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Optimal control strategies of phytoplasma vectors: an overview of efficacy results of (low-impact) insecticides and alternative products against pear psyllids

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COST FA0807; WG 3

31 January - 2 February 2010, Sitges, Spain

Working Group 3: Phytoplasma control in crop systems

- Task 1 identification and breeding of crop plant varieties that are resistant (or less susceptible) to the phytoplasma
- Task 2 examination of the effects of biotic and abiotic environmental factors on disease and symptom development
- Task 3 improvement of vector control with special attention to low-impact insecticides and treatment schedules as well as the development of innovative, environmentally sustainable vector control strategies
- Task 4 recommendations for best practices in disease control including prevention, eradication, control of vector, and best cropping systems based on results of tasks 1, 2 and 3 in WG3 as well as on results of WG1 and WG2
- Task 5 verification whether the interaction of endophytes with host plant and phytoplasma can be used to control phytoplasma diseases
- Task 6 verification whether mild phytoplasma strains can effectively protect plants from infection by virulent (or severe) phytoplasma strains

Pome fruit growers: Integrated Fruit Production (IFP)

Integrated Pest Management (IPM)

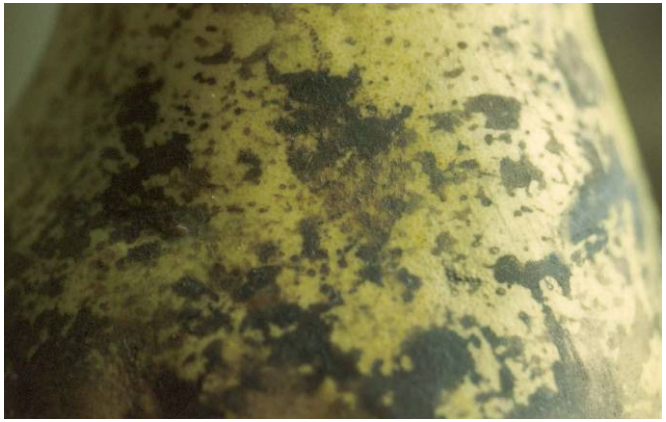
- Selective compounds: low-impact on beneficials
- Natural predators and parasites in the field act in synergy with the insecticides to control the pest
- Presence of pests does not automatically require control measures

Impossible to eliminate all vectors from the environment

Well-managed vector control strategies significantly reduce the chance of an epidemic outbreak

Cacopsylla pyri

Pear sucker



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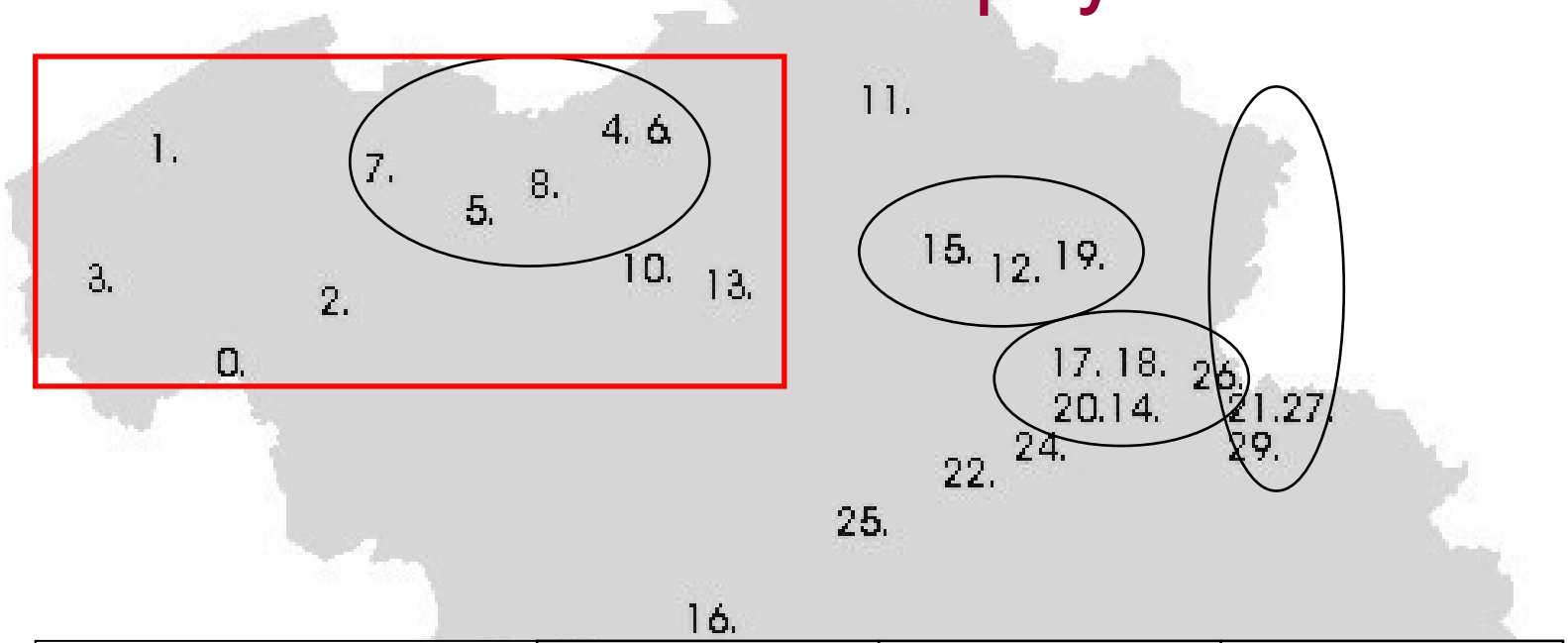
Pear psylla distribution



