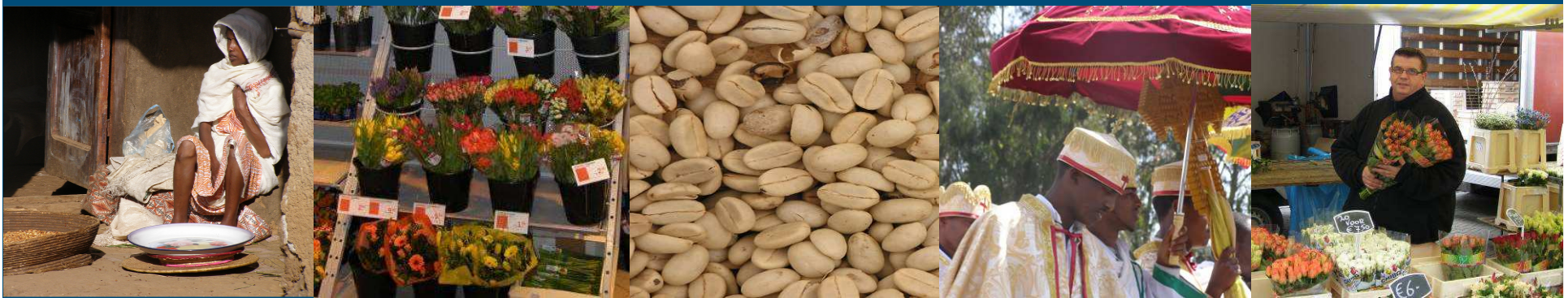


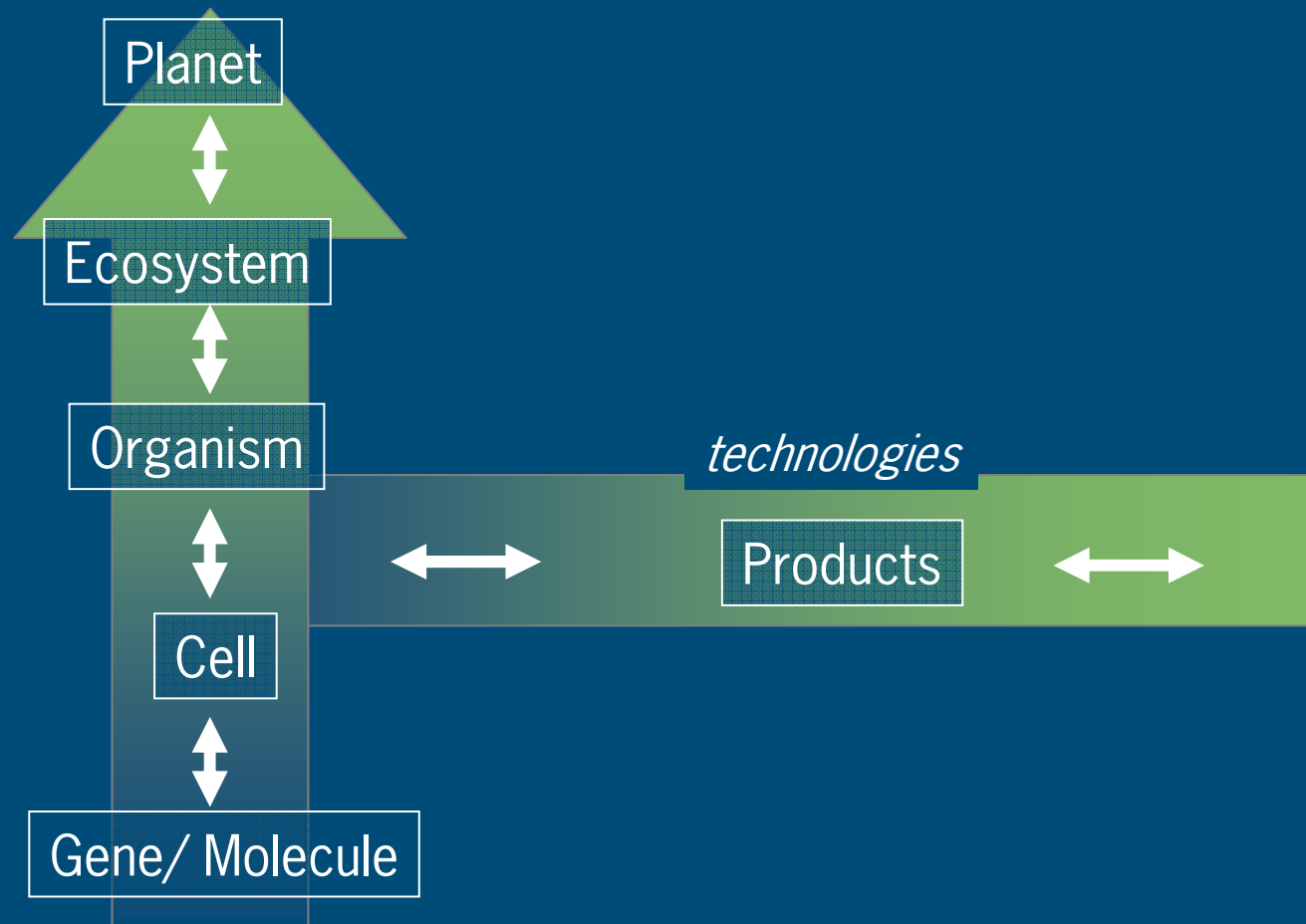
Status and future approaches of IPM in the Ethiopia Netherlands Horticulture Partnership Programme

