

MANAGED BEES ACROSS LARGE LANDSCAPES IN SOUTH AFRICA...

The Global Pollination Project and Honeybee Forage Project



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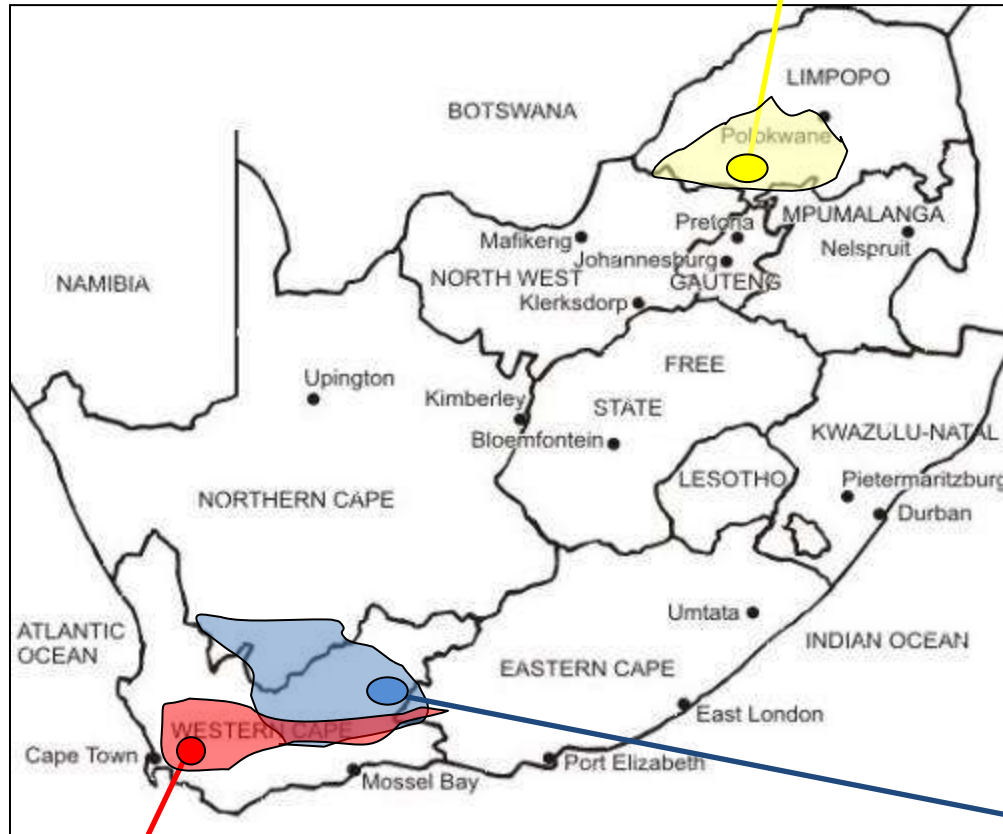
Global Pollination Project Sites in SA

Springbok Flats sunflowers



- Payment for mgd bees
- Export regs!
- Attractive to pollinators

- No payment for mgd bees
- Vast landscapes
- Attractive to pollinators



Biodiversity Hotspot!



Little Karoo hybrid onion seed

Boland, Koue Bokkeveld & Langkloof apples

- Payment for mgd bees
- Valuable export crop
- Attractiveness variable

Biodiversity Hotspot!



Some findings: apples

Importance of wild versus managed pollination

Madelé Mouton MSc Stellenbosch University (2010)

No difference in fruit set, but orchards using only wild bees had significantly lower seed-set. Therefore managed pollination is very important (export!)

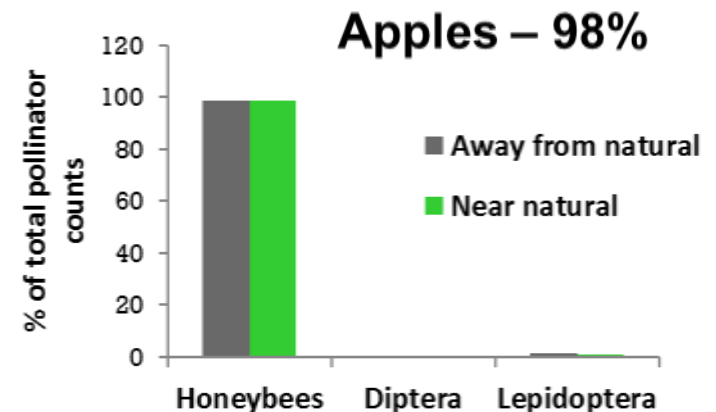


Deficit work

- Difficult to determine due to thinning, and no deficit due to current practices of bringing in managed bees

Pan trapping monitoring

- Very low catches in orchards
- Sampling in natural veg very different composition (monkey beetles!)



