



The world of insect production

Marian Peters

Co-founder of:



New Generation Nutrition BV



NGN Pro-active

Creation of a flowering industry for insects
Developing relevant insect knowledge

Realising market acceptance and collaboration:

- Breakthrough projects
- Consultancy
- Education

NGN Products

Smart and tasty solutions with insects
Specialties with high added value

New product development and prototyping:

- Feed
- Food
- Fertilizer

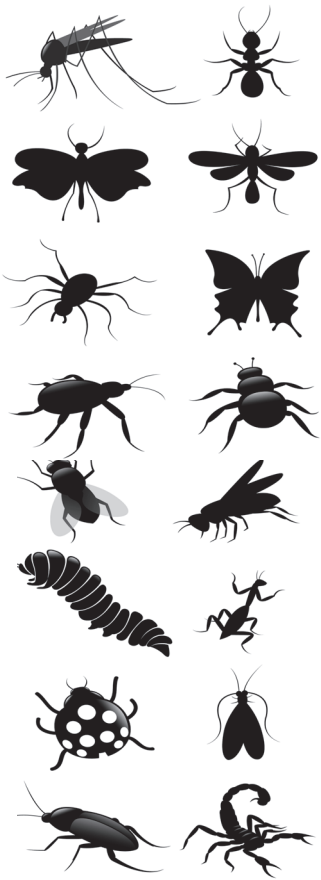
Content

- Insects in a broader perspective
- Insect production now adays
- Creation of future insect production supply chain



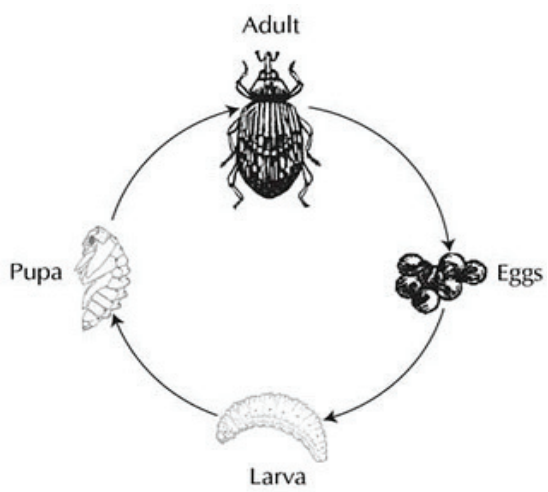
2x more & 2x less





Insects:

Desert locusts in 1 swarm	50.000.000.000
Insects per 1 km ² land	10.000.000.000
Insects per person	200.000.000
Species (estimated)	6.000.000
Species described	>1.000.000
Species edible	1.908
Species farmed in NL	62
Species allowed to farm in NL	29