Eefje den Belder, Anne Elings
Addis Ababa, 6 August 2010



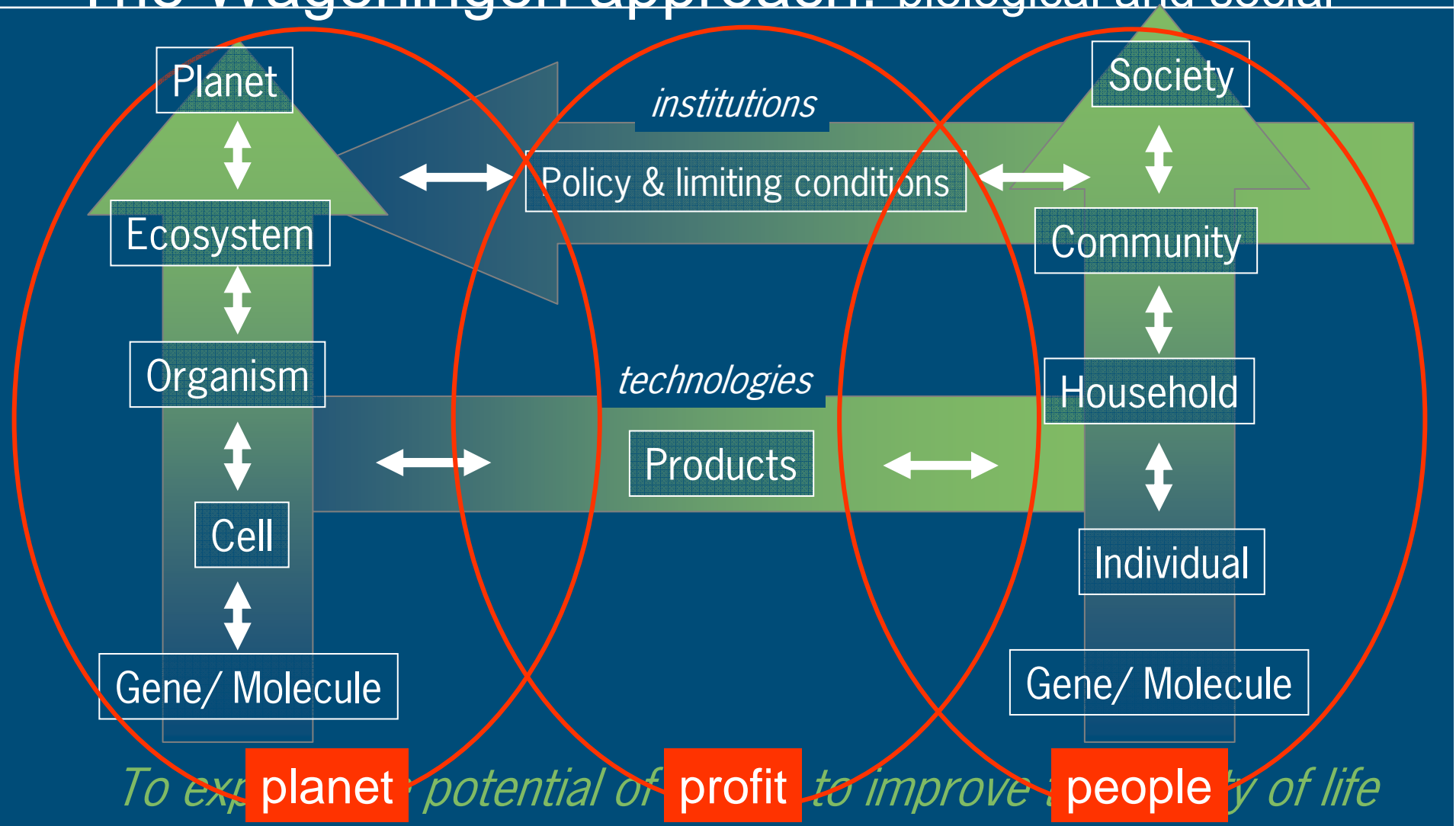
PLANT RESEARCH INTERNATIONAL
WAGENINGENUR

The Wageningen approach: biological and social



To explore the potential of nature to improve the quality of life

The Wageningen approach: biological and social



Strength of Wageningen UR: construction, climate energy control, crop



Strength of Wageningen UR: how to control pest and diseases



Red spider mite is captured by the predatory mite

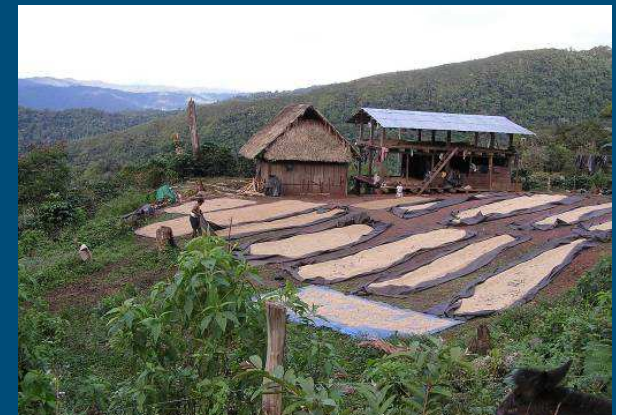


Larvae of Ladybird beetle

Strength of Wageningen UR: innovative approaches for facilitating learning processes



Strength of Wageningen UR

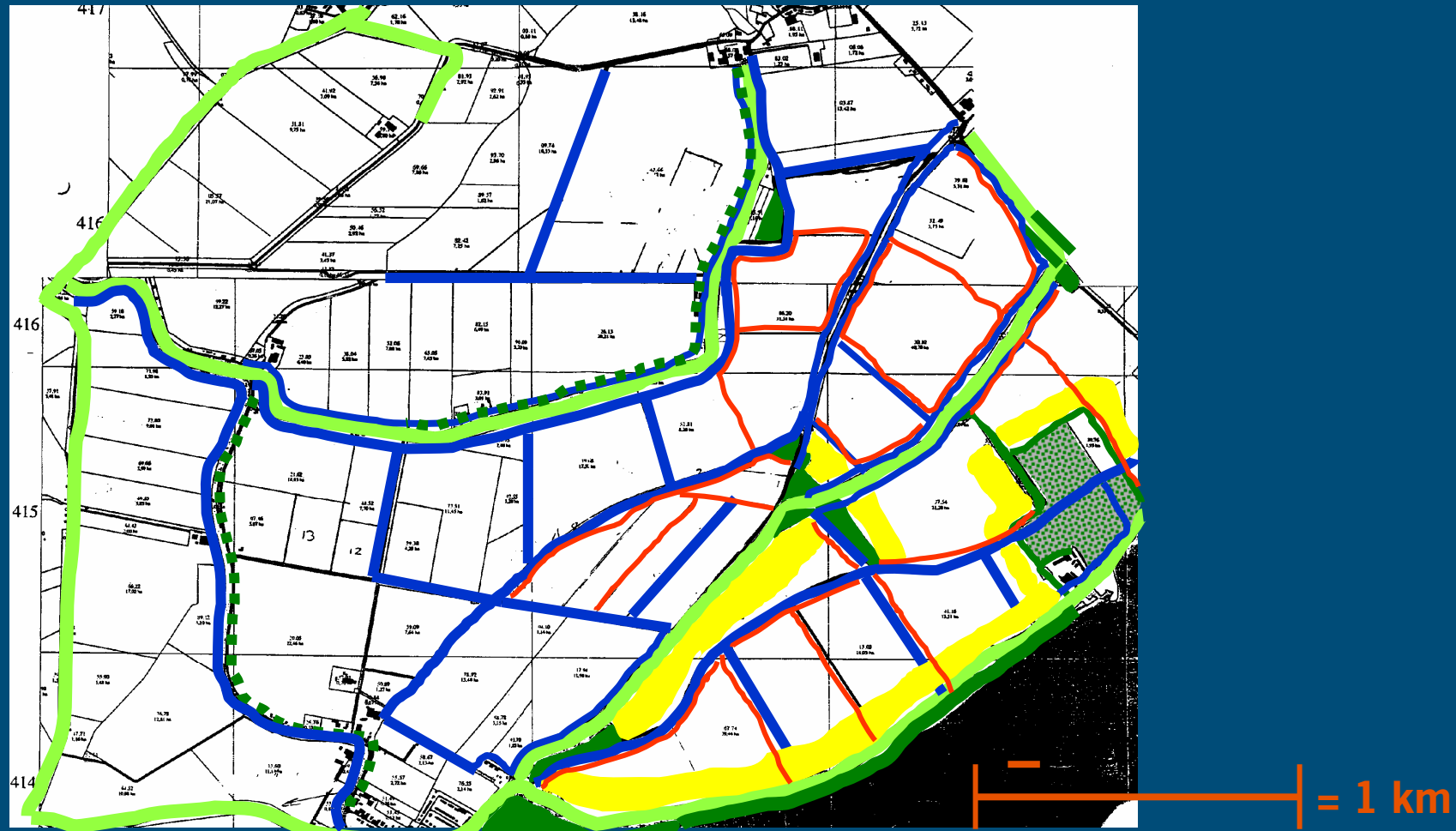


THE NETHERLANDS: REGIONAL IPM

Functional biodiversity: Enhance BCA's?



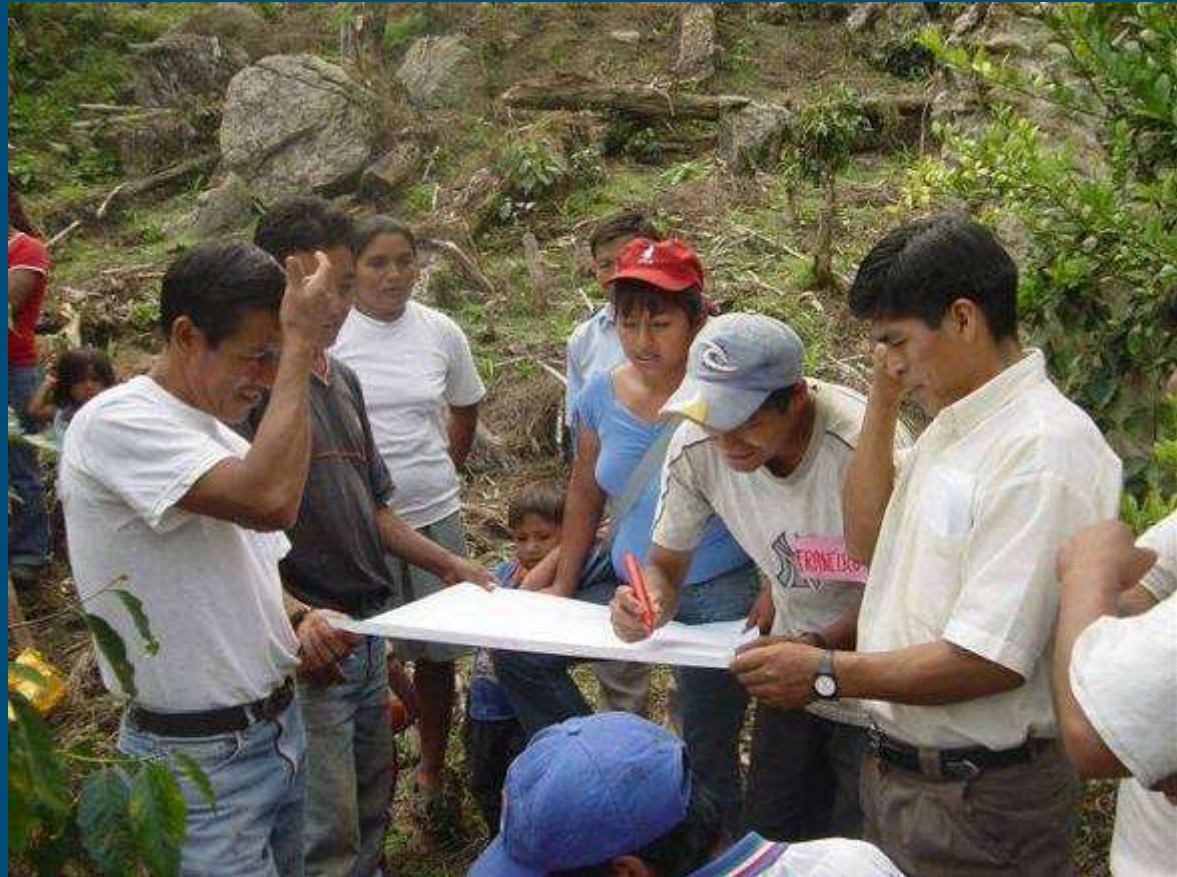
Management of permanent field margins by farmers, local and national government, water boards etc.



