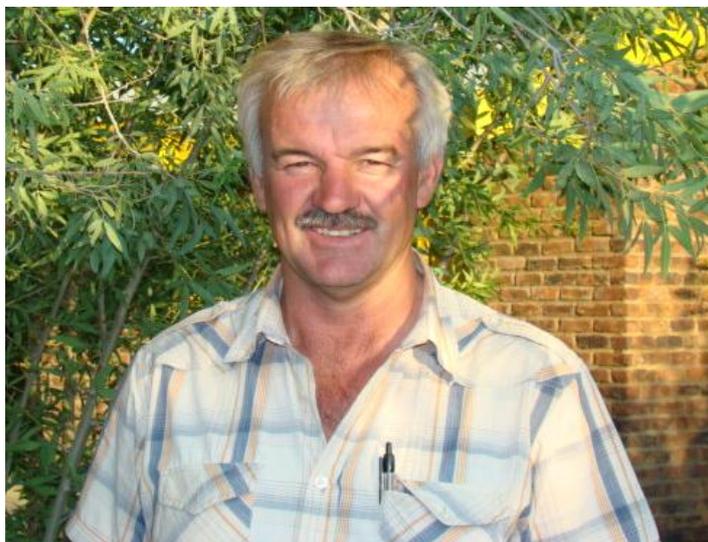


Global Pollination Project and Honeybee Forage Project South Africa

Implemented by the South African National Biodiversity Institute (SANBI) as part of the GEF/UNEP/FAO Global Pollination Project (GPP), also entitled "Conservation and Management of Pollinators for Sustainable Agriculture through an Ecosystem Approach"

Profile: Theunis Engelbrecht – Beekeeper



Theunis Engelbrecht

Introduction

The purpose of the case studies/profiles of the GPP is to showcase practices that have a different approach and are therefore of interest and possible value. In the South African project, individual farmers and beekeepers are reliant on and work with honeybees. Farmers utilise honeybees for pollination of their crops and commercial beekeepers use honeybees to provide pollination services and/or to make honey. The way farmers or beekeepers utilise honeybees has often been developed individually through years of learning and experience. While the different practices discussed in the profiles are not scientifically proven to have benefits (such as increasing agricultural yield or promoting pollinator conservation), they mean something to the individuals in the profile and may inspire people in the sector to explore alternative practices and possibly result in scientific research being undertaken. It is through the exploration of a range of different practices that lessons may be learned and applied at wider scales to benefit both agricultural and environmental conservation considerations.

Many farmers and beekeepers in South Africa undertake innovative practices relating to pollination issues, and it is unfortunate that we cannot profile more. We hope that the profiles/case studies that we have chosen to present are understood as being just some of the many interesting practices that could inspire discussion and consideration, and not as the championing of any particular practice or person.

We decided to profile Theunis Engelbrecht as Theunis is a good example of a beekeeper that transports his honeybee's very large distances across much of the *scutellata* region of South Africa for honey flow and to provide a pollination service to farmers.

The Project Management Unit in South Africa sent a questionnaire to Theunis Engelbrecht on 3 September 2013 and received it back on 14 November 2013, after which various aspects were followed up via telephone. This document is structured in such a way as to first tell Theunis' story in his own words. A short "lessons learned" section at the end discusses some of the possible implications of Theunis' practices.

Disclaimer: the practices discussed in this document have not been scientifically proven. This profile is therefore intended as an anecdotal account from which readers may draw their own conclusions.

Theunis' history of beekeeping

Theunis is a beekeeper/farmer based in Douglas in the Northern Cape of South Africa, but moves his bees large distances to the Free State, Northwest and other parts of the Northern Cape. Theunis' interest in beekeeping started in 1973, when he was in Grade Seven. He recalls that after the good rains that year, "there were a lot of wild bee swarms moving around" and he decided to catch some swarms. Thus he started beekeeping as a hobby to earn some pocket money. After extensive apprenticeships under other future commercial beekeepers, as an adult Theunis branched out to create a commercial beekeeping operation called "Douglas Bee Farms" that produces honey and rents out hives to farmers to pollinate their crops.



