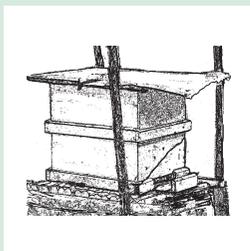
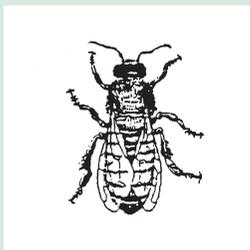


Beekeeping in the tropics

Agrodok 32 - Beekeeping in the tropics



partageons les connaissances au profit des communautés rurales
sharing knowledge, improving rural livelihoods



Agrodok 32

Beekeeping in the tropics

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This volume is published in cooperation with NECTAR, Netherlands Expertise Centre for (sub)Tropical Apicultural Resources. NECTAR is the association of tropical bee-keeping experts in the Netherlands.

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Foreword

You can keep bees as an interesting hobby or as a source of income. This booklet provides you with information on how to work with honey bees. In most regions of the world this will be the European bee *Apis mellifera*, although in large parts of (sub)tropical Asia the rather similar species *Apis cerana* is more commonplace. Although the composition of a honey bee colony is basically the same all over the world, the management of bees must be adapted to the species and race, the climate and the vegetation. If you want to start keeping bees it is advisable to start with the existing regional methods. Finer skills of this occupation can only be learnt from experience, step-by-step.

Try to obtain information and assistance from a beekeeper nearby. You could also approach your Ministry of Agriculture or Forestry, which often has a Department of Apiculture that organises demonstrations and courses, offers assistance and sometimes even provides bee colonies. The importance of starting at local level and to experience the profits beekeeping might offer is stressed in this booklet. Low-input techniques, implying the use of local bee races as well as local knowledge and local materials, can be the basis of successful beekeeping for individuals and for large projects.

While the authors who cooperated in the revision of this Agrodok are experts in their field of apiculture, this booklet is not a piece of scientific work, nor are the subjects covered completely. The purpose of this booklet is to indicate that beekeeping is possible also with little means. The chapter *Seasonal Management* by Marieke Mutsaers is new in this revision and is an important approach for sustainable production with hived bees. This publication has been published at the same time as Agrodok 42 : *Bee products*.

On behalf of all the co-authors of this Agrodok,

Leen van 't Leven

Chairman of NECTAR

Contents

1	The value of beekeeping	6
2	Composition of the colony	10
2.1	The queen	10
2.2	The workers	11
2.3	The drones	14
3	The daily life of a colony	15
3.1	The swarm	15
3.2	The development of the bee	15
3.3	The development of the colony	16
3.4	Swarming	17
3.5	Absconding from the hive	19
3.6	Replacement of the queen	20
4	How to start beekeeping	22
4.1	Comb building	22
4.2	Hiving a swarm	23
4.3	Administration	26
4.4	Inspection	26
4.5	Feeding	27
4.6	Handling bees	29
4.7	The honey harvest	30
5	Beekeeping equipment	33
5.1	Fixed comb hives	33
5.2	Removable comb hives with top bars	35
5.3	Removable comb hives with frames	38
5.4	Other equipment	44
5.5	Choice of hive site	50
6	Seasonal management	51
6.1	Natural development of a bee colony	51

6.2	Seasonal management	53
6.3	Hive size and honey production	57
6.4	Seasonal management and hive type	58
6.5	Good seasonal management practice	62
7	Honey extraction	64
8	Production of beeswax	69
9	Collecting pollen	71
10	Diseases and pests	73
10.1	Prevention and correct diagnosis	73
10.2	Varroasis	74
10.3	Wax moth	76
10.4	Ants and termites	77
10.5	American Foul Brood (AFB)	78
10.6	Chalk brood	79
10.7	Nosema	80
	Further reading	82
	Useful addresses	84
	Glossary	86

1 The value of beekeeping

Bees are found all over the world, from the tropics to the arctic, in rain forests as well as in deserts. There are over 20,000 species of bees, some of which are small, others are large, and each species has adapted to the specific conditions of their environment. The vast majority of bees live a solitary way of life, but some species such as the honey bees and stingless bees live in colonies. Honey bees collect large amounts of food, which they store in order to survive the periods when conditions are adverse. Man has harvested these stores of honey and pollen for thousands of years, and just like the honey bees, beekeepers are found all over the globe, although the technology they use varies with the region.

In order not to kill the colony, the beekeeper needs to avoid extracting the honey and pollen at moments when the bees cannot replace it, or he or she should provide them with adequate supplements. Such exploitation of the bees makes the beekeeper a professional. He or she takes care of the bees like a farmer takes care of cattle. Honey bees provide us with honey, wax, pollen and propolis, and are important pollinators of many of our food crops.