Study groups - Farmer Field Schools

Cooperation between Public-Private sector

Communication



IPM in Ethiopia: wide perspective

Rules & Legislation,
Knowledge, Logistics, etc.

Grower &
Crop Management

Greenhouse Climate

Crop

Pest

BCA's

■ Stakeholders

- Growers
- Suppliers
- Ethiopian Horticulture Producers and Export Organisation
- Ethiopia Horticulture Development Agency
- Ministry of Agriculture and Rural Development - Plant Protection Department
- Ethiopian Institute for Agricultural Research - Plant Protection Research Centre
- Jimma University – College of Agriculture and Veterinary
- Netherlands Embassy
- Wageningen UR

Baseline study IPM project: situation at 31 farms in 2007

- Medium size rose farm uses about 1000 L/ha
- 23 different chemical compounds
- At a cost of 100,000 ETB/ha, 9000 €



Pesticide use: must go down

- Market
 - 25% expenditures
 - 15% yield reduction
 - S → longevity plastic cover
 - Demand low residues
- Control
 - Resistance development to chemicals
- Image sector workers' health
 - Improvement image for consumers/retailers/supermarkets
 - Complaints from workers and neighbouring farms



Identification main pest at 10 farms January 2007

- Two spotted spider mite *Tetranychus urticae*
- Yellow flower thrips *Frankliniella schultzei*
- Legume /bean flower thrips *Megalurothrips sjostedti*



Amblyseius californicus, *Amblyseius swirskii*, *Phytoseiulus persimilis* all are predacious mites

www.pestinfo.org/Literature/thripspec.htm

IPM in Ethiopia: starting with one single pest



- Rose: various varieties
- Red spider mite (*Tetranychus urticae*)
- *Phytoseiulus persimilis* & *Amblyseius californicus*



Approach

■ Enabling environment

- Risk assessment with regards to use of beneficials
- Permit procedures embedded in rules and legislation
 - Import permit for experimental purposes
- Institutional linkages and partnerships (IPM association)

■ Research

- On-farm research
- Applied research
- Post-graduate research

■ Knowledge exchange

- Study groups
- Demonstration trials



Enabling environment – risk assessment

RISK	RESPONSIBLE ENTITY	RISK MANAGEMENT
PRODUCT		
Incorrect pest identification	Research	Correct identification
Incorrect organisms in BCA	Supplier	Random identification by Plant Protection Service in country of origin
	Supplier	predators are on the BCA-list of the EPPO region, and the USA Exclusion list
Low activity of BCA	Supplier	batch-wise control by producer according IOBC guidelines (for Europe)
	Supplier, grower	advanced transport & storage system
ENVIRONMENT AND WORKERS' HEALTH		
Exotic biodiversity	Ministry	BCA-list (EPPO) and Permit for Interstate Shipment (USA) are based upon broad expert knowledge, resulting in safe import in 60 countries.
Workers' health	Grower	BCA-list and Permit for Interstate Shipment comprise allergy tests.
FARM		
yield and quality reduction	Grower	Training, technical support, research, study groups
Crop attacked by BCA	supplier	In country of origin, a criterion to select BCA is its inability to attack

IPM ON-FARM TRIAL:

- 1) Trial lay-out
- 2) Scouts trained
- 3) Scout schedule
- 4) Release schedule
- 5) Climate data
- 6) Observations
- 7) Report on results

TRIAL-LAYOUT

Ethio Highlands				<u>treatment blocks</u>			
				A - D	Spidex+Spical		
				B - C	Spidex		
				E - F	Chemical control		
Greenhouse 2					Sticky trap (5 per treatment block)		
48 meter							
	A	19 beds					
	B						
		19 beds					
	C	19 beds					
	D	20 beds					



SCOUTS TRAINED



SCOUT SCHEDULES

Up to week 8 - 2008	Sample leaflets taken from <u>skirt only</u>
Spider mites	
0	<5 mobile stages per leaflet
1	5 or more mobile stages per leaflet
Predatory mites	<i>Phytoseilus</i> and <i>Amblyseius</i> were monitored separately
0	no mobile stages per leaflet
1	1 or more mobile stages per leaflet

From week 9 - 2008	Sample leaflets from <u>skirt</u> and from <u>stems</u> separately
Spider mites	
0	0 mobile stages per leaflet
1	1-5 or more mobile stages per leaflet
2	5-20 mobile stages per leaflet
3	>20 mobile stages per leaflet
Predatory mites	<i>Phytoseilus</i> and <i>Amblyseius</i> were monitored separately
0	no mobile stages per leaflet
1	1 or more mobile stages per leaflet

