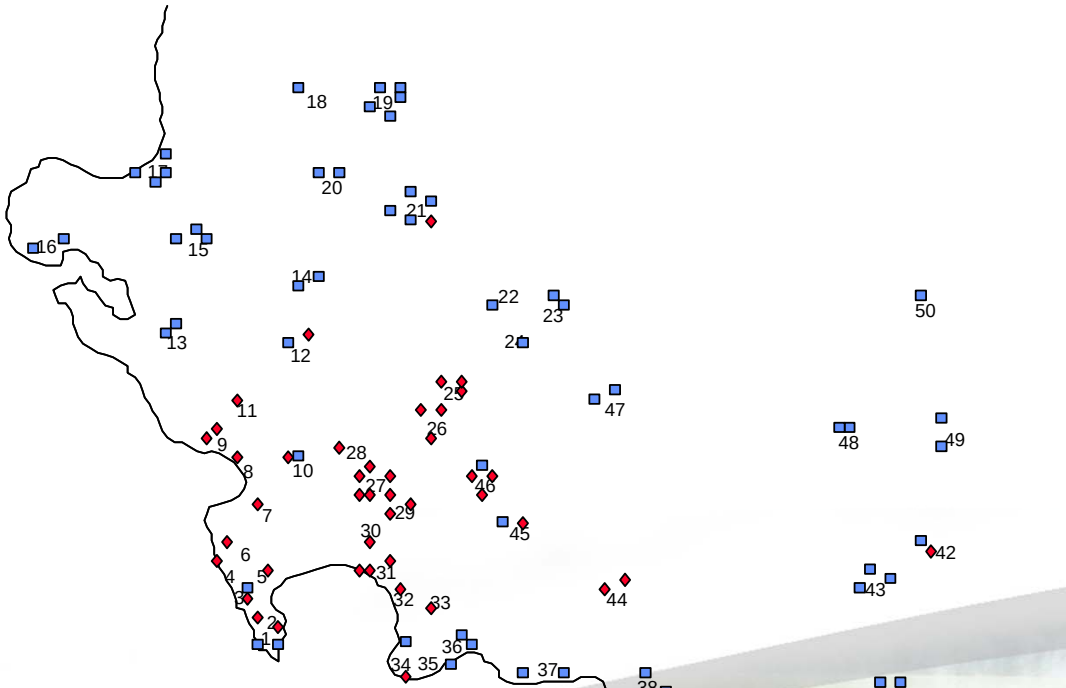
ARC • LNR
Excellence in Research and Development

Varroosis in South Africa

Mike Allsopp
ARC-PPRI, Stellenbosch

South Africa - Detection

- First detected in Stellenbosch in August 1997
- Comprehensive 1997 survey showed that only in the Western Cape and within 100km of Cape Town
- Probably arrived on a ship-borne honeybee swarm



ARC • LNR
Excellence in Research and Development

Strategy

- Nonetheless, no attempt to eradicate or quarantine; already too widespread & already in the wild honeybee population
- Primary focus was to determine the impact of varroa on the wild honeybee population; to determine if treatment was truly necessary; to see if natural tolerance would develop
- Monitor the impact on the managed bees
- Make varroacides available
- Encourage beekeepers to have treated & untreated populations, for comparison
- Avoid treatment unless really necessary

ARC • LNR
Excellence in Research and Development

Why the wild bees?

- Huge importance of subsistence beekeeping in Africa
- Importance of honeybees to the pollination of indigenous flora
- The nature of beekeeping in South Africa means that commercial beekeepers are totally dependent on wild bees
- Free from the stressors of agrichemicals & operational stress
- A very substantial and unselected wild population is the best hope for the development of natural tolerance; true test of the need for treatment
- Worst possible scenario is when you treat when you don't need to treat