Species and races of honey bees

There are altogether eight species of honey bees, most of which are found in Asia. Only one of these species occurs in other parts of the world, either naturally or imported by man. The scientific name for honey bees is *Apis* (hence: apiculture), followed by a second name that is particular to each species. Two species are domesticated and used in beekeeping: *Apis cerana* in South East Asia and *Apis mellifera* worldwide. The Asiatic species *Apis dorsata*, *Apis laboriosa* and *Apis florea* – though living in the wild – are exploited by honey gatherers.

Honey

About 80% of honey consists of sugars that are readily absorbed by the body and it is therefore an extremely suitable food for children,

sick people and those who perform heavy manual labour. It is a pleasant-tasting food and a sweetener for food and drinks as well as an effective medicine for treating superficial wounds and throat complaints. Its economic value is high and hence it is a good trade commodity. In many countries honey is used to make beer or wine, which can be healthy if not consumed in too large a quantity, and it can be preserved and sold.

In 2002 world honey exports totalled 1,250,000 tonnes, 20% of which came from the tropics. About 700,000 tonnes were sold and exported to countries where local production was insufficient to meet demands. Prices vary, but on the world market the price is between 1.00 and 2.00 per kg. Local prices are, however, usually much higher, sometimes even up to 10 times world market prices.

Table 1 shows average yields per colony in some regions.

Table 1: General averages of annual honey yields per colony

Continent	Average yield	Continent	Average yield
Europe	11 kg	Oceania	39 kg
North America	24 kg	Asia*	18 kg
Central America	25 kg	Africa	8 kg
South America	14 kg	(* both <i>Apis. cerana</i> and <i>A. mellifera</i> colonies)	

The honey yield largely depends on the climate, vegetation, bee species and the skills of the beekeeper. Bearing these factors in mind and in accordance with their income and skills, beekeepers may choose from the following possibilities:

- Having a few colonies around the house or somewhere else at a fixed place
- Migrating seasonally with the colonies to different forage areas
- Keeping bees as a part-time activity
- Full-time professional beekeeping

Whatever the chosen scale, a beekeeper will be busier at certain times of the year with preventing swarming, collecting the honey and feeding the colonies, for instance.

Beeswax

Wax is used in the manufacture of cosmetics, candles, foundation sheets for hives, medicines, polishes, etc. You will find an extensive list of practical applications of beeswax in Agrodok 42 *Bee products*. There is a good and very stable market for beeswax. World market prices vary between 2 and 3.5 per kg and this variation again is related to quality differences.

Wax production varies between 0.2 and 0.5 kg per hive per year when frames are used and between 0.5 and 2 kg when the honey is pressed and all the combs are melted down.

Pollen and propolis

Bees gather an average of 100 to 200 g of pollen per colony per day: 30 to 50 kg per year! They use the pollen to feed their larvae. You can harvest the pollen collected by the bees using a simple trap at the flight entrance of the hive. You should, of course, only collect a part of it so as not to seriously inhibit the development of the colony. Pollen can contain up to 35% protein and can be eaten dry or added to other foods. Pollen is sold to the perfume industry and also used for consumption and for medicinal purposes.

Pollen must be protected against moisture. It is hygroscopic, which means that it attracts water, and it deteriorates quickly when attacked by fungi. For further details please refer to Agrodok 42.

Propolis is a resin that bees collect from plants and they use it to cover the inside of the hive. The market trend for propolis is increasing as it has some therapeutic and antibiotic characteristics. *Apis cerana* does not collect propolis.

Pollination

The greatest added value of beekeeping lies in the fact that bees pollinate agricultural and horticultural plants. When a bee has found the flowers of a certain kind of plant, it investigates their profitability. If the flowers produce a fair amount of nectar and/or pollen, the bee will

encourage her hive-mates to use this source. The bees will visit these flowers as long as sufficient food can be collected from them. This flower constancy makes bees exceptionally valuable to plants needing to be cross-pollinated. If there are enough bee colonies in the area at flowering time, the plants will give higher yields and the quality of the fruits will also be improved.

In many tropical regions, however, farmers are still unaware of how beneficial bees are to their crops. Of course it is not only the honey bees that pollinate, all bees except the parasitic ones play their part. It is unfortunate that in many regions of the world modern agricultural techniques have caused a decline in the abundance of naturally occurring bee species.

The importance of bee pollination has been demonstrated by a vast range of plant species. Table 2 gives a few examples, but many more have been documented.

Table 2: Yield effect of bee pollination on tree species (Coleman, Zimbabwe, 1997)

Tree crop species	Hives per hectare	Yield increase
Nectarines and peaches	No data available	85%
Citrus fruits	1	40%
Lychee (<i>Litchi chinensis</i>)	No data available	35%
Kiwi	3	60%