Some findings: hybrid onion seed

Mariëtte Brand PhD student Stellenbosch University (2012)

- Honeybees 90% of insect visitors seen foraging
- Pan trapping resulted in 40 other species recorded, and difference in composition between years



Deficit work

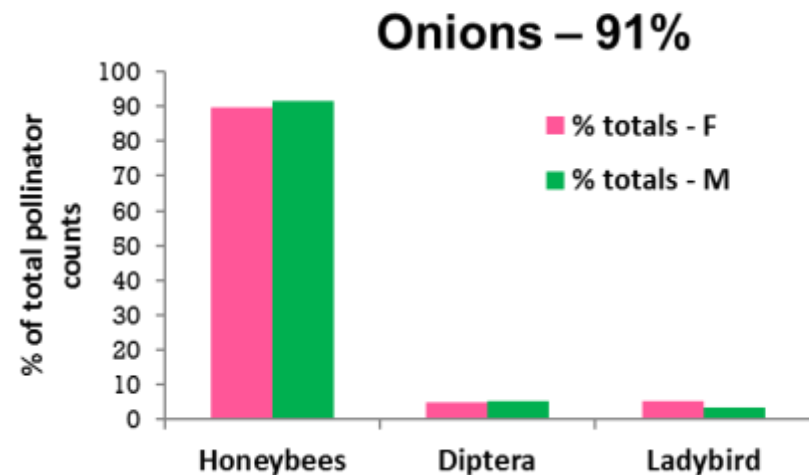
Limited numbers of non-honeybee visitors on crops

Farmers use mngd honeybees (mostly commercial) – no deficit

Pan trapping monitoring

2yrs to date – honeybees 80% of all
bee spp; $\frac{1}{3}$ non-apis community

Will do 2 more years of pan trapping



Some findings: sunflowers

SANBI
Biodiversity for Life



Awraris Shenkute (MSc 2009) – behavioural response

- ↓ abundance with ↑ distance from natural habitat
- Inter-species competition could increase cross-pollination



Gebreamlak Tesfay (MSc 2009) – mgd bees to yield&quality

- managed bees ↑ seed quality & quantity, but management needed

Papers (Dr **Luisa Carvalho**):

- Natural and within-farmland biodiversity enhances crop productivity (sunflowers) – *Ecology Letters*

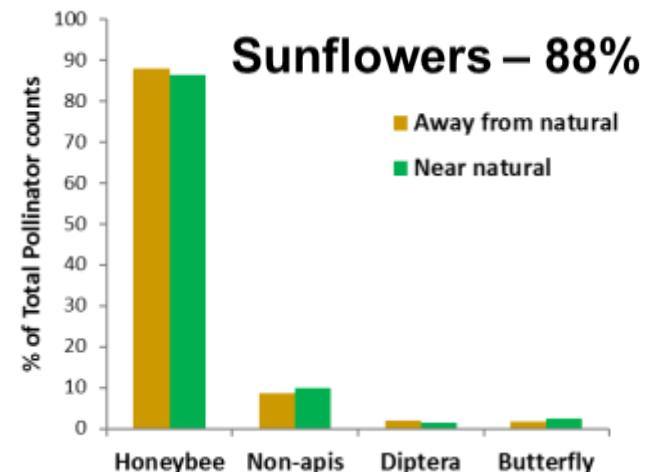


Deficit work

Honeybees major pollinator, but less management
Sunflower fields important resource for beekeepers

Pan trapping monitoring

Low capture, done 2 yrs, 1 more year



What now?

