

Biodiversity, sustainable apiculture and social development

Introducing organic apiculture in Egypt - experiences and learning processes in a pioneer project

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*Since three years a bee project exists, about 60 km North-East of Cairo on the banks of the Nile river delta. The overall objective is to set up the first DEMETER beekeeping **scheme** in Egypt. But the state of apiculture there is precarious, and Egyptian beekeepers face numerous problems. In general, bee colonies are weak and show poor vitality and performance. In this paper the authors approach how local conditions and processes can be understood, and how - in cooperation with local colleagues - an appropriate management concept might be introduced successfully.*

*A main target is the conservation of the indigenous bee species **apis mellifera lamarckii**, which is almost extincted. At a later stage the objective is to offer training and education on beekeeping practice for students and women, allow them to improve their families livelihoods.*

SEKEM – a holistic project

SEKEM is a large biodynamic, anthroposophic project located north east from Cairo. It was initiated by Dr. Abouleish in 1977. The aim was to turn the desert into green, flowering land, by a common and harmonized development of agriculture, commerce, cultural and social life. Today more than 2000 people work at SEKEM, and more than 2000 ha are cultivated bio-dynamically. Six enterprises produce organic clothing, DEMETER remedies and foodstuff. Furthermore, there is a Waldorf school, an academy for art and philosophy, and a medical centre for people from the whole region.

The SEKEM initiative was the starting point of the bio-dynamic movement in Egypt, today more than 100 farms are associated. In 2003 Dr. Abouleish and SEKEM were awarded with the alternative Nobel price.

In SEKEM there is an apiary comprising about 100 colonies, which were kept under conventional management until 2007. The task was to convert working methods according to DEMETER guidelines. The management was assigned to Islam Siam, a young Egyptian with a professional background.

The bee project

Beekeeping in Egypt has developed over millennia as an impressive culture.

Colonies used to be kept in so-called bee-walls, i.e. pipe hives from mud from the river Nile and straw. Sometimes these bee-walls did house up to one thousand colonies. To exploit different nectar sources beehives were transported on the Nile.

There was just one indigenous species in the Nile valley: *apis mellifera lamarckii*

It is small in size, almost like a housefly. The queen is as large as a European honeybee worker. The colouring is remarkably red. The colonies are small, but show a pronounced tendency to swarming, thus generating a considerable number of virgin queens.

Honey yields are low, about 3 – 4 kg only per hive and year. With the long apiculture tradition in mind I expected a conversion to DEMETER beekeeping to be feasible in a rather short period. Initially a number of larger apiaries were visited, and contact was made to bio-dynamic farms comprising beekeeping activities, as well as to the Department of Apiculture of the University of Cairo and Assiut, and the Egypt Ministry for Agriculture.

The inspection of the SEKEM piary and other apiaries did reveal very soon the impracticability of easy conversion. Colonies were generally weak with a precarious appearance and performance. Several brood diseases were obvious, occurrence of *varroa* mite was on a high level. Yields were low, while feeding was about 15 kg sugar throughout the year. Colonies did not have the power to develop a viable unit, to multiply by swarming, not to mention building fresh combs. These facts did basically change the settings for the SEKEM project. A first intermediate task was to find out the causes for the elementary weakness as a key for stabilization of the colonies.

The search for stress factors

Numerous talks to local people and colleagues did reveal that the situation was quite different just 30 years ago. Strong colonies and high yields were common. However, since then the appearance of the cultivated landscape did change a lot. An increase of artificial agricultural inputs, the widespread of pesticide application, the decline in diversity of nectar producing plants did contribute to the today's situation.

Since many years queens and colonies are being imported from Europe, consequently followed by a total suppression of the indigenous bee species. During the first years it seemed to work, but meanwhile the descendants of the imported colonies show striking deficiencies. Egyptian beekeepers did propagate without selection, thus causing a decreasing level of breeding. Today most colonies do not cover more than five or six Langstroth combs.

As honey is expensive in Egypt, intensive use and exploitation of the colonies came very much to the fore, neglecting the bees needs. The beekeepers remove honey throughout the summer. As soon as some honey is located in the combs it is immediately harvested, even from brood containing combs. Then sugar solution is fed, which causes a decrease in honey quality. As no supplies remain in stock the colony is under permanent stress. Brood nests are small and holey, and there is hardly any comb renewal. The combs are old and dark. Comb foundation wax is usually adulterated with paraffin. Egyptian beekeepers use to locate up to 600 hives on own grounds next to their home, which causes a serious infection thread. The risk of robbery and competition for food is high. Under given circumstances colonies remain simply too small and weak.