Roses introduction schedule

Name: Ethio-Highlands

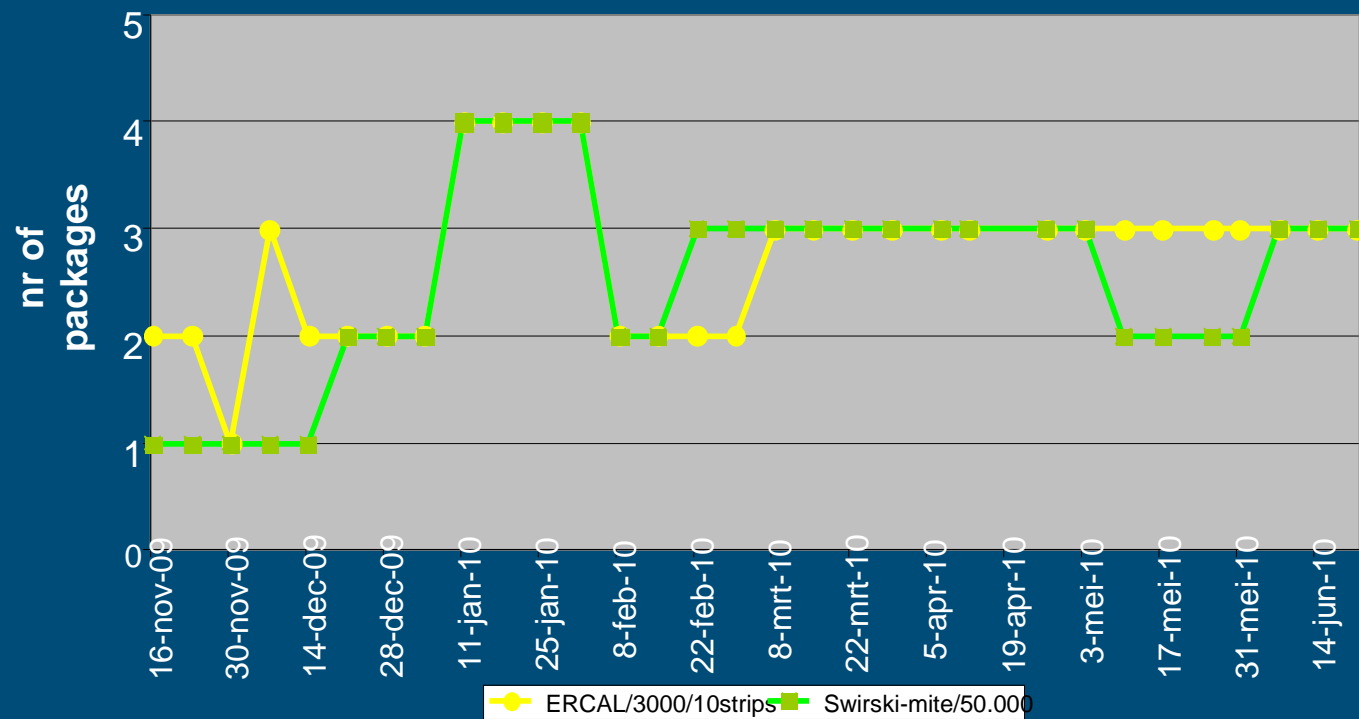
Area: 6,000



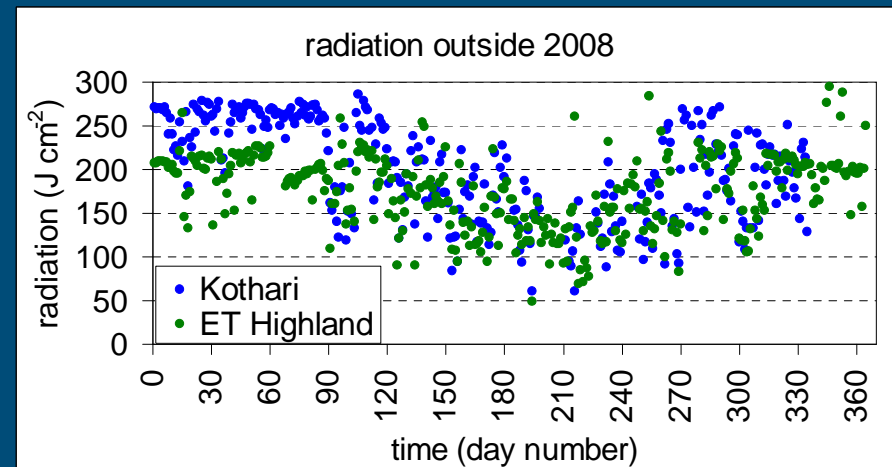
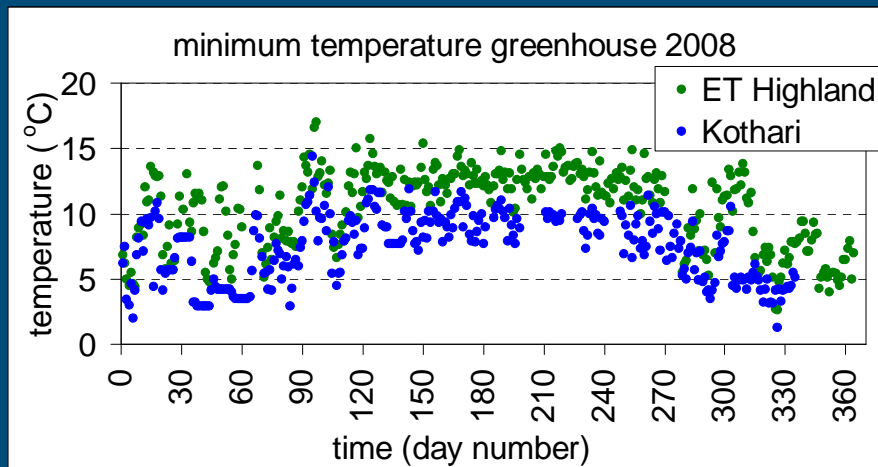
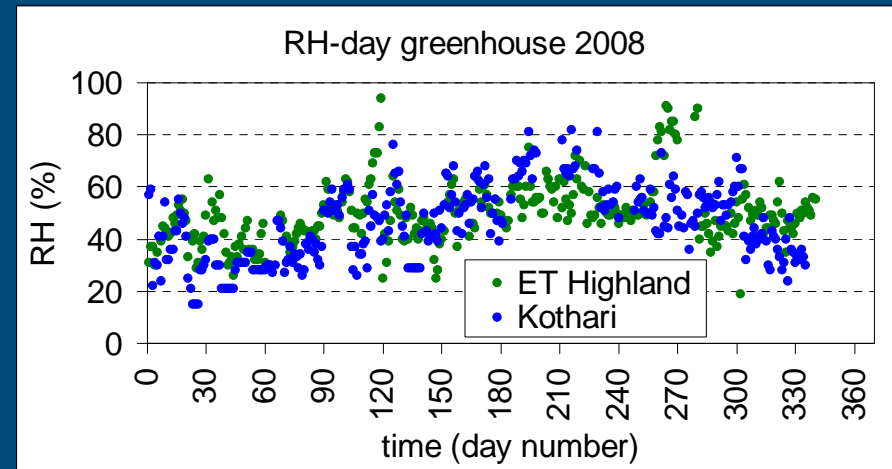
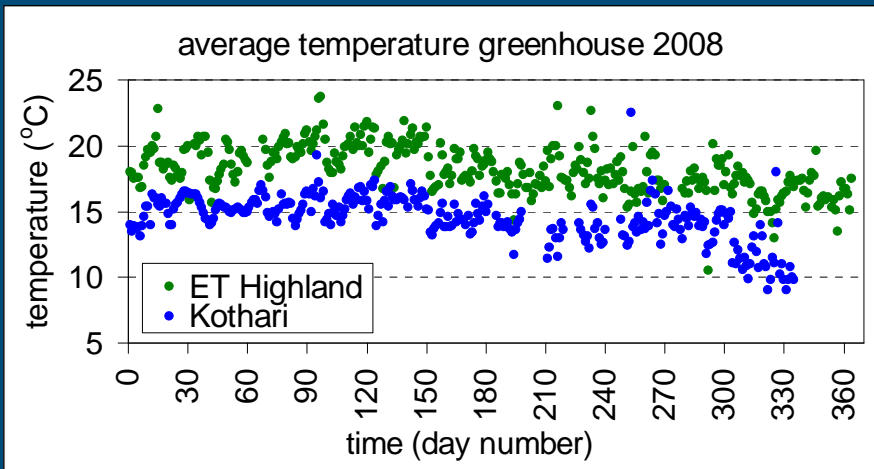
Product	Spidermite						Thrips				Thrips	
	SPICAL			SPIDEX (318)			SWIRSKI				SWIRSKI	
	Amblyseius Californicus			Phytoseiulus persimilis			Amblyseius swirski				Amblyseius swirski	
Per package	25,000			2,000			250				50,000	
Week #	per m2	insects	#	per m2	insects	#	per m2	insects	#	per m2	insects	#
46	9	50,000	2	3	16,000	8	0.5	375,000	3			
47	9	50,000	2	14	80,000	40						
48												
49	9	50,000	2	8	48,000	24						
50												
51				4	24,000	12	0.5	375,000	3			
52												
1												
2												
3												
4	4	25,000	1	20	120,000	60	0.5	375,000	3			
5	17	100,000	4	25	150,000	75				34.0	200,000	4
6	17	100,000	4	25	150,000	75						
7	17	100,000	4	8	48,000	24						
8												
9	17	100,000	4	4	24,000	12						
10												
11	8	50,000	2	2	12,000	6						
12												
13	8	50,000	2	2	12,000	6						
14												
15	4	25,000	1	2	12,000	6						
16												
17	8	50,000	2	2	12,000	6						
18												
19	4	25,000	1	1	6,000	3						
20												
21	8	50,000	2	1	6,000	3						
22												
23	4	25,000	1	1	6,000	3						
24												
25	8	50,000	2	1	6,000	3						
26												
27	4	25,000	1	1	6,000	3						
28												
29	8	50,000	2	1	6,000	3						
30												
31	4	25,000	1	1	6,000	3						
32												
33	8	50,000	2	1	6,000	3						
34												
35	4	25,000	1	1	6,000	3						
36												
37	8	50,000	2	1	6,000	3						