Provincie	Total number sampled	*Cacopsylla pyri*	*Cacopsylla pyricola*
Limburg	462	462 = 100%	0%
Antwerpen	165	165 = 100%	0%
Oost-Vlaanderen	204	188 = 92,2%	16 = 7,8%
West-Vlaanderen	143	46 = 32,2%	97 = 67,8%
Brabant	65	65 = 100%	0%

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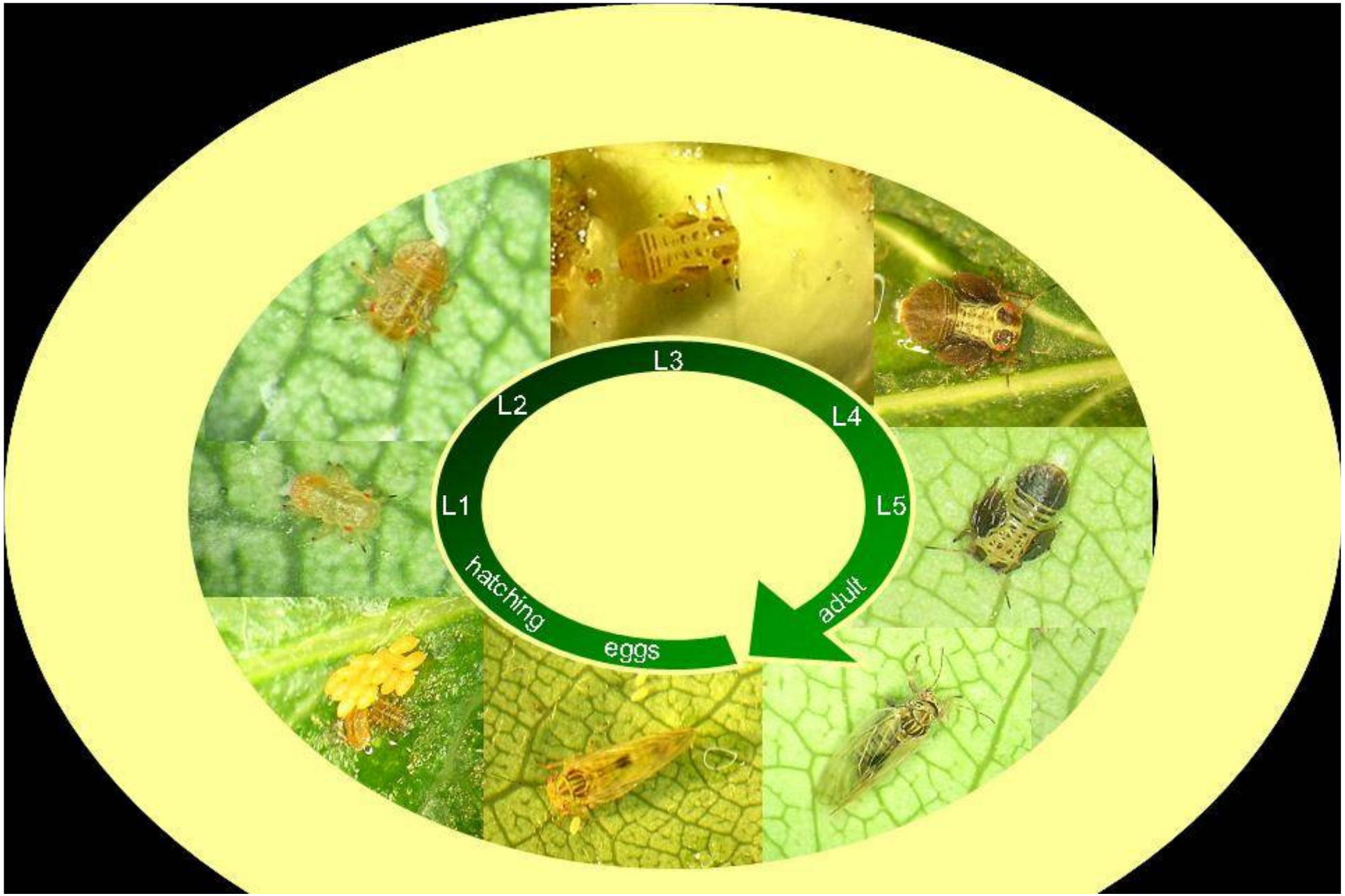