One of Theunis' apiary sites

Theunis' farming system: colony and forage management practices

Theunis spends 80% of his time as a beekeeper on crop pollination practices. Theunis provides pollination services to farmers in the Douglas area, to farmers in the rest of the Northern Cape (such as Augrabies, Groblershoop, Marydale, Prieska, Barkly West and Victoria West districts), to the Welkom and Bloemfontein areas of the Free State Province, and to farmers in the North West Province, such as in Delareyville. Often the distance that the bees are transported is up to 400km in one direction.

The crops to which Theunis provides a pollination service are: cucurbits, vegetable seeds, pasture crops and sunflower hybrids. The biggest pollination service is on sunflower hybrids. Theunis says that the period bees are needed for pollination varies between the different crops and can range from 18 to 42 days. The pollination of cucurbits can be anytime between November and March. The pollination of most vegetable seeds (of which onions are the biggest crop) mainly occurs between October and November. The pollination of pasture crops like lucerne takes place mainly between early December to the end of January and sunflower hybrid seeds usually from January until end of March. The following table summarises how Theunis moves his hives between provinces for pollination during certain months:

| Crops | Months | Regions |
|------------------------|---------------------|----------------------------|
| Onion seeds | October to November | Northern Cape / Free State |
| Cucurbits | November to March | Free State / Northern Cape |
| Lucerne | December to January | Northern Cape |
| Sunflower hybrid seeds | January to March | Free State / Northern Cape |

Theunis spends 20% of his time on producing honey. The honey is mainly produced from *Acacia mellifera* / *Senegalia mellifera* (Blackthorn or Swarthaak) trees, *Ziziphus mucronata* (Buffalo thorn), lucerne and various kinds of eucalyptus trees. According to Theunis, honey in the Northern Cape region has very low moisture content due to the high temperatures. In addition, most honey is very light in colour. The honey from the area crystallizes slowly because of higher fructose content. Although beekeepers are far from the market, there is a great demand for honey in the region.

Theunis maintains he has some practices that give him an advantage related to the competition, which he notes can help a business owner a great deal in the pollination industry. He has been to the United States of America and Canada several times with the specific aim to obtain more

knowledge about pollination services. In future, he feels, South Africa will also develop a combination of honeybee and leafcutter bee pollination for most of the pollination services.

At Douglas Bee Farms, beekeepers only use 'deeps' ('deeps' are a type of frame/box usually used for brood rearing and located on the bottom of the hive) as both brood and super boxes. This makes it a lot easier to split swarms, as well as to manipulate swarm strength. Theunis also builds his own hives and other equipment (floors, lids, traveling screens) and all are uniquely designed to suit his purposes and the area in which he keeps bees. When doing pollination services, Theunis tries to have sufficient numbers of bees in as few as possible hives – but not in a state to swarm. Theunis recommends $\pm 40,000$ honeybees/hectare (four bees per m^2) on an onion field, with back-up hives available to bring in if needed. Bees have the ability to double this figure themselves if the circumstances are suitable. Thus he uses three double brood boxes (with $\pm 30,000$ bees per box) per hectare. That gives $\pm 90,000$ bees per hectare which allows $\pm 50\%$ on flight and $\pm 50\%$ working on the onion flowers. To do this with a brood box and only a shallow super takes the hive, in many cases, to the brink of swarming. Swarming is undesirable, thus the use of 'deeps' for the super prevents this from happening.

Theunis notes that small or new developing swarms are energetic and work well, but it is difficult to create enough bees to supply all the possible demand for pollination services. Small-sized swarms are also more vulnerable to bee-pirates and can easily be destroyed by ants and bee-eating birds. Smaller swarms also have a negative effect on transport costs due to requiring more space.

