Pest management by modifying insect development and behaviour

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- Communication in insects
- Behavioural alteration
- Semiochemicals
- Pheromones
- Allelochemicals
- Chitin synthesis inhibitors
- Attractants
- Repellents
- Antifeedants

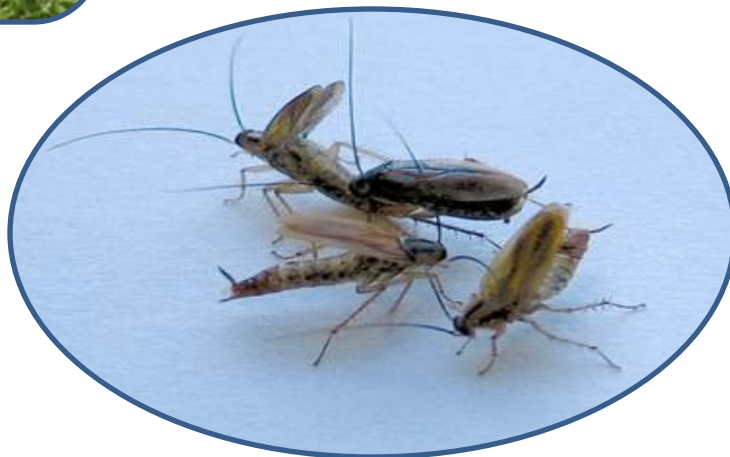
METHODS OF COMMUNICATION IN INSECTS

AUDITORY

VISUAL

OLFACTION

TACTILE



- **Control strategies against insect pests involve some sort of change to their behaviour through**

  - Chemical (*i.e*. volatiles and non-volatile compounds, feeding deterrents)
  - Visual or
  - Auditory signals.

- **Manipulating pest behaviour for insect control -known for centuries through the practice of trap cropping.**

- **Ex: Food lures and baits with pesticides to control household pests.**

Adoption of technologies to manipulate insect behaviour in agricultural systems – Slow ????

- **Arrival of cheaper chemical controls with broad insecticidal activity.**

Later

- Increasing public awareness of the negative effects of broad-spectrum insecticides on humans and non-target organisms.

- United States, the Environmental Protection Agency (EPA) implemented the Food Protection Act (FQPA) in 1996.

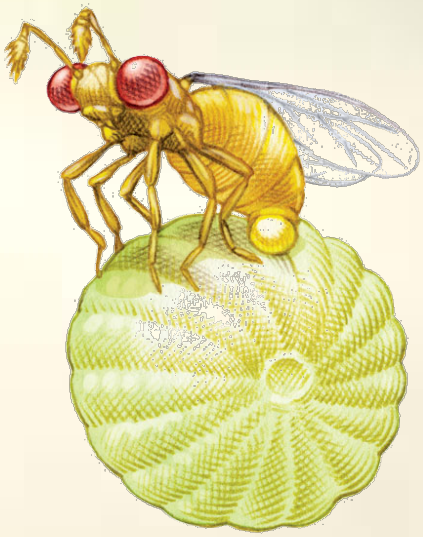
- Adoption of alternative pest management practices- manipulation of pest behaviour and

- To promote a transition from insecticide-based to more ecologically, integrated pest management (IPM)-based programs.