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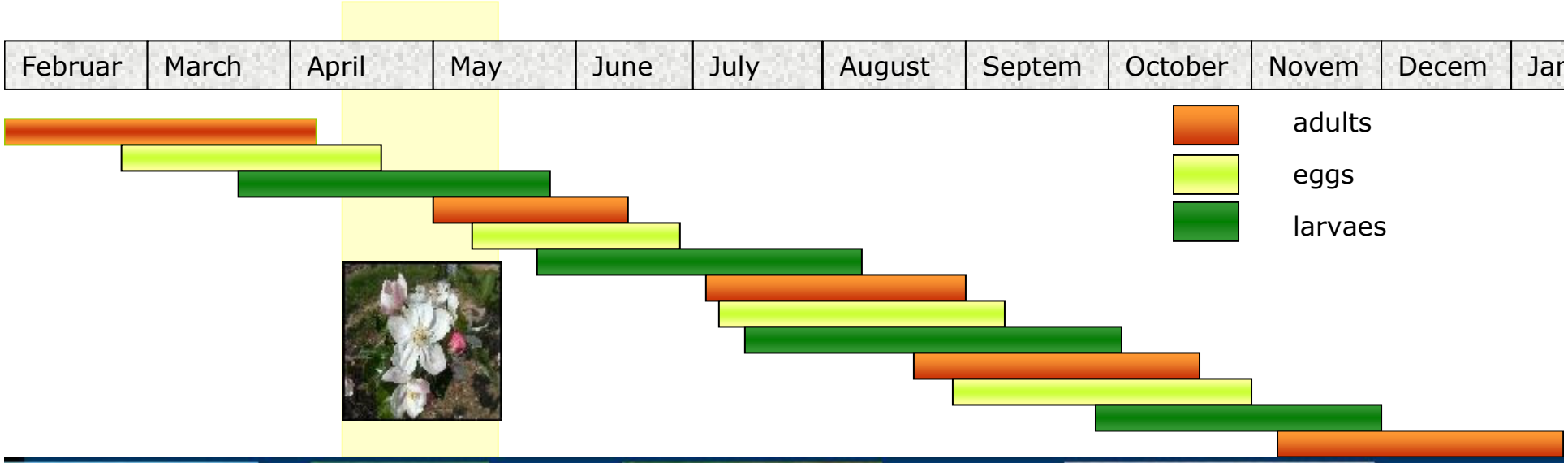
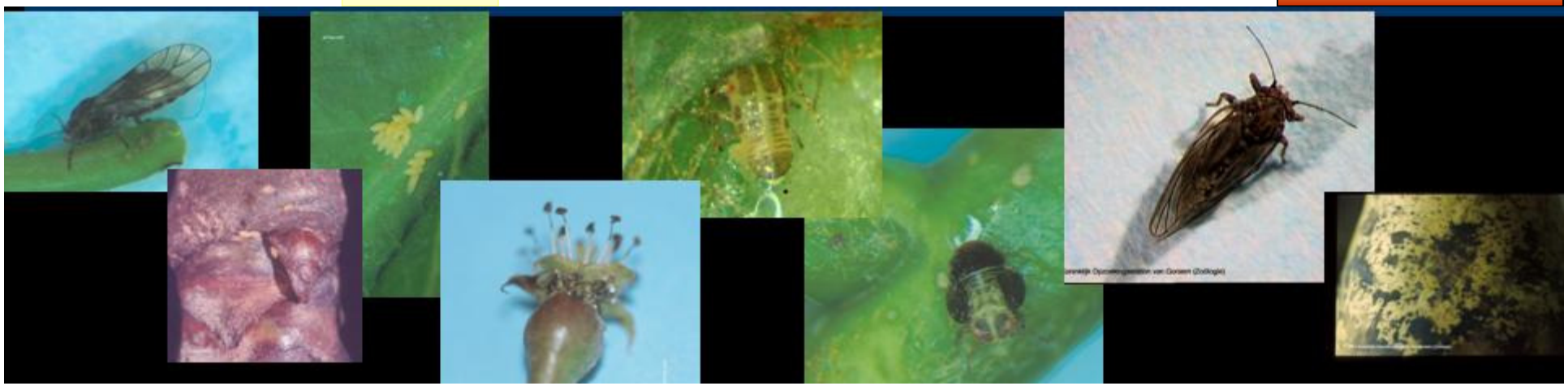
Life cycle pear sucker

Overwintering adults	First generation	Second generation	3rd - 4th generation	Last generation	