Short cycled
mini-livestock



Seasonal harvesting vs. farming

controlled production environment



Insect production at Kreca, The Netherlands













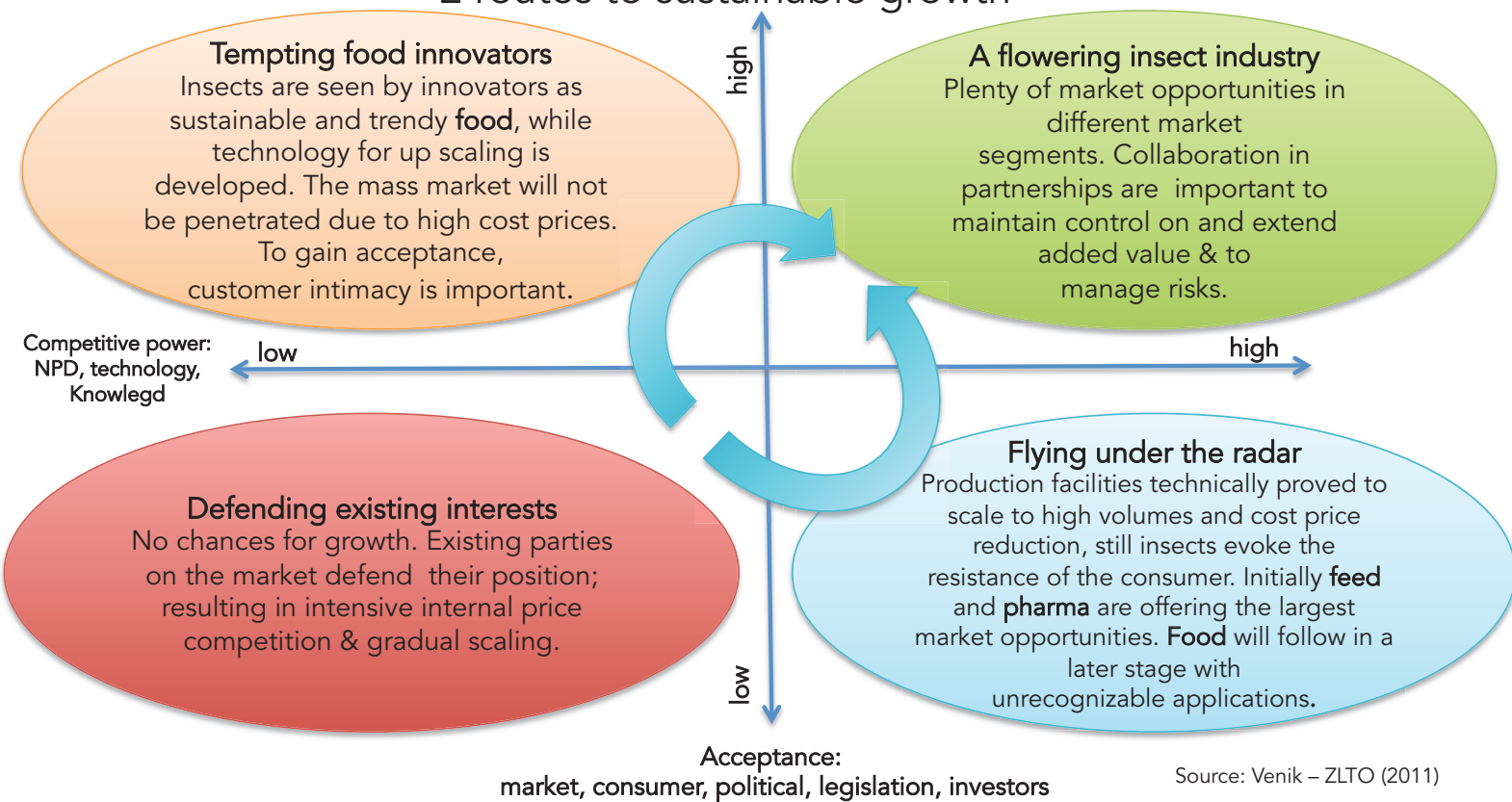








2 routes to sustainable growth





Rijksoverheid



collaboration

Creating awareness

- 2007 Insect rearing for 'human consumption' according to standards of the General Food Law
- 2008 Insects for Human consumption sold at Sligro
Foundation of Venik
- 2009 Insects in Dutch policy 'Duurzame Voeding'
SBIR Mc Bugs
- 2010 Start research program Supro2
Development of insect snacks
- 2011 Start network InsectCentre
Future scenario studies
Roadmap towards an Insect sector
- 2012 FAO meeting 'accessing the potential of insects as ingredient for feed and food'
Publication 'Het Insectenkookboek'
Greendeal 'insecten voor food, feed & farma'
Start feasibility study 'InsectLab' as shared research facility
- 2013 Publication of FAO on Edible Insects <http://www.fao.org/forestry/edibleinsects/en/>
Foundation International InsectCentre
- 2014 FAO Conference 'Insects to feed the World' in Wageningen (May 2014)
- 2015 Journal Insects for feed and food



Market situation for insects

- Current market
 - Niche markets: pet food
 - Products: whole insects (alive or dried)
 - High returns per kilo
 - Small companies
- Future markets
 - Bulk markets (feed, food)
 - Products: composed products, insects as ingredient
 - Low returns per kilo
 - Industrial production

Total system innovation

Until now:

- pest or contaminant
- insect production on small scale for special pet food
- insect sciences available at 'plant sciences groups'

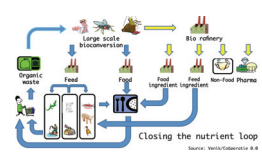
New:

- insects as production or farmed animal
- insects as ingredient for feed & food
- insect sciences located at 'animal sciences groups'