According to Theunis, nobody in the world knows scientifically why bees are sometimes very attracted to onion flowers, while in other years the bees are not interested at all. The beekeepers know that red onions are a lot more constant in production compared to white onion cultivars. This is mainly because of pollination consistency, and this may be where the secret of onion flower attractiveness for bees lies. Theunis noted that a good healthy field of onion plants, with as little as possible spraying of agro-chemicals from bulbs/seed to final product, very seldom has a pollination problem.

Douglas Bee Farms also use pallets under the hives, for various reasons, including: the protection of boxes against vandalism and predators (badgers, baboons), airflow between the boxes while in transit, lifting the hives ± 15 cm off the ground to protect the boxes (bees) against water infiltration, and for mechanisation (use of a forklift to move the hives).

Theunis uses the same technique as he uses on onions for pollinating other crops to try and create a situation where the farmer and the company obtains the best possible benefit from the bees. He notes that it is very important to ensure that the bees are able to survive the pollination period. To create this balance, Theunis says that one has to take into consideration the different and changing circumstances with each crop and each field. Being involved in crop pollination since 1979, Theunis has developed a wealth of experience in the basics of pollination services. He notes that with ever-changing varieties and agricultural methods, or requirements from farmers; the beekeepers need to keep up to date to make sure they are able to fulfil their role in the balance between pollination and the pollinator agent.



Theunis loads his hives onto trucks via forklift

Costs and benefits of practices

Theunis notes that being a bee-farmer in the *scutellata* region (as opposed to the *capensis* region in the southern part of South Africa) makes good economic sense because the honey loads are larger and there is a growing demand for crop pollination services. However, Theunis notes that the costs of operating in the *scutellata* region are high. For example, winter forage is scarce in the *scutellata* region and Theunis has to supplement food for the bees to ensure that colonies remain large enough throughout winter. The long distances travelled are another disadvantage, as this means fairly high stress for the bees. Additionally, the so-called “*capensis* problem” is also a very limiting factor for Theunis in terms of moving honeybees around for pollination. He explained that the *capensis* sub-species of *Apis mellifera* was restricted to the Western and Eastern Cape regions until Western Cape Beekeepers introduced them to the *scutellata* region in the 1980’s. The Cape honeybees invade the more productive *scutellata* hives and take over, eventually destroying the *scutellata* swarm. The introduction of *capensis* bees into the *scutellata* region has created havoc amongst the beekeeping industry. Theunis notes that a *scutellata* hive with Cape honeybees has to be destroyed to prevent the problem spreading to other hives.

Theunis notes that the biggest challenge is to have enough healthy, strong colonies to meet the demands of the ever growing seed production industry. Farmers differ a lot in their attitudes towards bees, but are slowly changing for the better, and some of them genuinely realise the value of the pollination service. Regarding his relationship with farmers, Theunis notes that he has a good relationship with his pollination clients and also with the farmers on whose farms he keep his bees for forage purposes. He said that good communication between the pollinator / beekeeper and the farmer is of the utmost importance.



One of Theunis’ forage sites with indigenous forage and eucalyptus trees

As a member of SABIO (the South African Bee Industry Organisation) and having been involved in its leadership for several years, Theunis feels that he is well-informed and connected to others in the industry, and is happy to share his knowledge and practices with people interested in learning more about bees and beekeeping. He notes that SABIO has an open door policy and that they really try to keep everyone in the industry informed regarding legislation (e.g. about importation and radiation of honey, etc.) and are continuously feeding back to the beekeepers via the South African Bee Journal and other bee forums.

Lessons learned:

Theunis’ bee farming system provides the following general lessons that could be broadly applied:

- Pollination service issues in South Africa are very dynamic, especially in the onion hybrid seed industry, and requirements, agricultural methods and crop varieties are constantly changing. A beekeeper therefore must keep up to date with latest knowledge, and much can be learned from other countries such as the USA and Canada.
- The practice of using ‘deeps’ as supers as well as brood boxes is worth considering, as small colonies that have to be more in number (compared to larger and fewer colonies) are not necessarily the best for pollination services and might also be more costly in practice.

This profile will be linked to the management consideration for pollination services in South Africa document that will be available towards the end of the project.