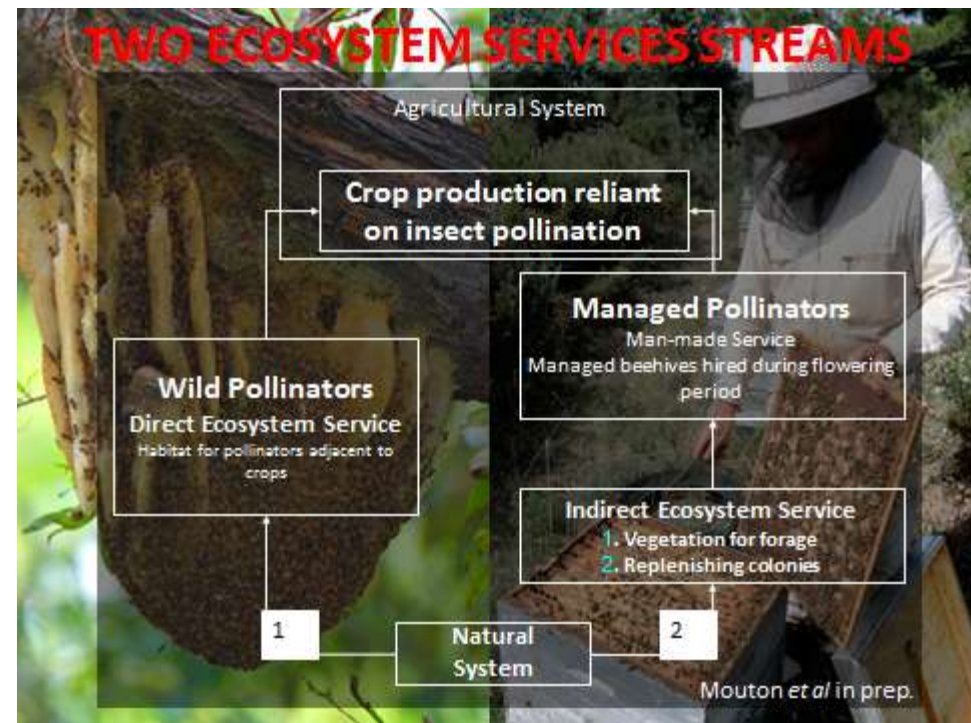
Two fundamental findings have resulted in paradigm shift in S. Africa:

1. Yields wrt pollination issues not a worry for farmers, i.e. no pollination deficits
2. Pollination management is considered to be near optimal using mgd honeybees

Managed Honeybees:

Relatively cheap, dependable resource; effective pollination strategy with large numbers brought in for short periods.

Not same scale problems as in Europe and North America.



But: **SUSTAINABILITY** of **POLLINATION SERVICES** (wild&mgd)?

Next logical question: what is the **ECOLOGICAL INFRASTRUCTURE** that supports this pollination service? (resources across landscapes)

Honeybee Forage Project

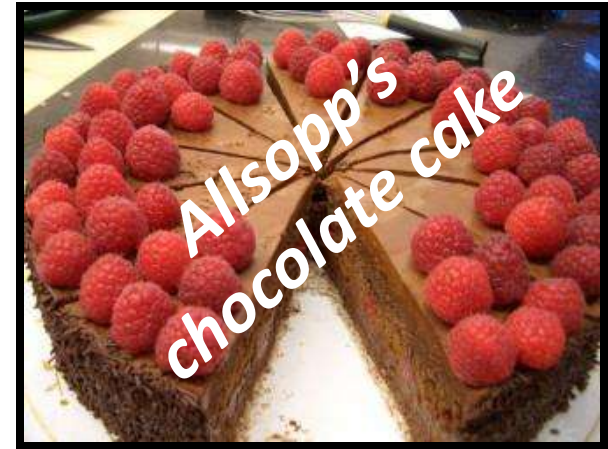


Working for Water funding; 2011-2013

- Relative importance of forage resources
- Spatial data of forage resources
- Alternative forage resources
- Optimal forage management
- Supply and demand of honeybees in SA



Environmental Affairs
Agriculture, Forestry and Fisheries
Water Affairs



Honeybee Forage Project

James Hutton-Squire (MSc Stellenbosch University) *“Historical and current relationship between the honeybee (*Apis mellifera*) and its forage in South Africa”*

- Top forage species used by SA Beekeepers (historically, currently)
- Categorise forage according to growth form (possible uses)
- Spatial Online Forage Maps



Tlou Masehela (PhD Stellenbosch University) *“Ecosystem services that support managed honeybees in South Africa: their availability, importance, current use patterns, potential for enhancement and management”*

- Comprehensively document South Africa’s current & potential honeybee forage resources.
- Outline the importance of Ecosystem Services that support managed honeybees
- Assess and evaluate the supply and demand of honeybees for pollination
- Provide means and ways to best maximise, manage and ensure the sustainable use of these resources

Annalie Melin (PhD University of Cape Town) *“Understanding the landscape requirements for pollination services derived from managed honeybees”*

Regional landscape elements. Resilience/sustainability of current honeybee forage availability in sustaining managed hives. Win-win conservation scenarios. Modelling.

Management Considerations



Management of the pollination service and the ecological infrastructure that supports the service is best considered in two regions

Two sub-species: *Apis mellifera capensis* / *A.m. scutellata*

Indigenous → wild & managed populations the same

Trapping + absconding!

- Profiles of beekeepers and farmers in the two regions (capensis done)
- Desktop research about two regions
- Bring together results of all research
- Not easy!!