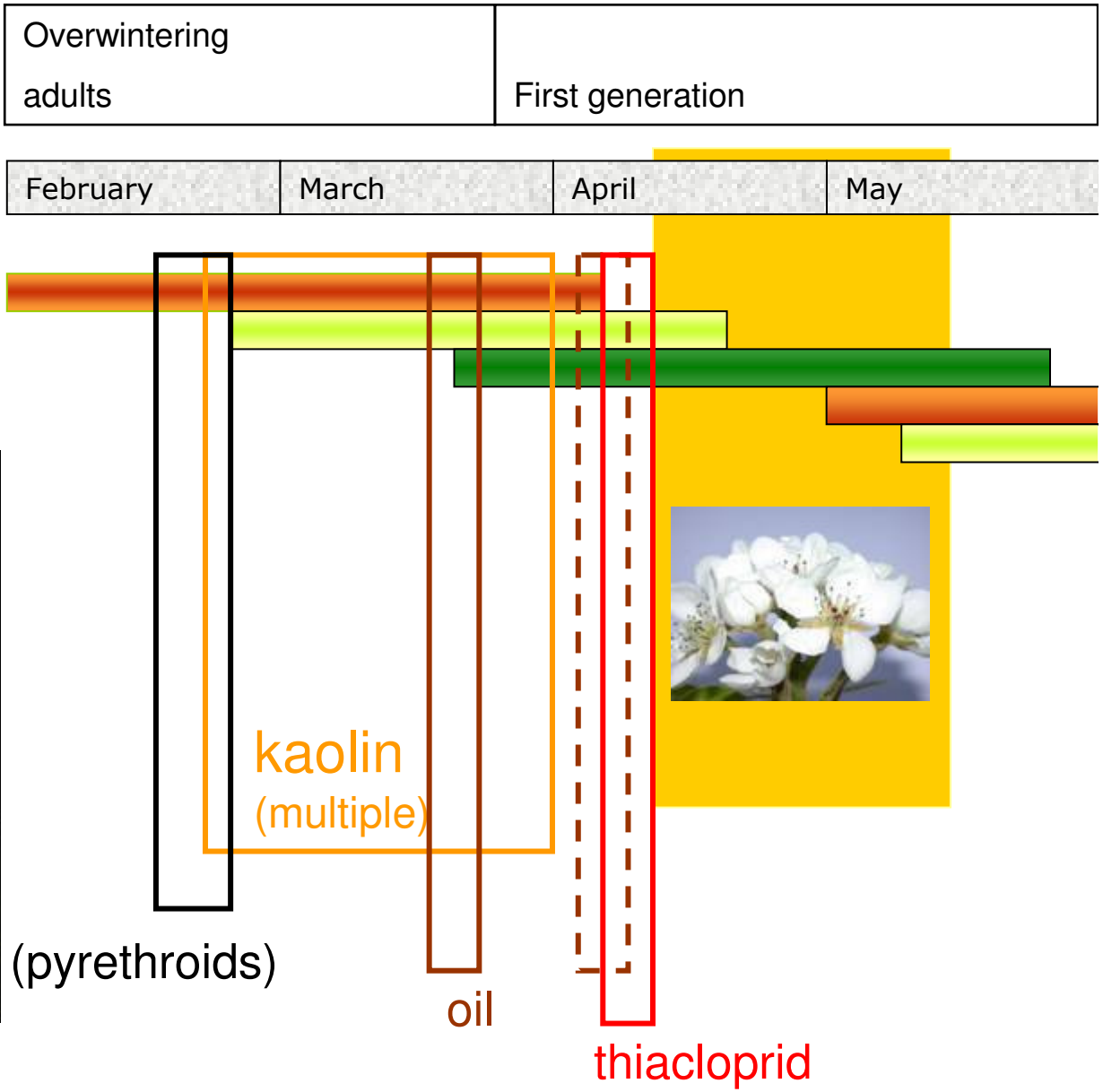


Controlling pear sucker spring

adults

eggs

larvaes



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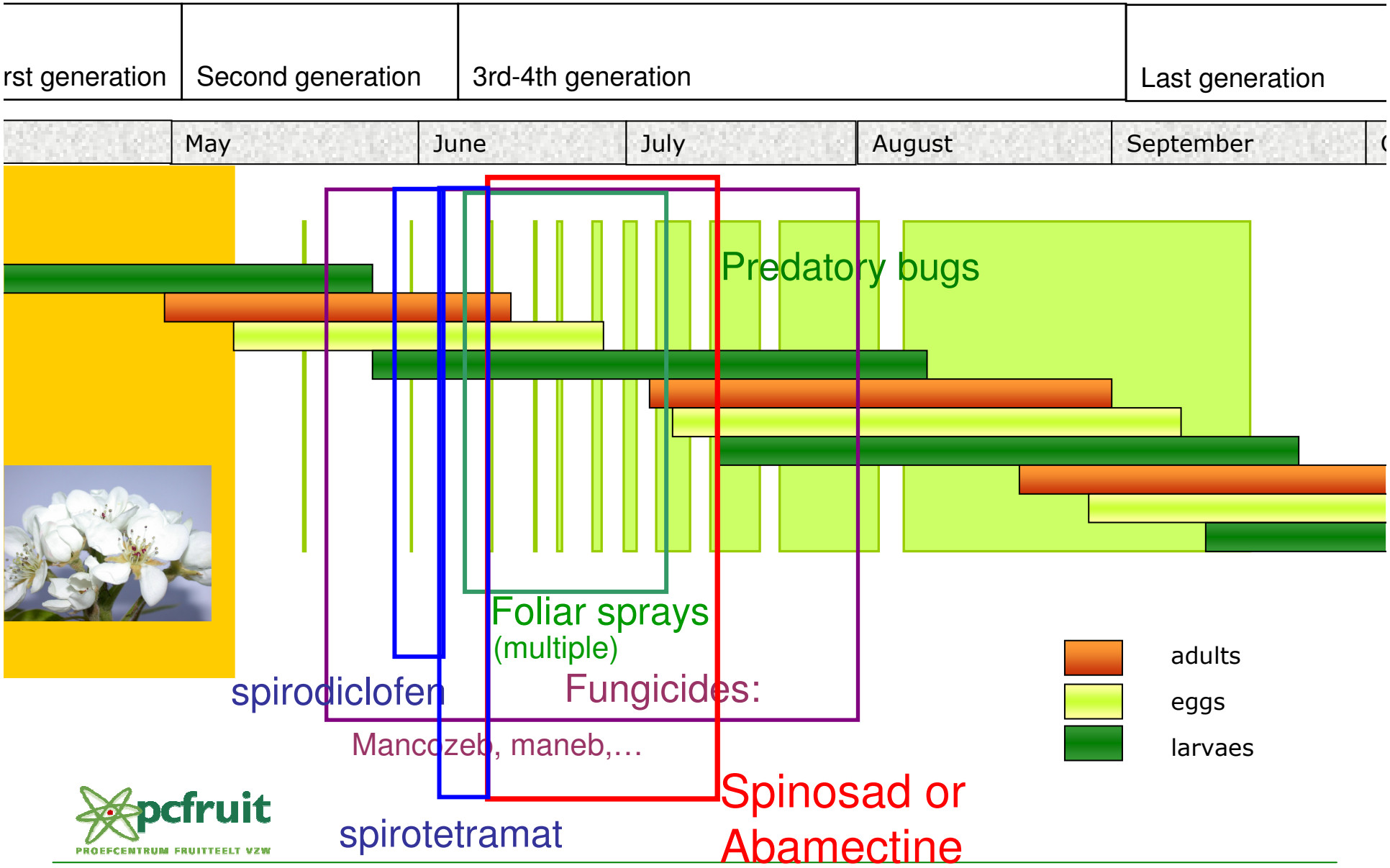
Summer control pear sucker