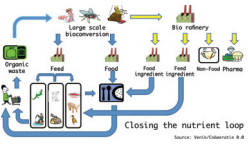
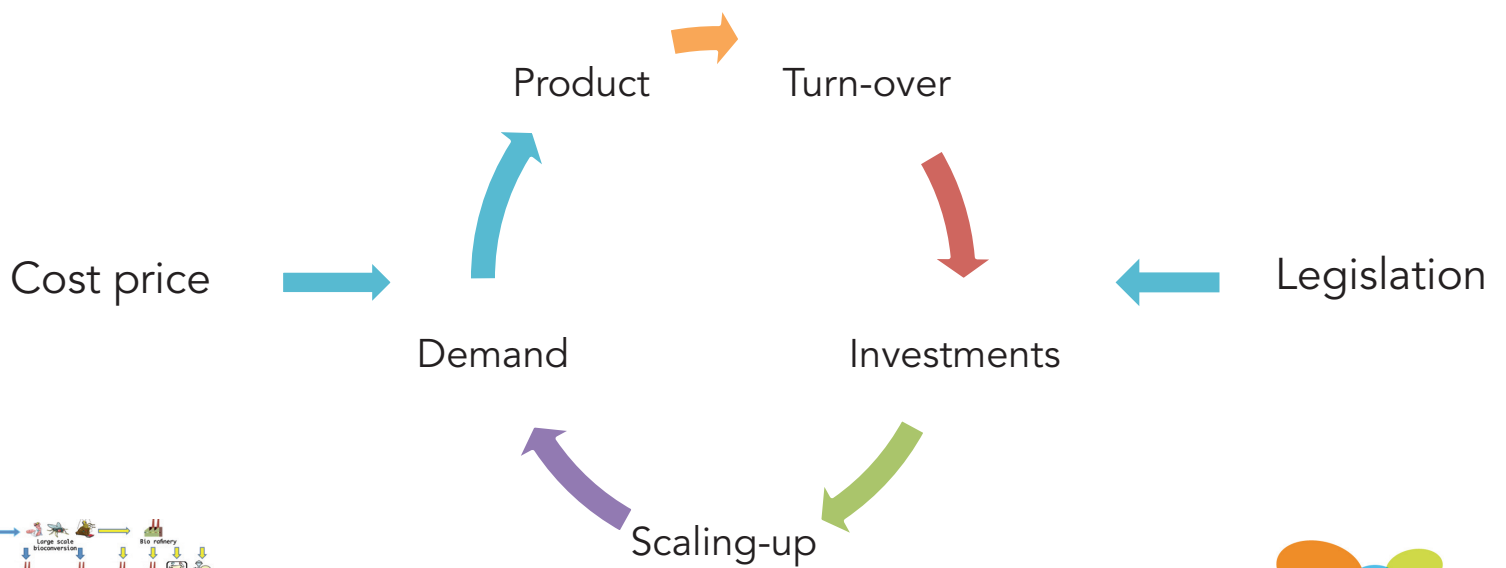
Consequences:

- market acceptance
- risk control: diseases, contaminations, GMP+/HACCP, food/feed safety, substrates
- legislation
- scaling – develop new technologies
- NPD
- funding
- education

