the juice of the plant, it will die. But the active agent is also in the nectar and the pollen, which are collected from the bees to feed the brood and to feed the colony. Very often the insecticides are only sublethal to the bees. But they weaken the bees, they shorten the life span of the bees, and make them susceptible for diseases and parasites.
Many beekeepers think only inseciticides are responsible for the dead of their colonies. But my experience shows me, that this is not correct. My bees live in different landscapes: in the citiy of Munich, in the Bavarian Alps, in intensive

agricultural areas. In the Alps and also in the town there is no use of pesticides. But the problems with the bees are the same everywhere.

B. So I think the monocropping, the too intensive utilisation of fields and meadows and as the consequence, the poverty of flowers and blossoms, the loss of biodiversity are much more important for the problems of the bees.
For example the practice of feeding the cows, gaining for milk and meat. These animals eat only little hay, no fresh grass, but mostly silage. Silage means , the farmer cuts the grass before the blossoms came and let it fermenting like Sauerkraut. For gaining hay, he cuts the meadows 2 or 3 times a year, for silage 6 -7 times a year. As a consequence there is not enough pollen and nectar and the insects are starving and are on the breadline . In quantitative and qualitative aspects.
The nourishment of the insects got much more worse through the decision of the german government to support gaining of bio energy, biogas, with a lot of money. The farmers cultivate mostly maize for gaining energy. And now 30 % of the german fields are planted with maize. This maize is full of neonicotinoides and a dangerous food, but also worthless for the bees as food. This maize monocropping is a very bad devellopement and we may say in Germany : **The landscape in many regions is no more able to feed the insects living there.** So food deficiency is normal and the susceptibility increases. Especially in late summer lack of pollen happens, when the bees need it urgently to breed the winter bees, which live 6 month or more, while summer bees live only 3-4 weeks. Overwintering of the colonies depends strongly from the health of the long-living winterbees.

C. I am convinced, the techniques and practices of modern, intensive beekeeping are highly responsible for the weakness and the susceptibility of the bees. The beekeepers use to manipulate their bees intensively to maximize honey crop.
I will show it to you later, but to express this situation in short words, we may say : **in comparism with their natural life, in modern apiaries the bees are no more allowed to live as a natural bee .**
Modern beekeeping can easily be compared with the factory farming. The animals exist far away from their natural needs and natural life, and have to follow the interests of their farmer strictly. **This is maximum of honey crop**
For me, it was not astonishing, that a bee catastrophe happened in the USA. There beekeeping is a really industry for pollination. Honey is not interesting. The beekeepers transport their bees over thousands of Kilometers from the south to the north to pollinate different cultures of plants, like almonds, cranberries, etc.

We know that transporting bee colonies several times a year produces stress. At first the transportitself for many hours, the bees cannot fly out and are excited. Scouting the new countryside several times completely new, is also very exhausting. They have to find new food sources and starve hunger and deficiency at first. In these plantages are very often insecticides used, if the bees are not transported very quickly to the next plantage. I got angry, hearing in interviews the American beekeepers grumbling about intensive agriculture. These beekeepers earned really lot of money by pollination and had no conscience about what **they** are doing with their bees. It is always easy to point to others with fingers. Easier to think about what you are doing yourself.

3. Why the crisis of the bees and beekeeping is a strong signal to us?

There are 2 reasons!
First: Bees and food production in agriculture are strongly connected. About 50 fruit and vegetable crops are primarily pollinated by honey bees and these plants and fruits together form the most nutricious parts of our daily diet. 50-80% of pollination in nature is done by honeybees. They are mostly responsible for the bio diversity of the flowers and blossoms in nature.
Why is it so? Bees are superior in comparison with bumble bees, butterflies or solitary bees. Because only honeybees spend the winter as a whole colony with 10000 or 15000 individuals. In spring they fly out in large numbers, while bumble bee queens are working alone and start up building a little colony during the summer.
Another reason is, that honeybees visit only one sort of blossoms during one flight. The effect of pollination is much bigger than a bumble bee changing from apple blossoms to pear blossoms, while collecting pollen and nectar.
Also the communication system in a bee hive is very effective gathering worker bees to fly to the best and richest blossoms. Bumble bees for example are only flying around, looking for nutricious sources.

The second reason, the crisis of the bees impacts us as human beings is more general. There are not many beings in the world, able to live in nearly all climate regions, from Sibiria to the African desert. I know only 2 beings who achieve this: Human beings with their cultural skills and techniques. And the bees as result of their vitality and ability of adaption to the environmental circumstances.

If such a vital being as the honey bee , gets difficulties to survive after millions of successful years, this should bring us to reflection. In future it could be probable, that we get also problems in surviving.

4. The difference between conventional beekeeping, organic beekeeping an bio-dynamic beekeeping

In this chapter I want to talk about the differences and I will also show you some details about the live of bees. This is very complex, but I will try to make it very simple.
Organic bekeeping is the result of finding chemical residues in honey, wax and propolis after varroa treatment. Organic rules allow only organic stuff for varroa treatment like Formic Acid, Oxalic acid, or biotechnical measures which never produce residues in the bee products. Also wood is the preferred material to build new hives. Also organic sugar should not be forgotten.
But the hive management to crop honey is completely unregulated and in the beekeeping reality the organic beekeepers use the same intensive methods like all the conventional beekeeper collegues to maximize honey production.
These methods and manipulations of the life of the bees are responsible for the weakness of the bees. I want to point out 2 examples later.
Organic beekeeping is part of the organic movement. The main reasons for organic agriculture besides residue free food production and help for the environment, are to improve humus production and to treat the animals with respect and to improve their health. Organic beekeeping has to leave the concentration only to residues, and has to change philosophy: Who, but the organic beekeepers should be pioneers in devellopement of beekeeping practises which improve the health and the vitality of the honey bee colonies.