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Monitoring pear sucker in Belgium: long tradition

Name	Stage	Min	Mean	STD	# year	Max	2009
Psylla pyri	start activity	27/Nov	**4/Feb**	22	42	20/Mar	20/Jan
Psylla pyri	first eggs	15/Jan	**22/Feb**	20	50	9/Apr	14/Feb
Psylla pyri	first larvaes	25/Feb	**1/Apr**	18	47	20/May	27/Mar
Psylla pyri	first adults 1g	7/Apr	**26/Apr**	9	15	13/May	
Psylla pyri	eggs summer	16/Apr	**5/May**	12	14	29/May	
Psylla pyri	larvaes summer	21/Apr	**16/May**	23	14	30/Jul	11/May

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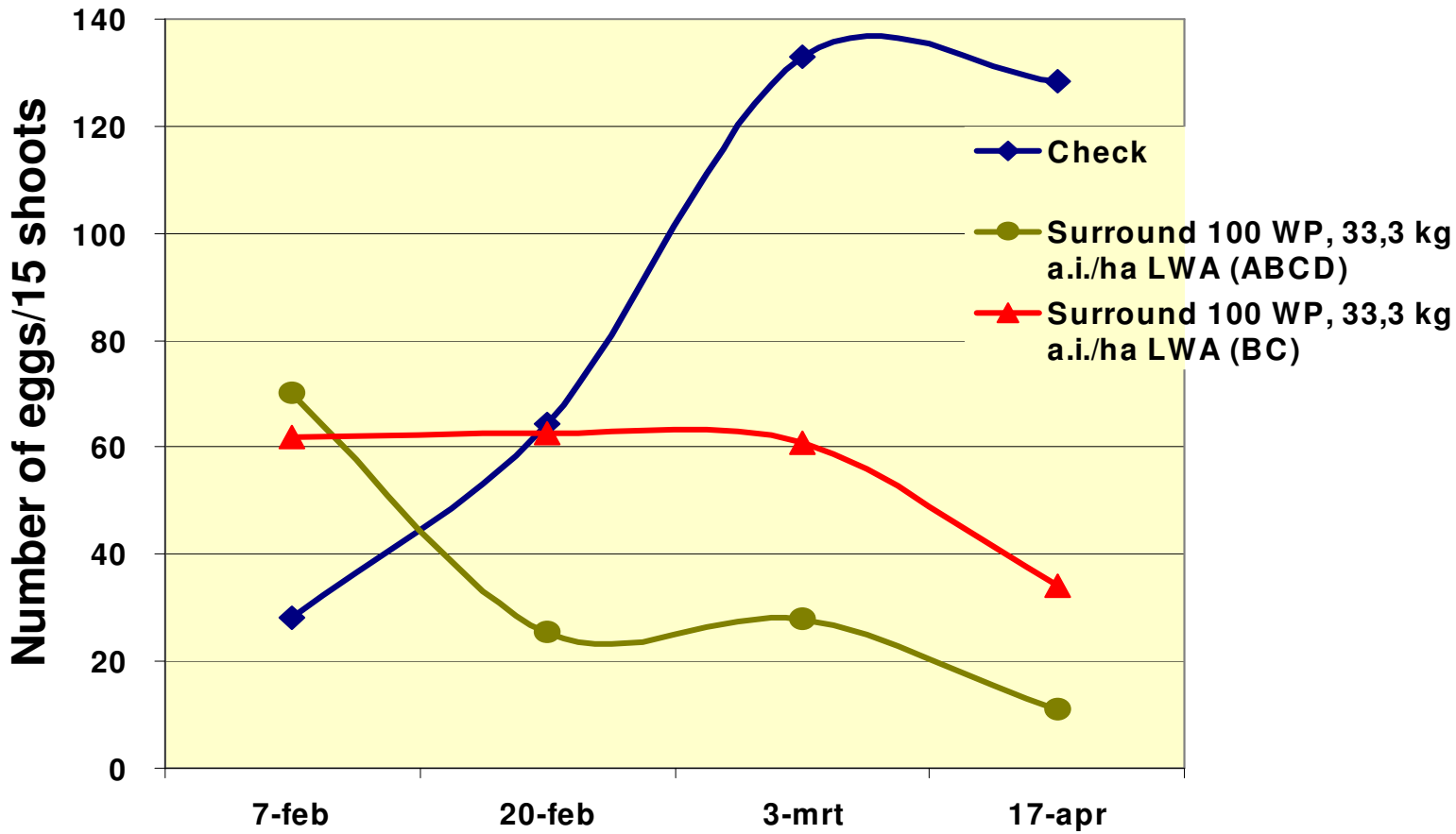
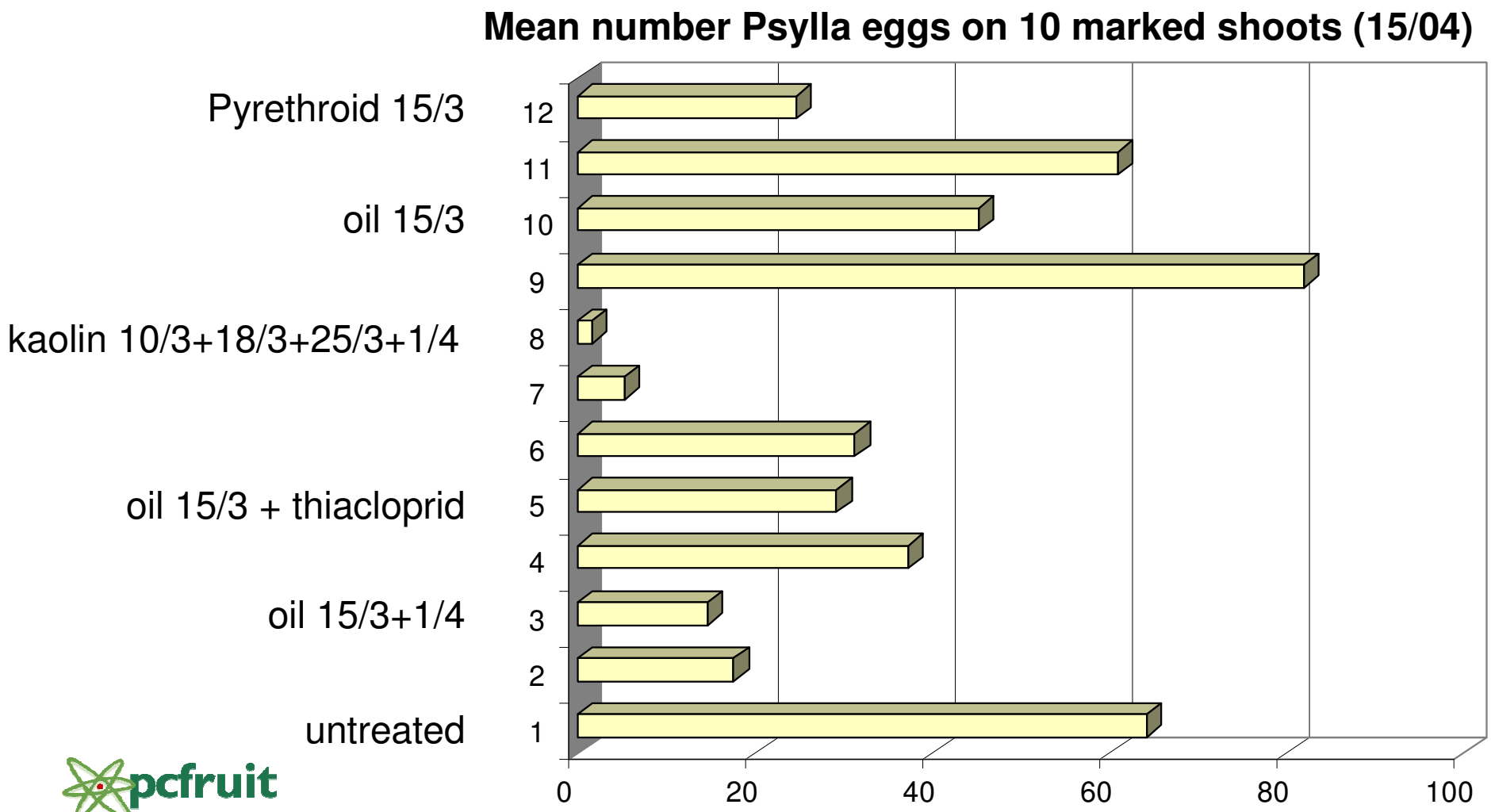
Overview insecticides and alternative products