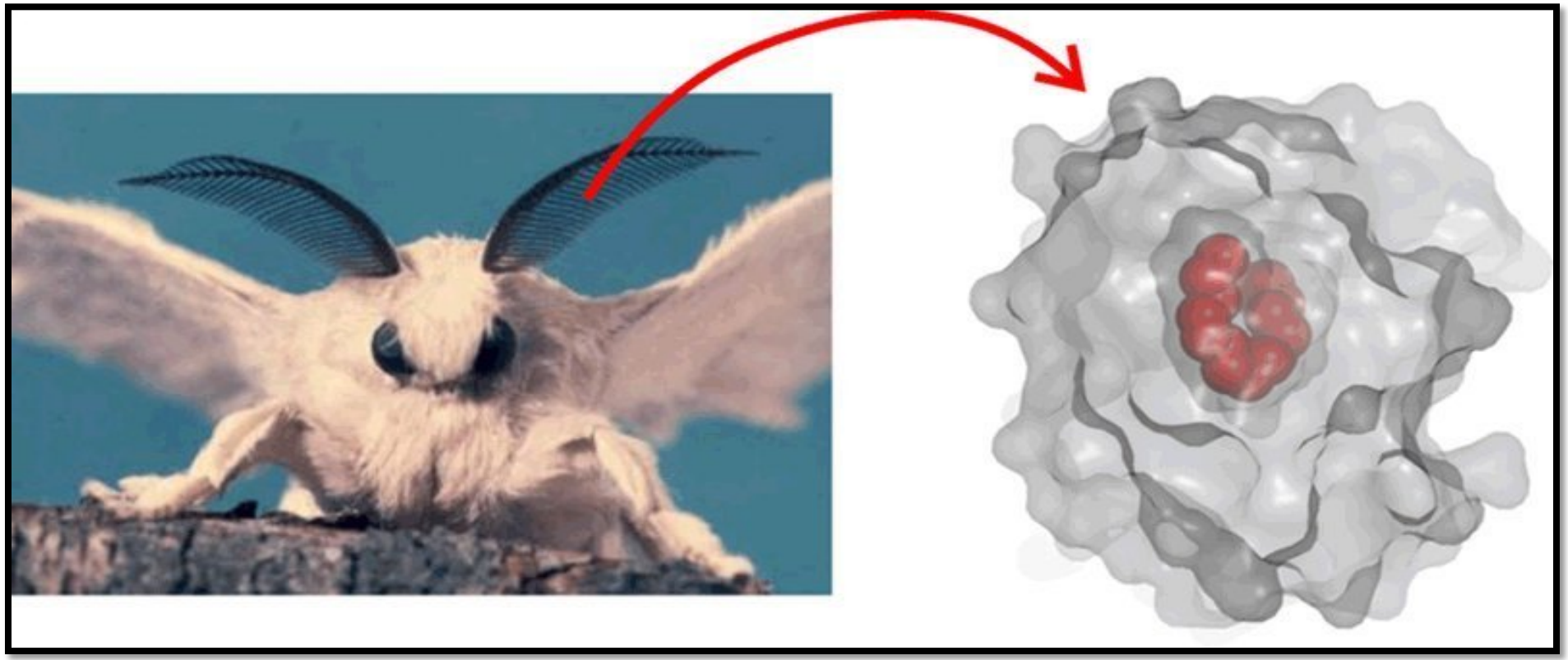
- Since then, many conventional pesticides have been replaced by low risk or bio-rational pesticides/ reduced risk pesticides.

- Chemicals that affect the growth, development, biology and ecology of pest species, differently from that of beneficial species.

- Low toxicity to non-target organisms.



- **Insects more dependent on chemical cues and chemicals.**

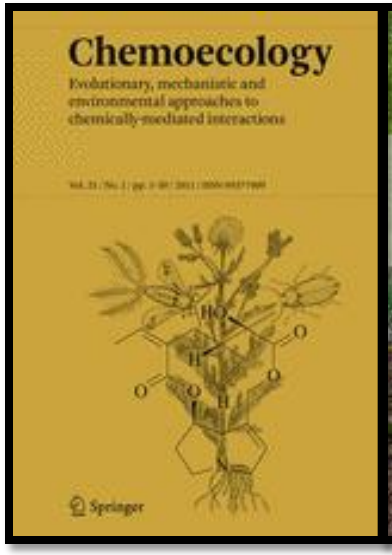


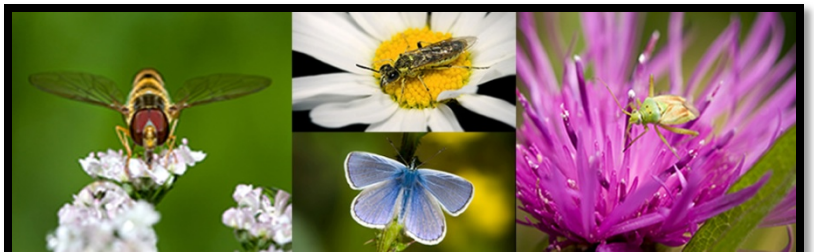
Exploitation in pest management

- Advances in chemical technology in the last three decades have allowed the discovery, identification and synthesis of specific chemicals that regulate or mediate growth and development and species behaviour.

- That may cause

  - Premature death (abnormal moulting or metamorphosis)
  - Attracting or repelling towards the source.