Bio-dynamic beekeeping has gone this step, already 18 years ago, because natural comb building and using the swarming process for rearing young queens and new colonies are the main points of bio-dynamic beekeeping.

I will illustrate this in 2 examples:
A. Living in free nature, the bees only use natural builded combs made from new produced wax in the glands of 10 to 12 days old worker bees. A swarm occupies a new home, like a cave or a hollow tree. At once the bees start to build up new combs. These combs are necessary for the life of a colony, because all the life processes of a colony take place and are manifested on these wonderful structured combs. The combs are a kind of body, where the bee hive is personificated.
The young bees eat nectar an pollen and produce way in their own body. They then model the hexagonal cells and wonderful regular combs. In these combs the

honey is stored, the brood is reared and on these combs all the communication in the hive takes place.
The combs normally consist of new and pure wax. This has also a big influence on the honey quality. The own wax production in their body makes the difference of the bees to other insects like hornets or wasps, which use old wood to produce their combs made of a kind of paper.
In bio-dynamic beekeeping, natural build combs are normal at least in the brood chamber, as the most important chamber of a hive.
But producing natural combs costs honey. The bees need 5kg of honey to produce 1 kg of wax.
So the conventional beekeeper and the organic beekeeper too, use comb foundations for new combs. This means old combs and the wax of these combs are melt together and recyclet to new foundations in which the hexagonal structure is already pressed.in. But this method produces danger of residues because of the old combs, and suppresses essential life processes through which a bee colony incorporates itself and found itself as an organism. For that, new wax is essential, because the biography of a colony is pictured below in these combs.
If recyclet wax is used, the bees will find there the old biography of all the other colonies, which participated in the production of this wax.
Pure and new wax is also important for the communication which takes place on these combs and which is a communication using the finest smell of different comb sectores.

B. **The swarming process**
In nature, new colonies are found and new queens are reared by the swarming process. What does this mean? Normally a bee colony is a strongly related organism.
This organism dissolves itself when there is the need to found new colonies and many young queens. This takes place in spring and early summer, if the hive is full with honey, or the queen is old and weak. There are also further reasons.
Now the dissolving process begins: the worker bees build queen cells, quite different from worker cells. The queen lays eggs into these cells. The growing larvae there eat much royal jelly. Worker larvae are feeded with less royal jelly and much pollen.
9 days after the first queen egg has been layed into the cell, the pre swarm flys out. This is a swarm of about 10000 bees and the old queen. They fly to the next branch, sit down there as a cluster and the scouting bees look to a new home. There then the life process, wax, combs, as I told you, etc starts again.
8 days later, the next swarms will fly. 3000-5000worker bees, with one or more young not matured queens. They also look for a new home and there start life as a new colony.
The dissolving and refounding of the organism comes from the center of the first organism, from the bees themselves. This process is completely self organized.

The conventional beekeeper is afraid of swarms. He fears chaos and a big loss of honey. So he manipulates the hives, to suppress swarming attitude. He weakens the colonies taking away bees and brood. He knows many tricks to work against this natural process. The beekeeper manipulates the colony to rear queens from worker larvae. This process exists also in nature but is there a makeshift solution if the old queen dies or disappeares unforeseen. Later in nature, this not optimal queen is replaced by a real queen. The modern beekeeping uses this makeshift solution as the regular method to rear queens. These queens are not perfect. This weakens their vitality and power to keep the organism close together by pheromone production.

In intensive beekeeping, new colonies are found at a time which is good for the beekeeper, not for the bees. The beekeeper mixes bees and brood combs together. Brings a new, artifical queen to this formation and ready is the new colony. **This goes mechanistic and under the beekeepers arbitrariness. The beekeeper suppresses the natural process, manipulates this process and subordinate it under his interest of maximum honey crop.**

The bio-dynamic beekeeper gives attention to the natural processes and tries to cultivate them. New colonies and new queens are the result of the swarming process in his apiary.

5. Perspectives

We see a big crisis in the world of the bees. This crisis is also the expression of a fundamental crisis in nature. Our way of agriculture, inclusive modern beekeeping is responsable for this developpement. The hive management weakens the bees.
But the end of this process is not obligatory the catastrophe.
I am working in Egypt at the SEKEM farm in a bee project. In Egypt the bees are so weak and ill, I had never seen such a thing in Europe. But with some little treatments we improved the health of the bees in a short time. It was astonishing for me, how fast the regeneration of the bees took place.

In the world there are some bee races, like Apis mell. Cerana in Asia, or the So called “murder bees” in Brasil, which are able to coexist with varroa without medical treatment. Scientists showed now, that also our European bee, Carnica or Mellifera, is able to coexist with varroa after a difficult selection process. But the fundamental condition for this surviving was, that the swarming process took place over some generations of bees. These scientific results show a direct way into the future.

So the standarts of Bio-dynamic beekeeping are on a good way. But many questions are yet open..

All this showes that the beekeeper is one important reason for the weakness of his bees. But he could also help the bees to build up more vitality and help them to get healthy. But he has to developpe his awareness and his respect and honour towards these animals. This has to be the first step.

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