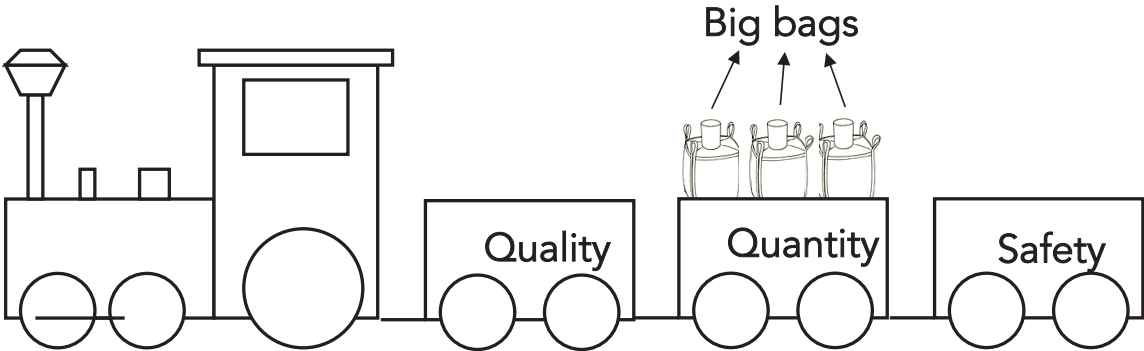
Challenges



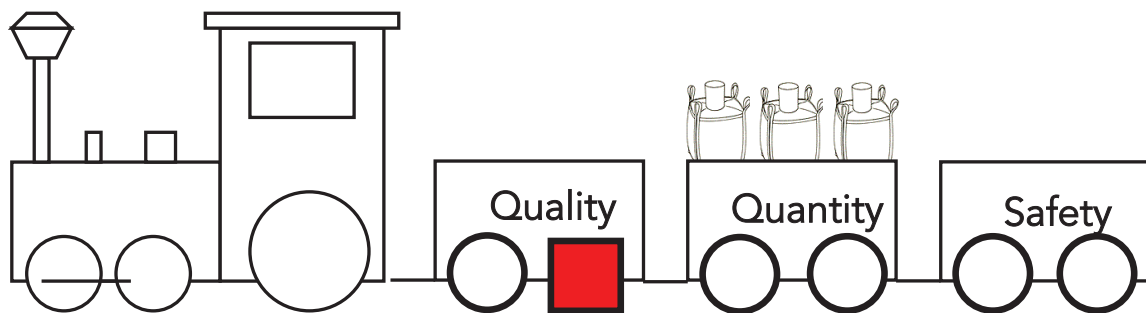
Vicious circle in scaling



The insect supply chain can be seen as a train with carriages



But: when one of the carriages is not functioning,
the whole chain is effected



Quality and safety

Issue	Legal demands for Food safety	Extra demands concerning Quality
Lifetime cyclus	X	X
No diseases/healthy	X	X
Contaminants/Bacteria	X	X
Medicines/ no-antibiotics	X	X
Smell (insect specific)	X	X
Quality GMP-feed	X	
Shiny appearance		X
colour		X
Taste		X
Temperature/lifetime		X
Purity		X
Uniformity of size		X
Quantity		X
Content in the package		X
Nutritional value		X
Transport/storage		X
Genetics		X
Lively		X

Quantities BSF-production (global)

		current production scale	2014 kg/week	2014 kg/year	2015 kg/week	2015 kg/year
Agriprotein	South Africa	Pilot plant	4.500	234.000	98.000	5.096.000
Bioflytech	Spain	Pilot plant	2.000	104.000	3.000	156.000
Co-prot	Cambodia	Building plant	500	26.000	4.000	208.000
Entomos	Switzerland	Lab scale	100	5.200	150	7.800
Environflight	United States	Pilot plant	5.769	300.000	8.654	450.000
Hermetia	Germany	Lab scale	500	26.000	750	39.000
Koppert	Netherlands	Lab scale	200	10.400	300	15.600
Milibeter	Belgium	Lab scale	30	1.560	300	15.600
Protix Biosystems	Netherlands	Pilot plant	3.000	156.000	30.000	1.560.000
Ynsect	France	Building pilot plant	200	10.400	300	15.600
Total production	kilograms			873.560		7.563.600
Turn-over	price per kg/current price level		€ 6,00	€ 5.241.360,00		€ 45.381.600,00
Available dry matter	kilograms			291.187		2.521.200

Quantaties tenebrio-production (NL/Belgium)

		current production scale	2014 kg/week	2014 kg/year	2015 kg/week	2015 kg/year
Delaere	Belgium	Farm, not automated	600	31.200	700	36.400
Klok	Netherlands	Farm, not automated	500	26.000	600	31.200
Kreca	Netherlands	Farm, not automated	1.000	52.000	1.000	52.000
Marba	Netherlands	Farm, not automated	7.000	364.000	7.000	364.000
Starfood	Netherlands	Farm, not automated	5.000	260.000	5.000	260.000
Van de Ven Insectenwekerij	Netherlands	Farm, not automated	2.000	104.000	5.000	260.000
Vivara	Netherlands	Farm, not automated	1.500	78.000	30.000	1.560.000
Imported for Dutch Market	Hungary/Czech Republic	Farm, not automated	2.500	130.000	2.500	130.000
Totaal				1.045.200		2.693.600
Turn-over	price per kg/current price level		€ 4,50	€ 4.703.400,00		€ 12.121.200,00
Available dry matter	kilograms			348.400		897.867

Buffaloworms (Alphitobius laevigatus)

			Production for petfeed and human consumption in Netherlands & Belgium			
		current production scale	2014 kg/week	2014 kg/year	2015 kg/week	2015 kg/year
Kreca	Netherlands	Farm, not automated	1.500	78.000	1.500	78.000
Top Insect	Belgium	Farm, not automated	1.500	78.000	1.000	52.000
Van de Ven	Netherlands	Farm, not automated	35	1.820	100	5.200
Wormenwekerij Van der Vleuten	Netherlands	Farm, not automated	150	7.800	250	13.000
Totaal				165.620		148.200
Turn-over	price per kg/current price level		€ 6,00	€ 993.720,00		€ 889.200,00

Insects in legislation

- Recognition insects as 'production or farmed animals'
- Production of insects on waste streams
- Animal welfare
- Regulation on the storage, handling and slaughtering
- Authorization for feed applications
- Novel Food Regulation



Rijksoverheid

Preparing the ground & building the business case

Chain collaboration and new consortia needed:

- Fundamental research
- Proof of concept
- Creating business

Insects as food



What is the difference?



Traditional foods - food design



gastronomy



Questions?

Thank you for your attention!