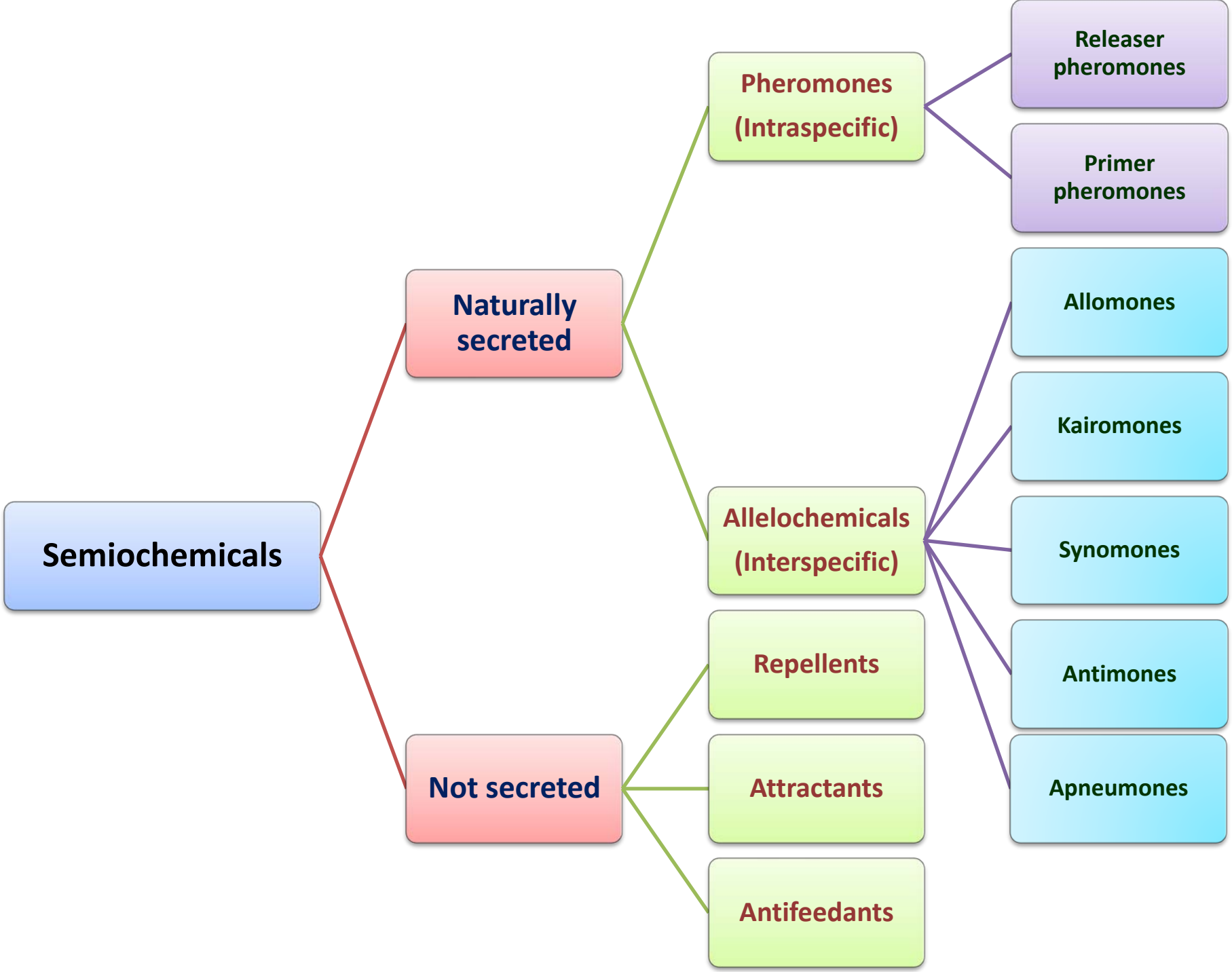


Behaviour alteration

- **Manipulation of pest behaviour is defined as “the use of stimuli that either stimulate or inhibit a behaviour and thereby change its expression” (Foster and Harris, 1997).**

- **Semiochemicals: Greek word- simeone – a mark or a signal.**

  Chemicals that are able to modify the behaviour of a perceiving organism at sub micro or nano gram levels.


Semiochemicals
Naturally secreted
Not secreted
Pheromones (Intraspecific)
Allelochemicals (Interspecific)
Repellents
Attractants
Antifeedants
Releaser pheromones
Primer pheromones
Allomones
Kairomones
Synomones
Antimones
Apneumones

Thank you