Capacity Building

Undertook capacity needs assessment through survey & curricula analysis

Working with 6/7 institutions: “train trainers”

Various levels: High School/College/University

Materials:

- About the projects brochure & poster
- “Pollinators in Africa” booklet
- “Pollinators of SA Crops” Poster
- Guest lectures and talks (ongoing)
- DVD with film and associated activities (2013)
- Book: “Beeplants of South(ern) Africa” (early 2014)
- Booklet (end 2014 – translation of management consideration)

+ Observation hive project (?)

+ CapeNature Factsheet 2013/4

+ forage maps, calendars, seed packets – what to plant, when, where





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Ensuring our future

Applied Biodiversity Research

Ecosystem Services

Global Pollination & Honeybee Forage Projects

What we do and where we work

What we have achieved

Who we are

Global Pollination and Honeybee Forage Projects

SANBI's [Ecosystem Services Programme](#) under the Applied Biodiversity Research Division is implementing very interesting projects on pollination in crop agriculture and the honeybee.

Background & reason for our projects

Animal pollination is required for approximately one-third of human food consumed on the planet (many fruits and vegetables), and for the production of many fodder, seed, flower and oilseed crops. Insects, birds, bats, and other animals serve as pollinators while they forage for their own survival, consequently providing a free ecosystem service upon which we depend. Honeybees are a pivotal species in Africa as the most important generalist pollinator on the continent. Honeybees pollinate 40-70% of indigenous flowering plants and probably supply up to 90% of commercial pollination. About 50 crops in SA are insect-pollinated, with much of the service provided by beekeepers and their managed honeybees.

There is mounting evidence of a global "pollination crisis" with the mysterious disappearance in Europe

Mainstreaming

Policy in South Africa complex and challenging, set systems and timeframes

Practice is hard to change without very clear evidence and guidance – and also when science is relatively slow

Need high-level “champions” as awareness on pollination/pollinator issues low

Designing an “Impact Pathway” – science uptake and utilisation

- Building understanding of honeybees as important crop pollinators (policy makers, educators, general public)
- Protection of existing forage resources for honeybees: management of eucalypt, indigenous and crop forage; access to unusable forage (policy makers, forestry industry, private landowners, managers of public land)
- Establishment of new small-scale forage resources for honeybees through exploring potential to grow forage on public and private land (managers of public land, forestry industry, landowners, urban greening programmes, general public)

What should be influenced	Why this should be influenced	Who should be influenced in this regard	How the project could influence these parties	What data from the project could be used, and what other data is required to influence	Timeframe (from 2012)	Likelihood of success influencing and reasons	
1. Building understanding of honeybees as important crop pollinators in SA	1.1 Building understanding of links between pollinators and food production	Educational institutions and educators	Providing materials to certain institutions Train the trainers	Curricula material (DVD and associated worksheets) Pollinators of SA Crops poster	2 years	High with chosen institutions. Wider influence requires longer	
		General/public	Write press releases	Press release about project Press release 2012/13 Press release end project	Done 1 year 2 years	Was fairly successful Medium High	
		Policy-makers	Write briefing documents and draft targets for sector plans / delivery outcomes Ask to be placed on agendas of forums and engage in policy forums (Consultancy Ph II)	Consultative papers Shortcase MSc Tutorial MB Main PhD	2 years, perhaps longer	Medium, if taken forward correctly	
	1.2 Building understanding of wild and managed managed pollination services in SA	Potential to expand knowledge of ecosystem services and encourage correct valuation thereof	Policy-makers – so that pollination is recognised as an ES to be maintained along with all other ES	Write briefing documents and draft targets for sector plans / delivery outcomes Ask to be placed on agendas of forums & engage in policy forums (consultancy Ph II)	Monitor MSc Mascarella PhD Main PhD	2 years, perhaps longer	Medium, if taken forward correctly
			Landowners???				
			Ecosystem Services scientists	Publish scientific papers and theses	Monitor MSc Mascarella PhD Main PhD	Done 2 years 2 years	?
	1.3 Building understanding of threats to honeybees in SA and potential solutions	Potential to engage relevant stakeholders in solutions	Educational institutions and educators	Providing materials to certain institutions Train the trainers	Curricula material (DVD and associated worksheets) Pollinators of SA Crops poster Specialists of SA book	2 years	High with chosen institutions. Wider influence requires longer
			General/public	Write press releases Create forage-related awareness materials	Press release about project Press release end project All forage-related materials like calendar, etc.	Done 1 year 2 years	Was fairly successful Medium High
			Policy-makers	Write briefing documents and draft targets for sector plans / delivery outcomes Ask to be placed on agendas of forums & engage in policy forums (consultancy Ph II)	All work on forage can be used, as lack of forage is a threat	2 years, perhaps longer	Medium, if taken forward correctly



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