RELEASE SCHEDULES

introductions Ercal (3000/package) and Swirski-mite (50.000/package)

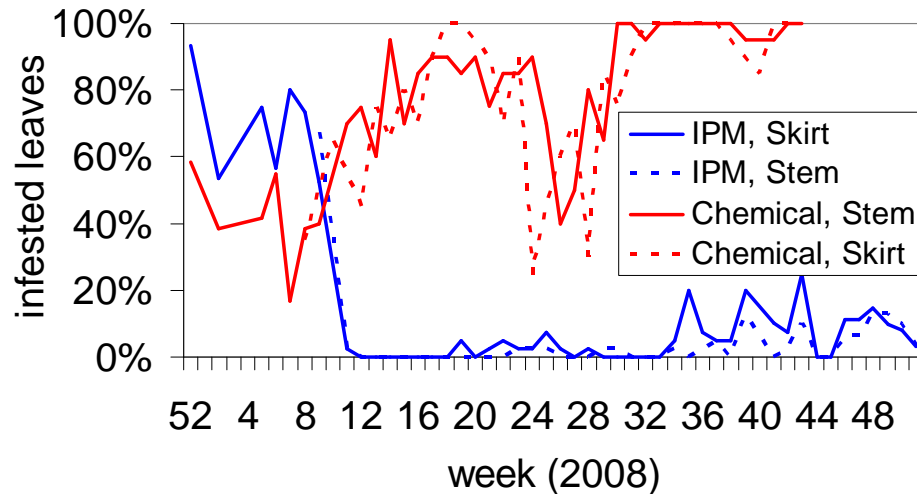


On-farm research: climate



On-farm research: results

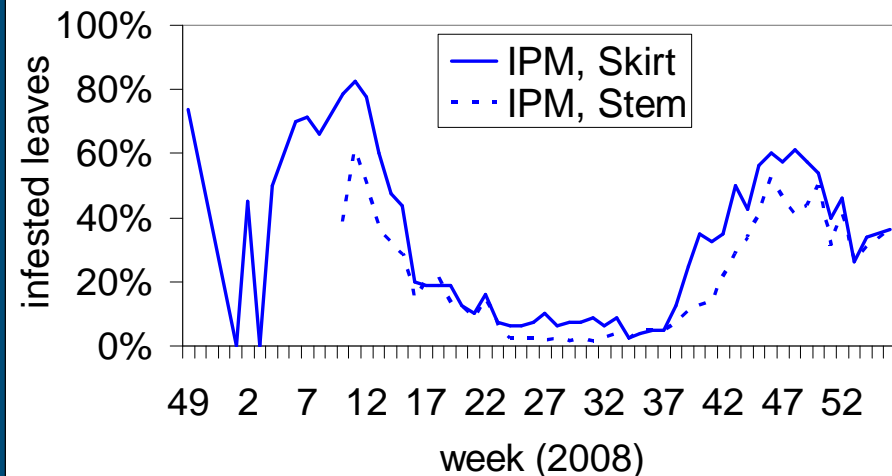
ET Highland: Spider mite presence



- ET Highland: 2100 masl
- JJ Kothari: 2600 masl

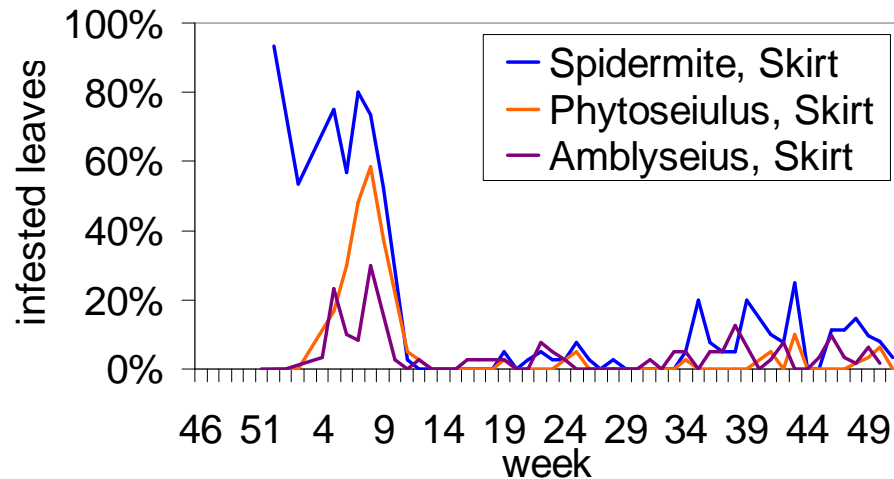
- 10-15% more stems m^{-2}
- Greater stem length

J.J. Kothari: Spider mite presence



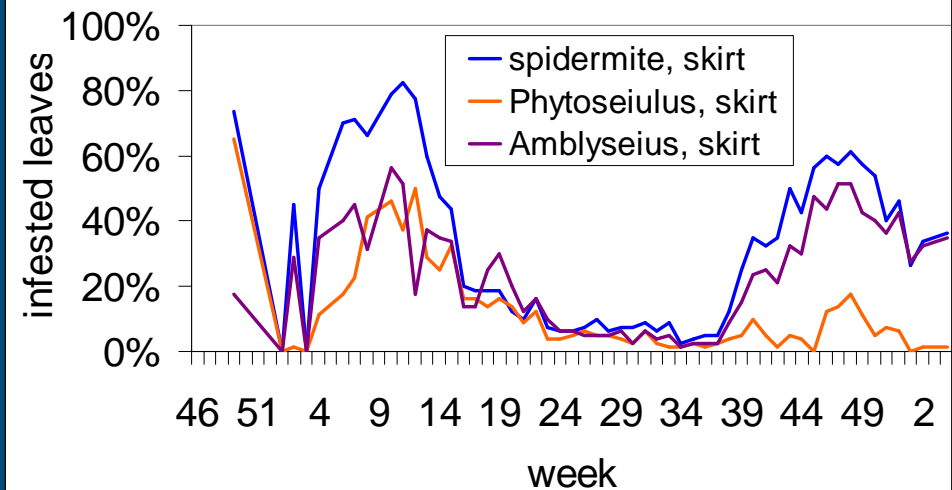
On-farm research: results

ET highlands, population dynamics



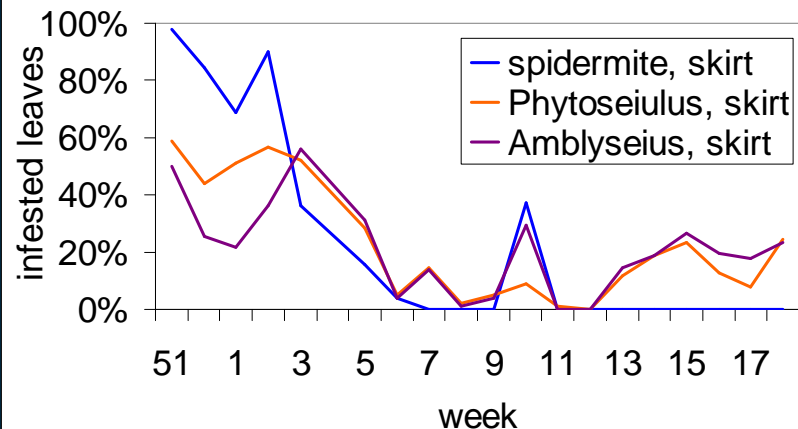
- ET Highland: 2100 masl
- JJ Kothari: 2600 masl

Kothari, population dynamics

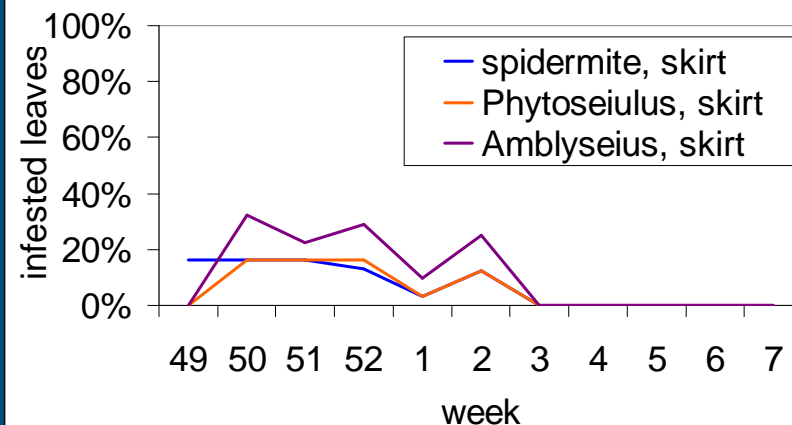


On-farm research: other farms

Oromia Wonder (2009)