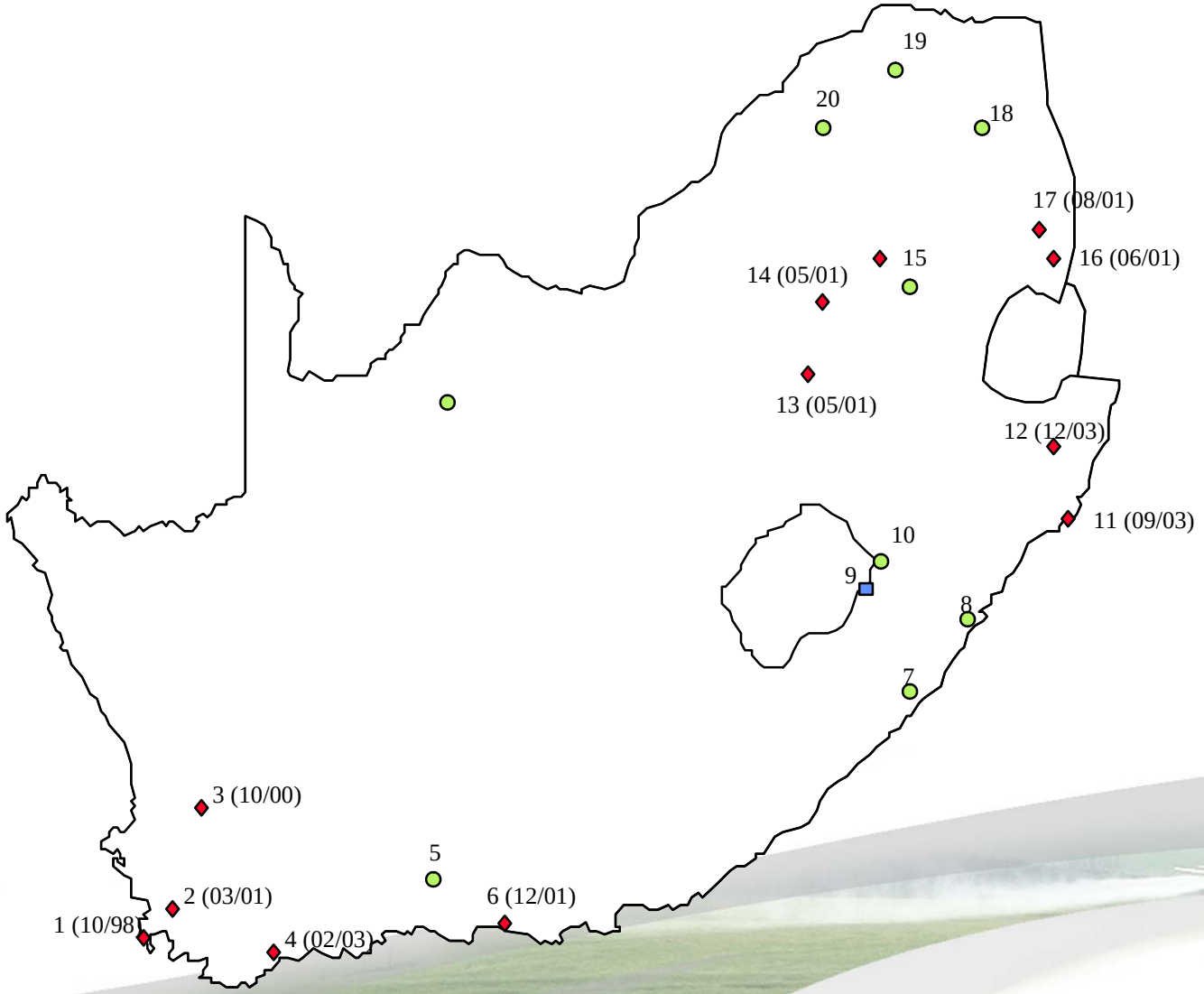
ARC • LNR
Excellence in Research and Development

Varroa Monitoring in Nature Reserves

- Free of “beekeeping stresses”, varroacides & agrichemicals
- Attempted to trap honeybee swarms in 21 reserves, pretty much all over the country
- Trapped colonies are only monitored for varroa and impact; no beekeeping or other disturbance allowed; fairly represent the wild population