Countermeasures

After extensive identification of different reasons for the colonies weakness it was decided how to introduce measures for strengthening and stabilization. On SEKEM grounds, from this season on the hives will be distributed in an open formation. Meanwhile the cultivation of nectar-spending plants will be extended. Harvesting and feeding operations will be converted. There will be only one harvest a year - in July. All honey in the brood chamber will be left with the bees, and combs containing brood are not longer used for extraction. After harvest colonies are fed with the total quantity of sugar which they will need during winter. Most colonies had problems to take in more than one or two litres in a few days. During hibernation the colonies should not be disturbed, contrary to the previous practice of feeding by-weekly only small amounts. Bees don't have sufficient supplies at this time a year.

Converting *varroa*-treatment

As in many other apiaries *varroa* treatment was usually done by formic acid (FA). Though beekeepers became increasingly conscious about the problem of residues, chemical remedies as *Perizin* or *Apistan* are still applied in most apiaries. However we made the experience that FA is estimated as being inappropriate, as evaporation is massive in Egypt's hot climate, and causes considerable damage on bees and their brood. Since spring 2008 lactic acid has been applied in SEKEM. A 15% solution is safe for bees and effective at any temperature. It is well-proven and successful and *varroa* is not longer life-threatening to the bees.

A different approach to apiculture

Our focus in breeding bees is on the selection of vital and well assimilated strains. However, in this respect there are only very few strains worth to be propagated. The process of selection is time-consuming. Furthermore, specific parameters must be developed, as there is no remarkable experience in this field in Egypt. It is remarkable, but Egyptian beekeepers are not conscious about the

basic requirements and necessities of selection. Nuclei are usually raised by putting a single brood comb with bees into a separate hive within the same apiary. While being fed the bees now start raising several queens. The queen which hatches first will be the coming colonies mother. In Egypt the importance of working with a carefully selected bee became very obvious, as well as its adaptation to climate and landscape conditions.

The current state – first achievements

Reducing stress factors and careful selection did help to improve bee health thoroughly, and omnipresent massive brood diseases which occurred until 2008 almost disappeared.

Antibiotics, usually a common agent in Egypt, were not applied. The number of weak colonies did decrease. Pollen supplies are better now, all colonies had good quantities in stock. Seizing food for overwintering works better, brood nests are complete. Larvae lay in a good portion of royal jelly and are not longer starving as before. Next to the alighting board one will find hardly any dead bees. These results are encouraging to continue the chosen working methods and intensify selection.

Apis mellifera lamarckii

While the described measures aim to strengthen the vitality of the European honeybee strains which are preferred by the Egyptian beekeepers, the project tries to tie in with the tradition of using the old-established indigenous bee. *Apis m. lamarckii* has a bad reputation in the beekeeping community, and has been nearly eliminated during the past decades. While about 96.000 colonies were counted in 1995, ten years later the population was reduced to just 15.500, mainly present in the Assiut region (Central Egypt). Nevertheless it seems reasonable to readopt the work on that breed.

As there has been no selection or breeding target for a long time, the remaining colonies are in an extremely poor condition, except of a few really nice and vital ones. Actually SEKEM bought 200 colonies of them and will start an ambitious propagation program. On the one hand this will be a contribution to conserve this breed, on the other hand a good basis for a consequent selection will be provided. The colonies will be hived in a specially designed top bar box, as the traditional pipe-hives from straw and clay are not appropriate to up-to-date apiculture. An effective *varroa* treatment is not feasible. Colony size, vitality, health and performance will hopefully be amended, and the breed might become attractive and economically sound again for the local beekeepers. This is the only chance to ensure its further existence. Under aspects of biodiversity the disappearance of this globally unique bee was a pity, as *apis m. lamarckii* is interesting in terms of its biology and genetic potential. A tolerance potential against *varroa* should be examined, as small cell diameter, a short growth phase,

an expressed cleaning and social behaviour suggest an according character. In general this bee is adaptable, construct virgin combs readily and perform a high propagation rate through swarming. A conversion to DEMETER is likely to be successful.

Social aspects

The SEKEM bee project aims to involve students of the SEKEM schools, the Professional Education Centre and the Environmental Service Centre, to get accustomed to the handling and care for the bees. A special target group are young women, as experiences in other countries prove their pronounced aptitude for beekeeping. Later on they can be supported in setting up their own organic apiaries. SEKEM might commercialize this premium quality honey that meets the standards for ecological honey throughout the Arabic market, where it is in high esteem. For quite a number of families this sustainable work might create a sound chance for developing sustainable livelihoods and improved living standards.

In conclusion, as a pre-condition for a successful project the described problems in Egyptian apiculture must be addressed and solved by measures as outlined above, to enhance bee's vitality and biodiversity.