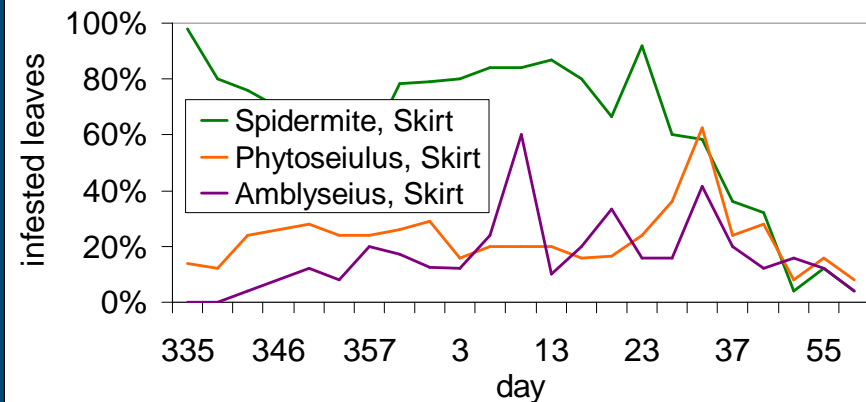


Golden Rose, skirt and stem



- Oromia Wonder: 2400 masl
- Golden Rose: 2000 masl
- Herburg: 1700 masl

Herburg (2008-2009)



On-farm evaluation of integrated pest management of red spider mite in cut roses in Ethiopia

Final Report to the Ministry of Agriculture and Rural Development

Eefje den Belder, Anne Elings, Yeraswork Yilma, Mohammed Dawd & Fikre Lemessa



Ethiopia Netherlands Horticulture Partnership

Report 296

On-farm research: summary

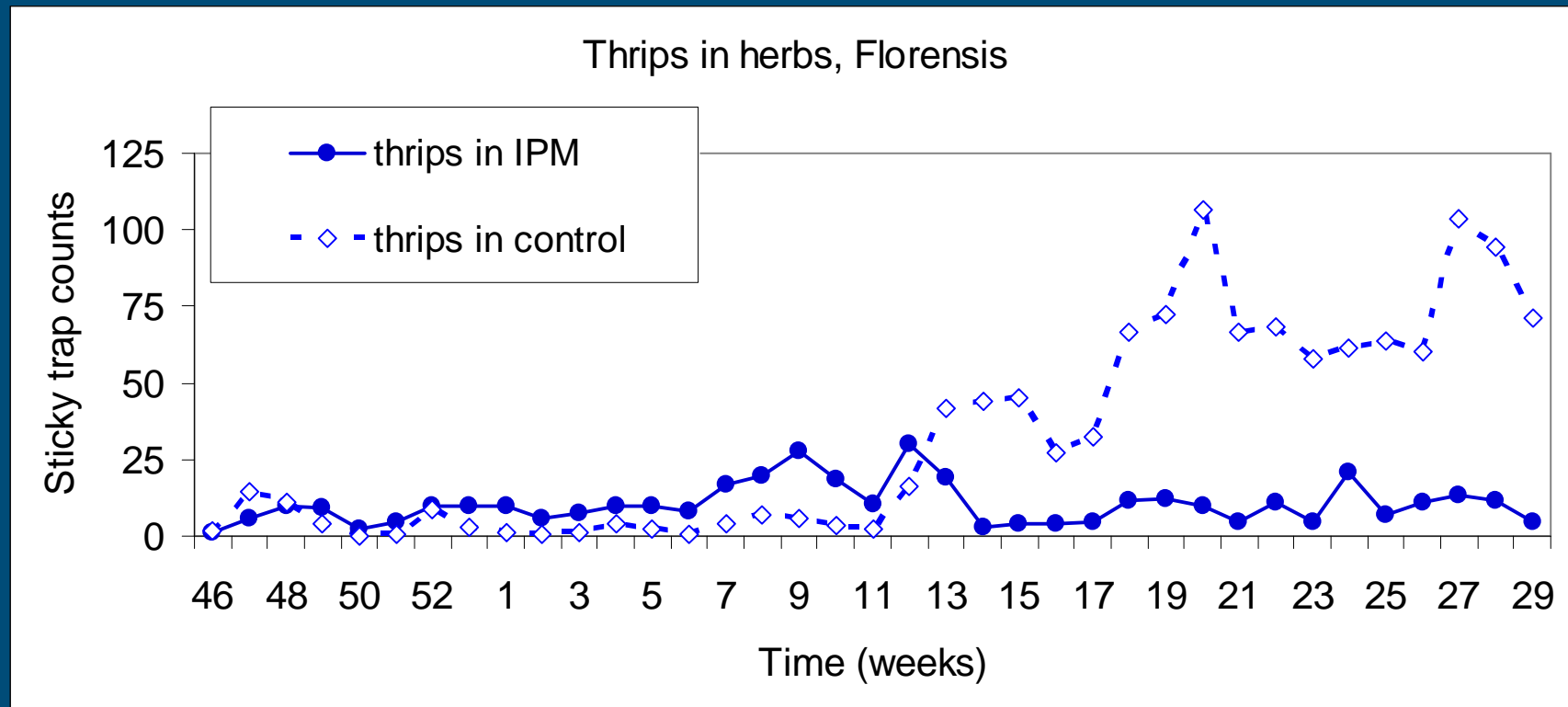
- IPM is possible, financially profitable
- Increase of production and quality
- Not-limiting factors
 - Rose variety
 - Humidity
 - Crop age (although young crop is preferable)
- Limiting factors
 - Training
 - Low temperatures
 - Chemical residues