ARC • LNR
Excellence in Research and Development

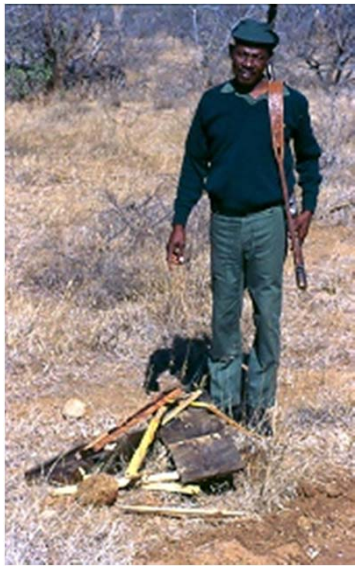
Monitoring of the Wild Population



ARC • LNR
Excellence in Research and Development

ARC • LNR
Excellence in Research and Development

Results

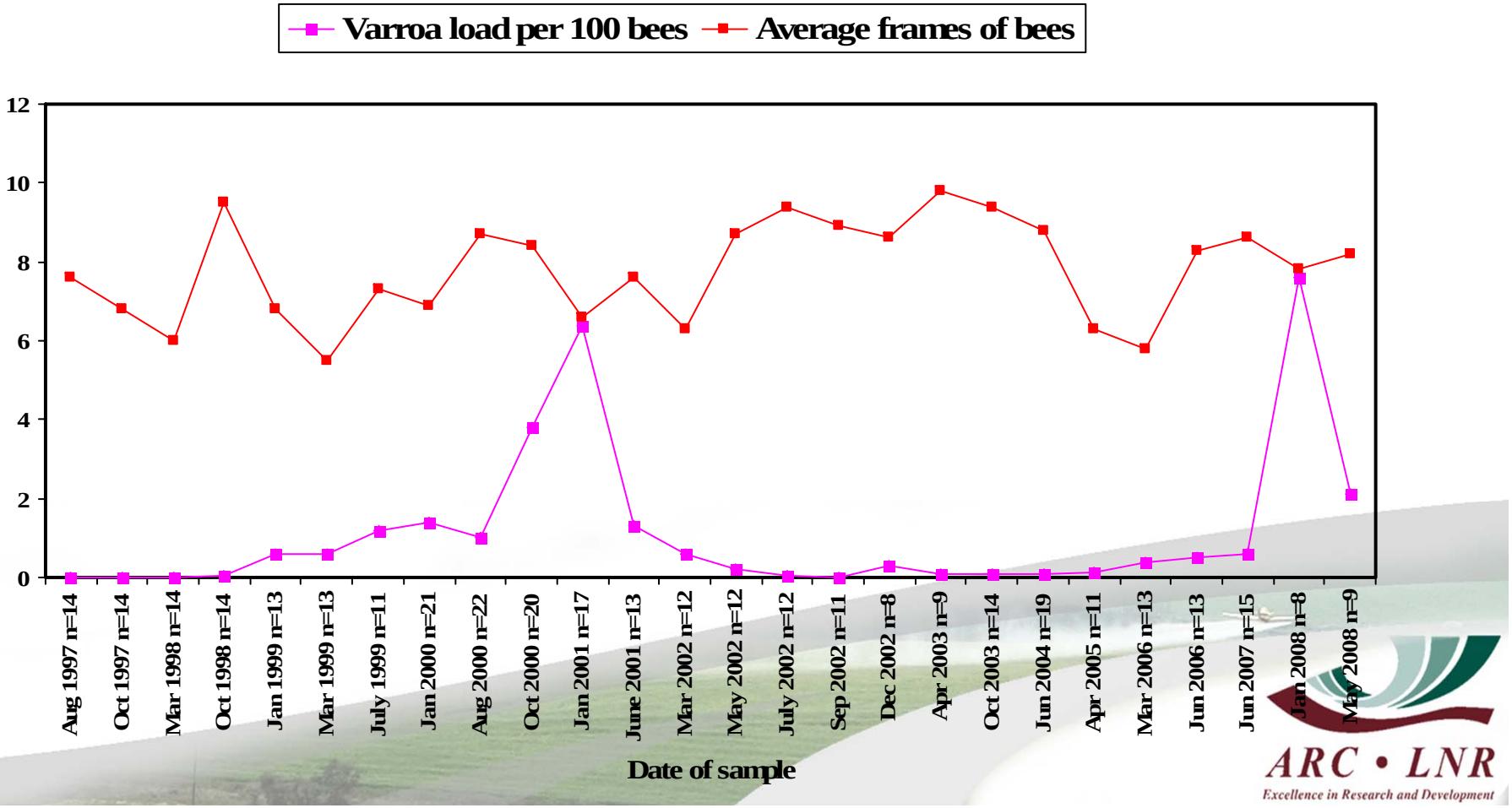


- Rhinos do not like bee boxes
- Some reserves never trapped bees (interesting in itself)
- Where honeybee swarms were trapped, varroa was found in all reserves except one; almost whole honeybee population has varroa
- Some reserves have only had varroa since 2004, so limited data
- But the pattern is the same in all the reserves