	Active ingredient	Brand name	IPM	Dose kg or l/ha LWA	R	#	Remark
	bifenthrin	Talstar Bistar	(A) P	0.25-0.63 0.63	P	1x	Permission for exception required
	deltamethrin	Decis Splendid Patriot	A P	0.3-0.4 0.3-0.4	P	2x	
1	kaolin	Surround					Repellent, irritating
2	oil	Oviphyt SunSpray 7E	(A) (P)	6.2 6.7	Q		Until white bud stadium
	thiacloprid	Calypso (480 SC)	(A) P	0.25 0.25	N	2x	P: before bloom (30 % infestation, 30 % L1-nymphs) and after harvest
3	spirodiclofen	Envidor 240 SC	P	0.4	U	1x	After blossoming
4	spirotetramat	Movento 100 SC	P A	1.5	U	1x 2x	P: 1x, after blossoming
	abamectine	Vertimec 18 EC, Agrimec	P	0.5	S	1x	In exceptional cases: 2x
	spinosad	Tracer	(A) P	0.15 0.30		3x	P: After blossoming, 1-2 x 7 d interval

Cacopsylla pyri field trial
Efficacy preventing laying of eggs



Cacopsylla pyri field trial (Doyenné, 3 repetitions, 44 trees each)



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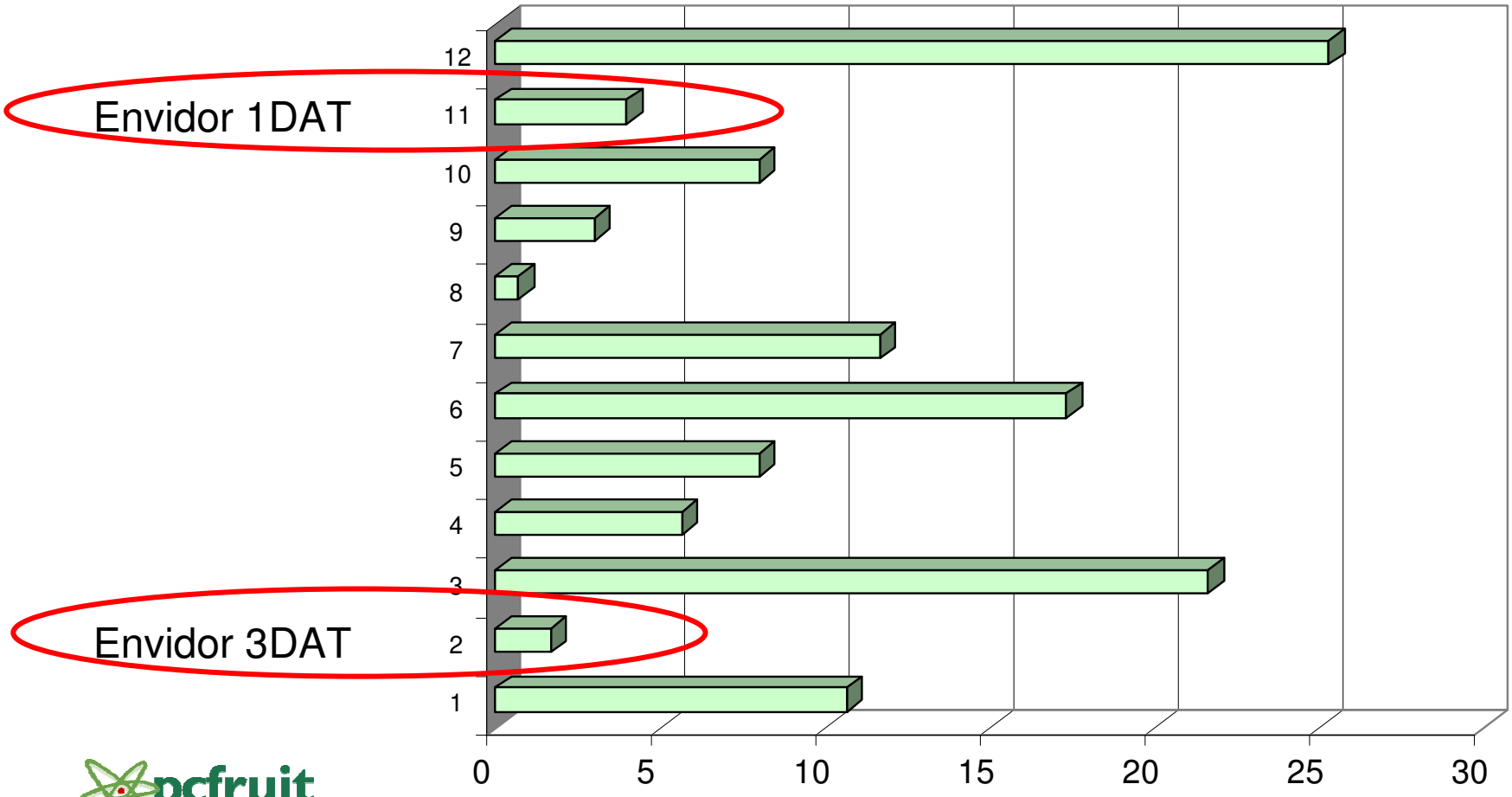
Cacopsylla pyri field trial