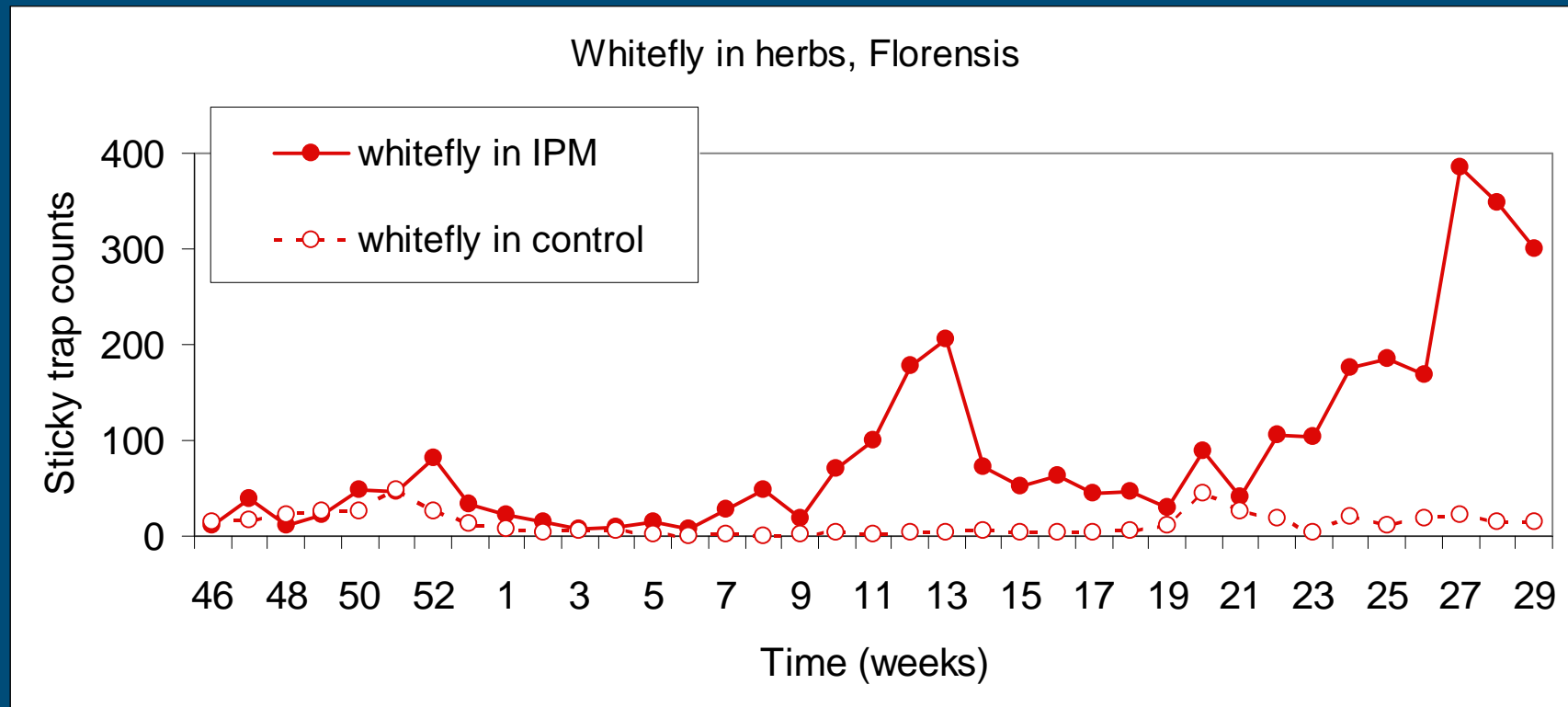
HERBS	IPM plot		Chemical plot	
<i>Purpose of chemical application</i>	<i>Number of applications</i>	<i>Chemicals used (or part of mix)</i>	<i>Number of applications</i>	<i>Chemicals used (or part of mix)</i>
Whitefly	1	Buprofezin (before first introduction biological control agents)	12	thiocyclam hydroxalate, buprofezin, pyriproxyfen, pymetrozine
Whitefly, thrips			28	thiacloprid, abamectin, spinosad, pyrethrin - piperonyl butoxide, Azadirachtin, buprofezin
Whitefly, thrips, spider mite			4	abamectin, azadirachtin
Thrips			31	spinosad, azadirachtin, lufenuron,
Total insecticide applications	1		75	

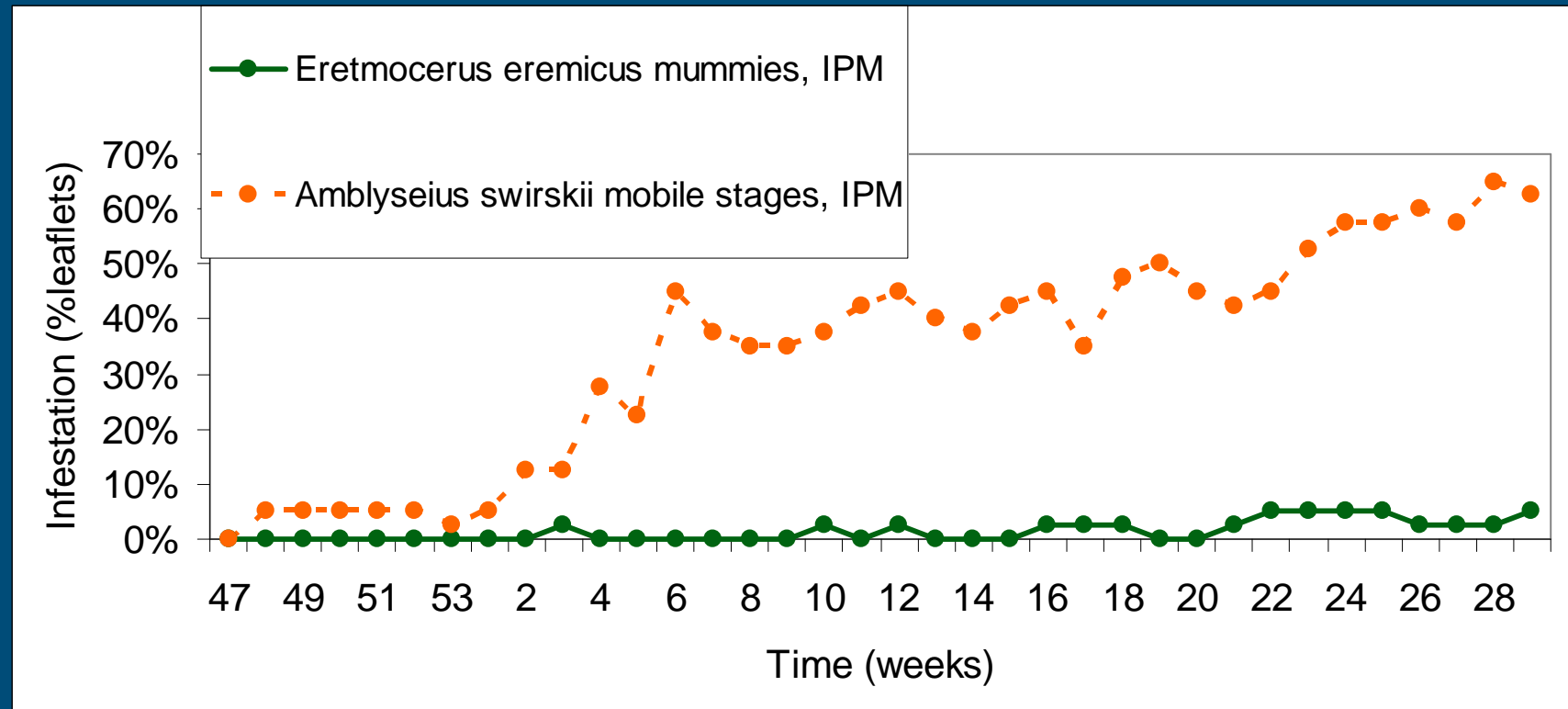
During 36 weeks 44 applications against whitefly
63 applications against thrips