ARC • LNR
Excellence in Research and Development

Cape Point

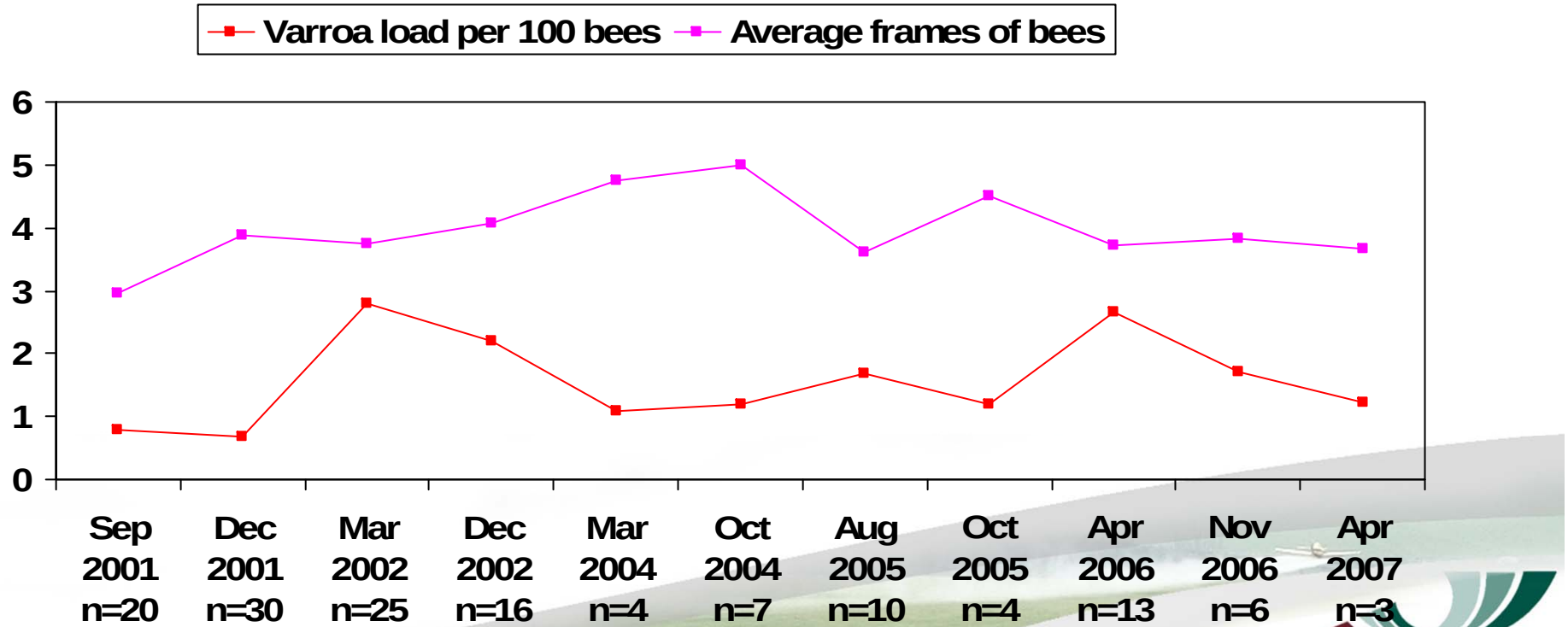
Apis mellifera capensis



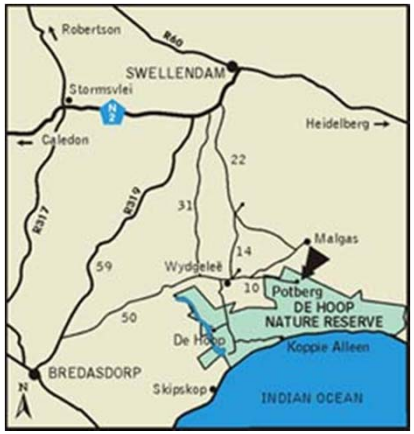
ARC • LNR
Excellence in Research and Development