Mean number L1-L3 on 10 marked shoots (30/05)



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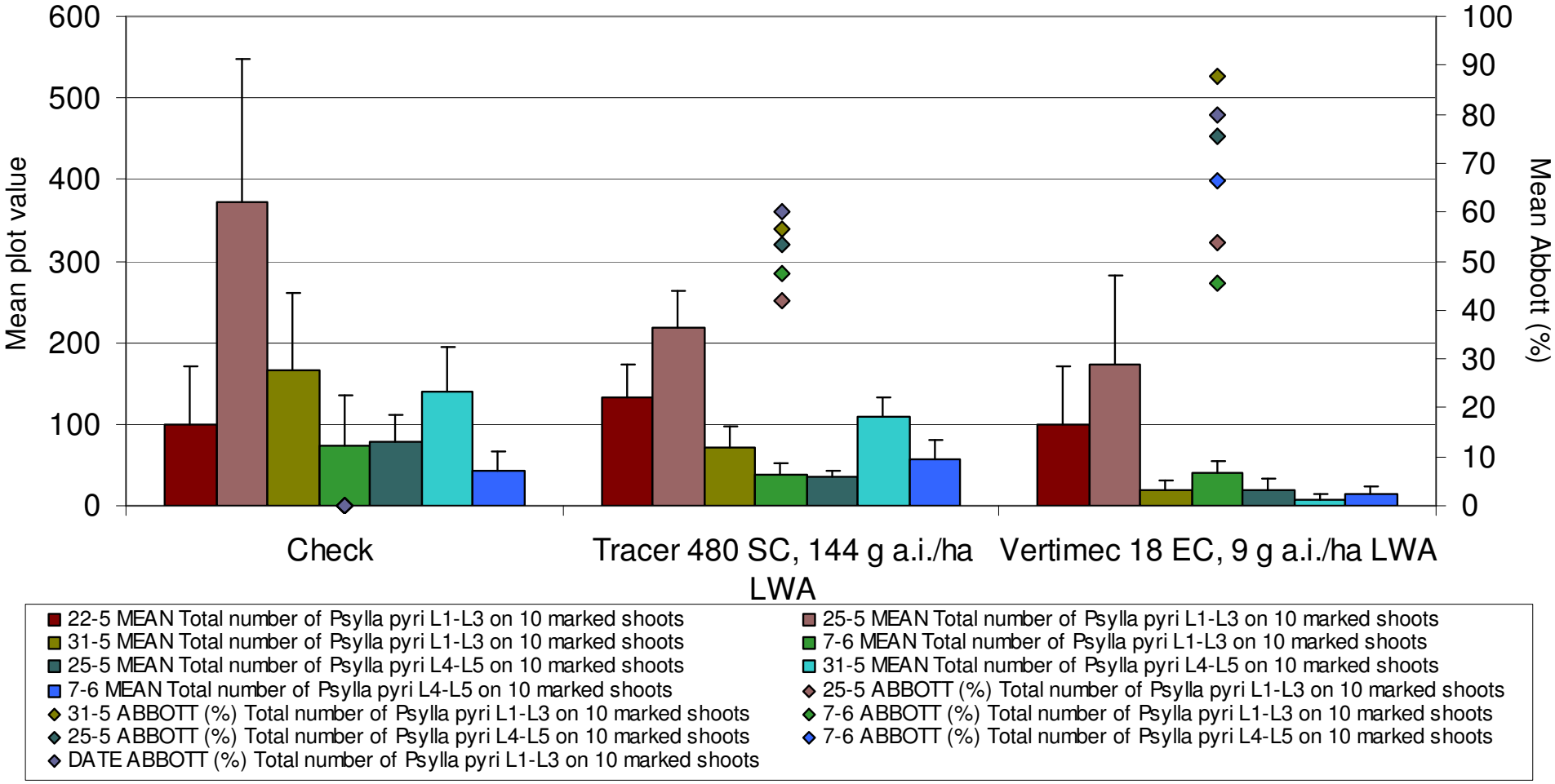
4. After blossoming abamectine/spinosad

Cacopsylla pyri field trial



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Anthocoris sp. or predatory bugs are predators of pear sucker

Egg in leave

Predatory bug eating eggs of pear succer

Adult predatory bug

Field trials efficacies insecticides or alternative products

- **Random block design (4 repeats)**

  (cages for mobile (adults)?)

- **Concept of leaf wall area: dose is adapted to the 'crop surface':**

  # trees x distance in row x height trees x 2

- **Minimum infestation level**

- **Importance of timing of application / different life stages**

- **Importance of side-effects on natural predators**

Thanks

- G. Peusens, E. Bangels
- C. Duchêne, P. Lepoivre, S. Steyer

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Project funding:

Evaluation et gestion des risques liés à deux maladies de quarantaine en Belgique : la prolifération du pommier (*Candidatus* Phytoplasma mali, AP) et le dépérissement du poirier (*Candidatus* P. pyri, PD).

Contractueel Onderzoek
Federale Overheidsdienst Volksgezondheid, Veiligheid van de Voedselketen en Leefmilieu

Thank you for your attention

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