observations so far thrips



observations so far whitefly

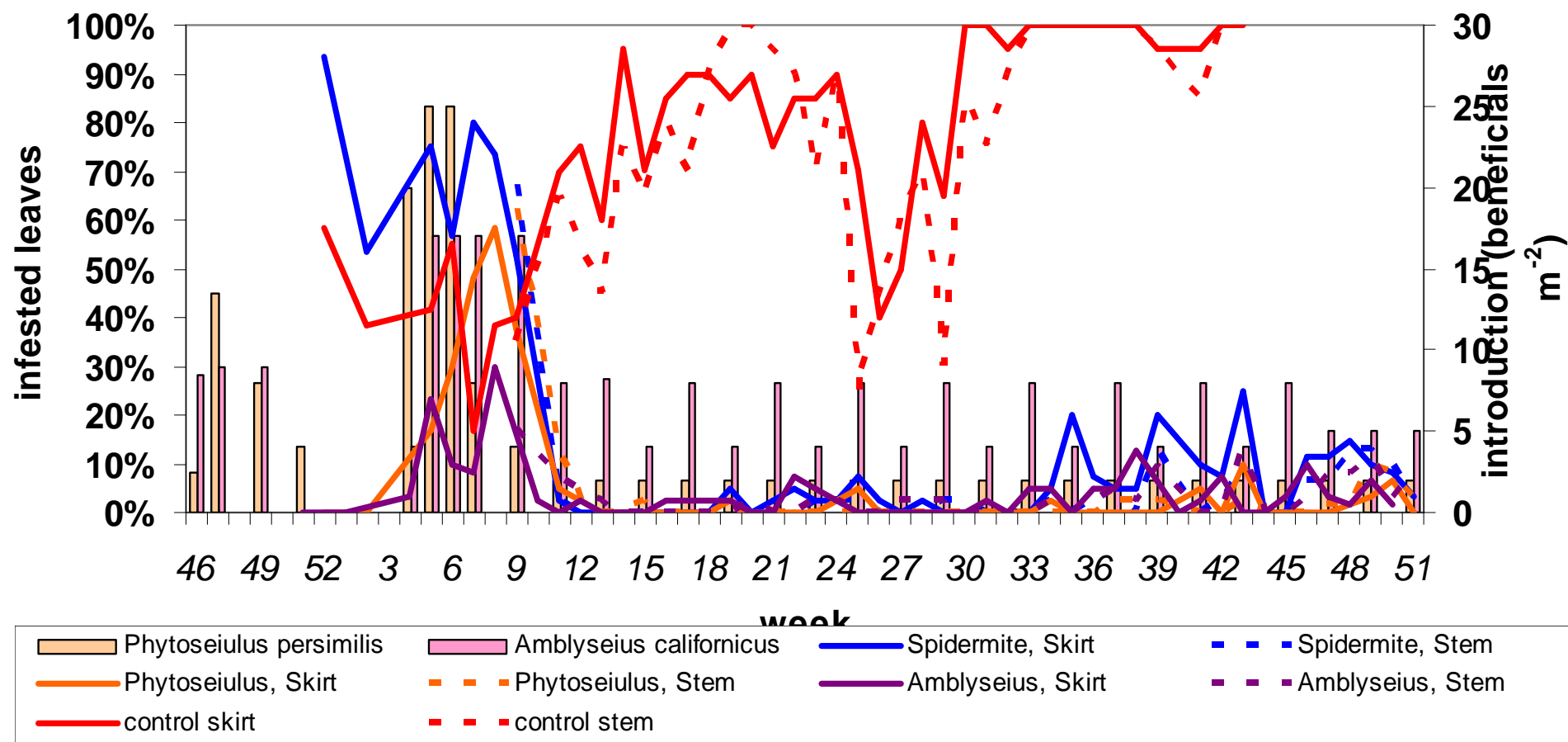




Possible conclusions herb on-farm trial

- Efficacy of *A. Swirskii* is sufficient against thrips in herbs
- Efficacy of the *A. swirskii*/Ercal system is ok against whitefly if combined with limited number of applications
- Efficacy of Ercal is not sufficient

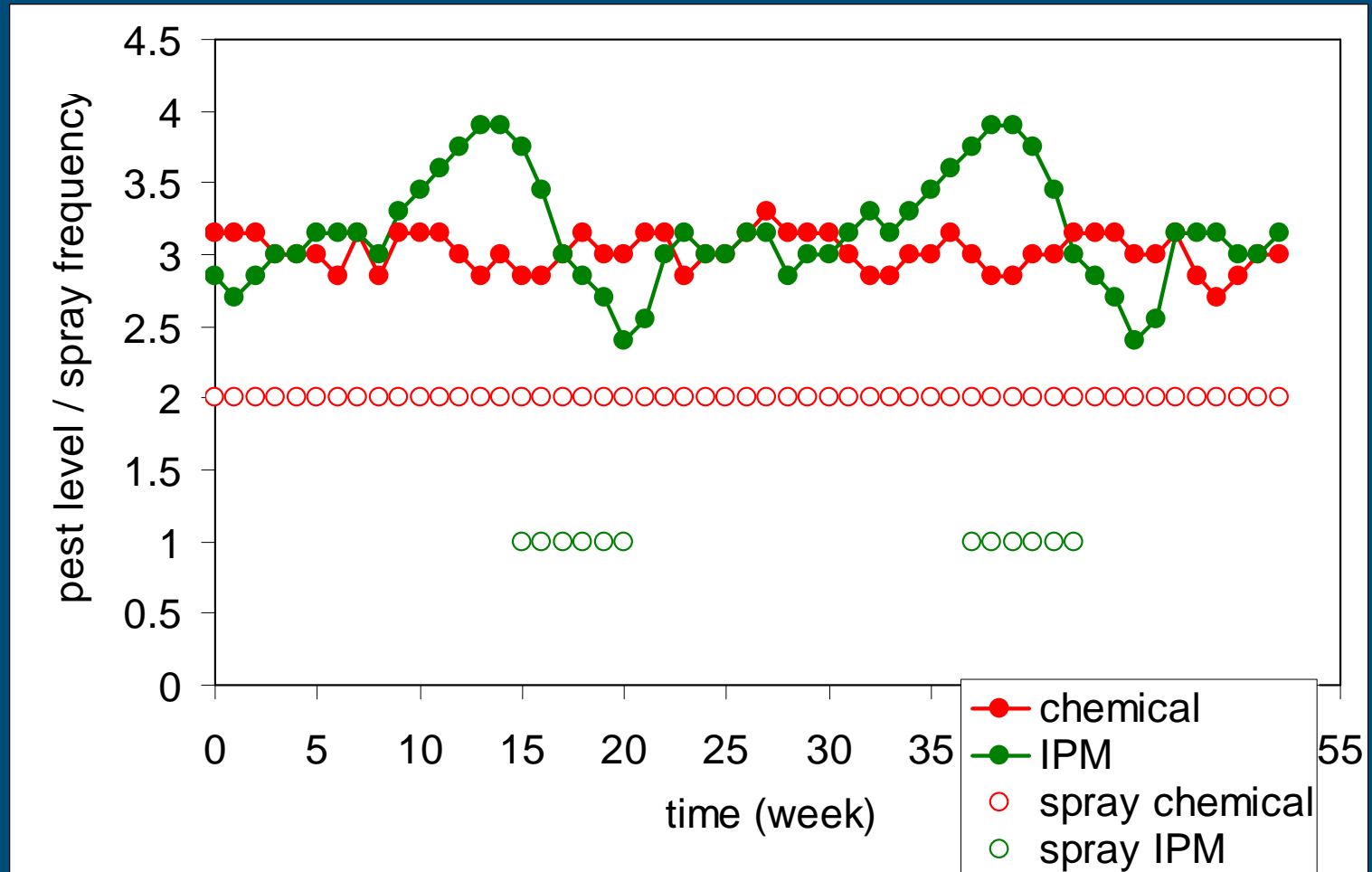
ET highlands, Control and Spidex + Spical, skirt and stem



Questions are:

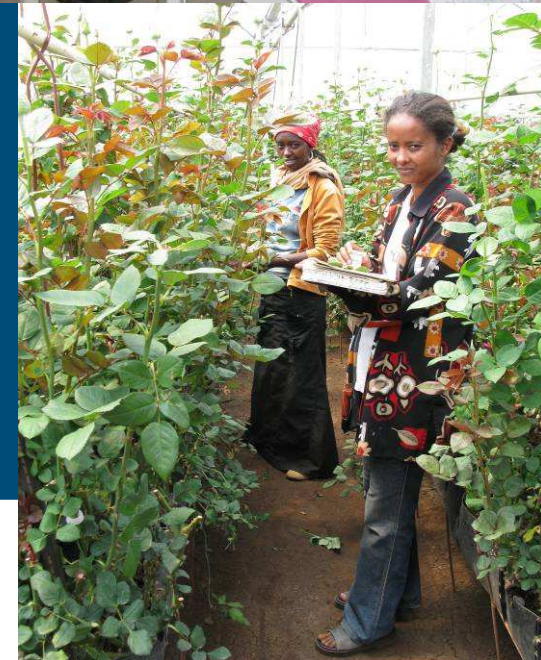
- How long do we measure?
- Do we measure 1 pest - 1 bca relations ?
- Do we measure 1 pest - 2 bca's relations ?
- Do we measure 2 pests - 1 bca relations ?
- Do we measure 2 pests – 2 bca's relations ?
- Are the application of a soft chemicals acceptable?

Hypothetical example



On-farm research: lessons learned

- Commitment
- Identification & monitoring
- Intensive communication
- During transition phase:
 - Low pest levels
 - No chemical residues
- Knowledge exchange



IPM

- Further capacity building
- Rose – pest and diseases
 - acreage
 - # farms
 - propagations
- Strawberries – spider mite
- Herbs – thrips - white fly
- Outdoor vegetables- Fusarium Phythophthora (started)
- Tomato -whitefly (started)
- Propagations- Sciaridae-shoreflies
- Fruit vegetables



Future

■ Enabling environment

- Permit procedures embedded in rules and legislation
 - Import permits for experimental purposes/commercialization
 - Adjustment of permit formats
 - Improvement customs at airport
 - Improved logistics
 - Institutional linkages and partnerships
- Private-public co-operation

■ Knowledge exchange

- Facilitation of study groups

■ Research

- On-farm research
- Strategic research on local bca's
- Post-graduate research



Wageningen UR Agro Systems Research Greenhouse Horticulture

Thank you

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Sustainable crop production in Ethiopia