Suikerbosrand / Leeufontein

Apis mellifera scutellata

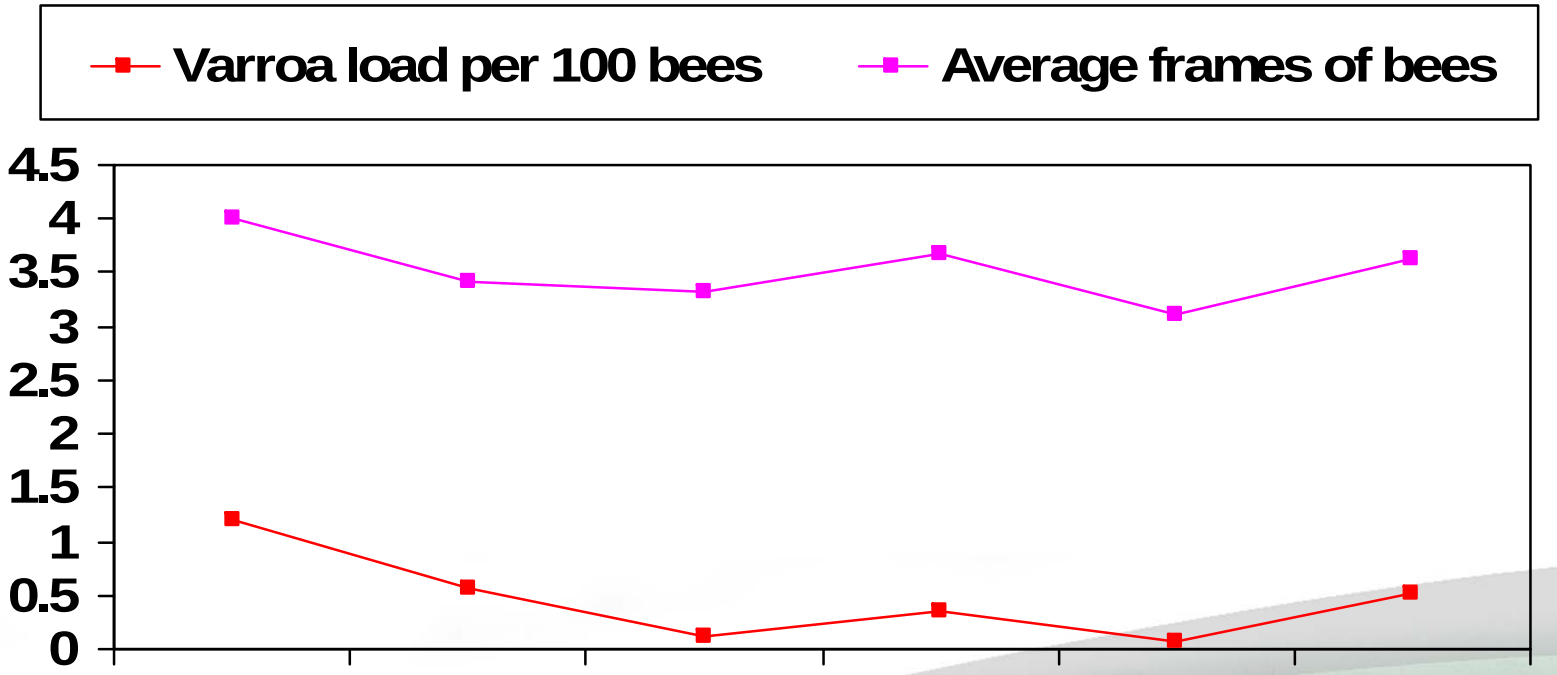


ARC • LNR
Excellence in Research and Development



De Hoop

Apis mellifera capensis



ARC • LNR
Excellence in Research and Development

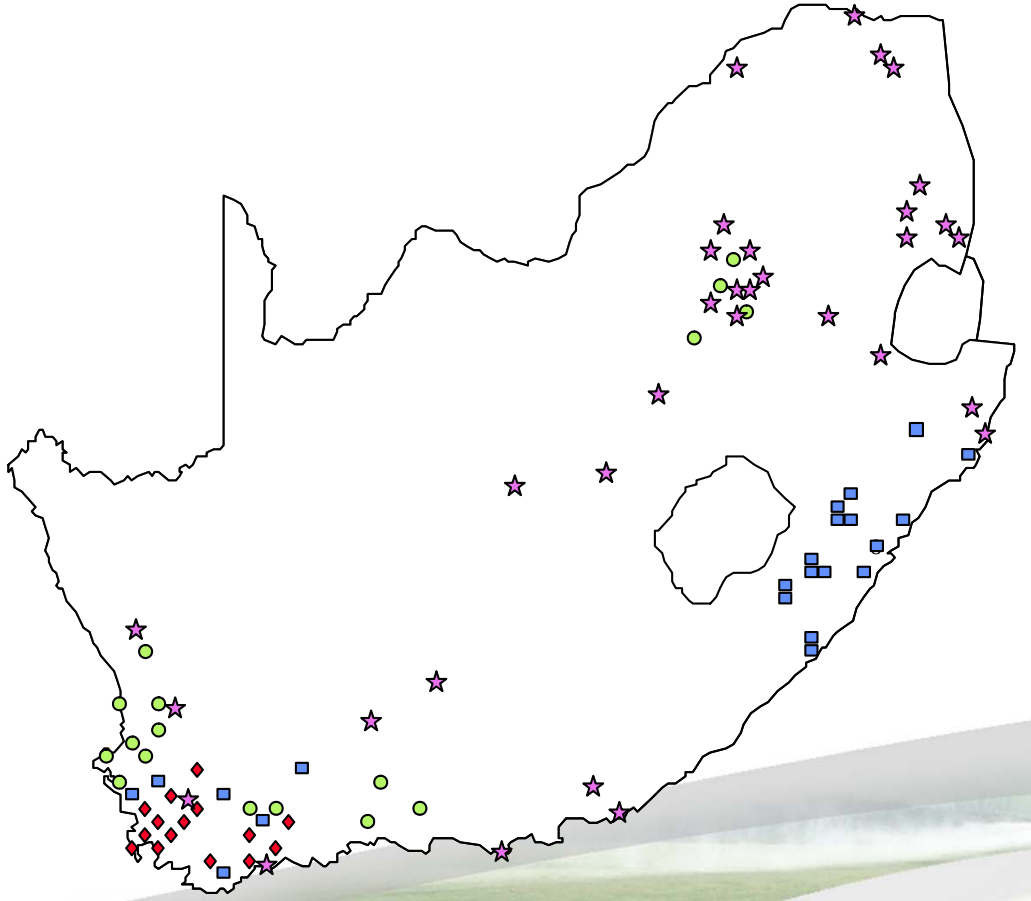
Wild honeybee population in South Africa

- No varroa mediated collapse
- Only relatively mild symptoms
- Few colony losses
- Varroa numbers much reduced with 3-4 years in *Apis mellifera capensis* colonies and 5-6 years in *Apis mellifera scutellata* colonies
- Natural tolerance

ARC • LNR
Excellence in Research and Development

Commercial honeybee population

- Spread throughout the country, mostly through beekeeper movements



ARC • LNR
Excellence in Research and Development

Impact

- Far more severe than in the wild population; reflects the added stresses (operational, nutritional, environmental); and higher infection rates resulting from apiaries
- All typical varroa symptoms (dead drones, deformed workers, dead-out colonies full of honey and no bees)
- Very obvious chalkbrood problems
- Colonies and apiaries collapsing; shown with trials with treated and untreated colonies; beekeepers lost 40% and more of their bees; many used varroacides on some colonies

ARC • LNR
Excellence in Research and Development

Varroa Numbers

- At the “front” of varroa spread, huge numbers of varroa in colonies
- Both *capensis* and *scutellata*

Apiary	Honeybee race	Varroa mites per 100 bees		Estimated number of bees in colony	Estimated mite population size	
		Average	Maximum		Average	Maximum
Western Cape (37 colonies)	*A m capensis*	17.4	65.0	20 000	11 832	44 200
KZN (38 colonies)	*A m scutellata*	25.1	58.0	20 000	17 068	39 440
Gauteng (80 colonies)	*A m scutellata*	20.7	72.7	20 000	14 076	49 436

ARC • LNR
Excellence in Research and Development

2007/2008 commercial apiaries

- Still some affected colonies, but basically varroa tolerant
- No beekeepers have treated for 3-4 years

Region	Number of Apiaries	Number of Colonies	Varroa mites per 100 bees	Range of varroa mites per 100 bees
W Cape	6	35	0.90	0.00 – 0.75
KZN	11	36	1.80	0.00 – 8.80
E Cape	4	19	1.89	0.00 – 10.00
N Cape	3	16	2.67	0.30 – 9.25
Gauteng	16	77	1.82	0.00 – 18.33

ARC • LNR
Excellence in Research and Development

Commercial Population Recovers

- After initial losses, and massive varroa numbers at the “front”, population slowly recovers
- Colonies have more pests & diseases, non-defensive and non-productive
- Continual minor losses, and seasonal effects
- No population collapse and no beekeepers treat for varroa
- Differences in wild bees and managed bees indicate the added “stress” in managed bees
- Varroa tolerance in South African honeybees

ARC • LNR
Excellence in Research and Development

Africa

- Has spread rapidly through Africa
- Botswana, Zimbabwe, Swaziland, Lesotho, Mozambique, Zambia, Kenya, Tanzania, Ghana
- Probably other countries as well
- No reports of substantial colony losses or negative effects

ARC • LNR
Excellence in Research and Development

Why Tolerant?

- Inherent multi-factorial behavioural characters of African bees; hygienic behaviour and development time the most important; maybe also that there seem to be very few viruses
- Large, unselected wild population
- Live-and-let-die strategy; easy to develop varroa tolerant bees; key component is to let varroa susceptible bees die; allows fixing of tolerance at a population level

ARC • LNR
Excellence in Research and Development

Conclusions

- *Varroa destructor* is unlikely to be a significant threat to South African honeybees; and probably not in Africa; provided the honeybee populations are left alone for tolerance to develop
- If left alone, varroa tolerance likely to develop in 3-6 years
- There will be natural fluctuations; as in any host-parasite relationship
- The same live-and-let die strategy would probably develop varroa tolerant bees anywhere in the world – a variable time-frame might be needed – if the susceptible bees were allowed to die; a sustainable solution
- But maybe varroa weakens our bees more than we think – maybe has allowed AFB – maybe is the ultimate factor behind CCD
- We need to watch it carefully . . . . but for now

ARC • LNR
Excellence in Research and Development

Doing nothing can be the best thing to do

Varroa diagnosis

- Need to distinguish varroa (a Ferrari) from *Braula coeca* (a Land Rover), the harmless bee louse

ARC • LNR
Excellence in Research and Development