Intraguild predation by *Harmonia axyridis*

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1. *Harmonia axyridis* Pallas



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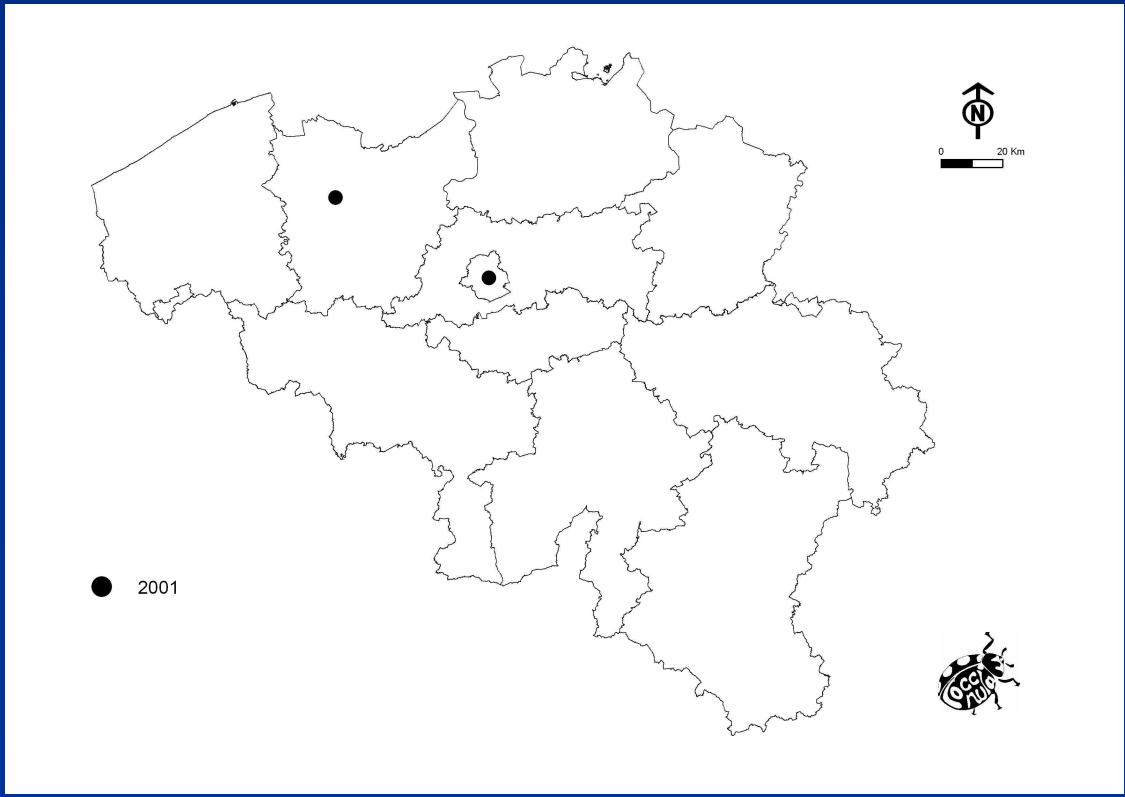
1. *Harmonia axyridis* Pallas

- Ladybird native of Far East
- Introduction for biological control
  - North America (1916 - 1982)
  - Greece
  - Portugal
  - Belgium (1997)
  - ….

  and ESTABLISHMENT in
  - North America (1988)
  - Belgium (2001)

1. *Harmonia axyridis* Pallas

Belgium distribution of *H. axyridis* in ***2001*** (GT Coccinula data)



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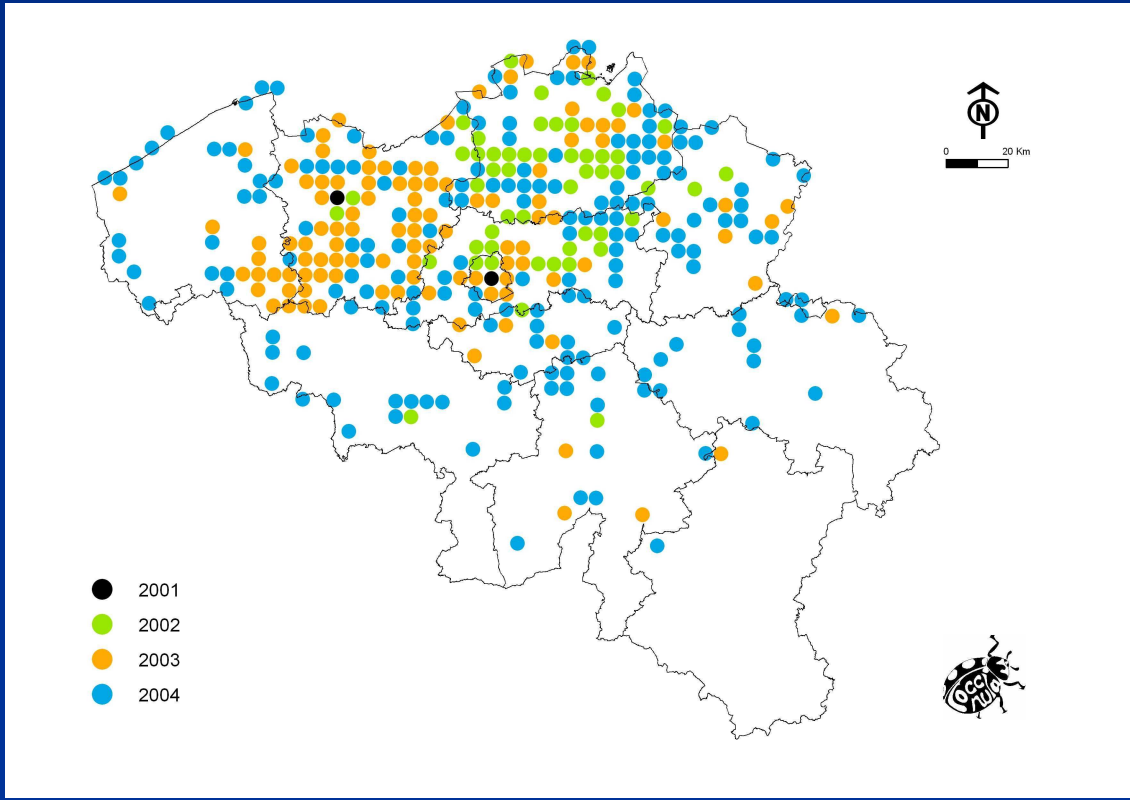
1. *Harmonia axyridis* Pallas

Belgium distribution of *H. axyridis* in ***2004*** (GT Coccinula data)



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1. *Harmonia axyridis* Pallas

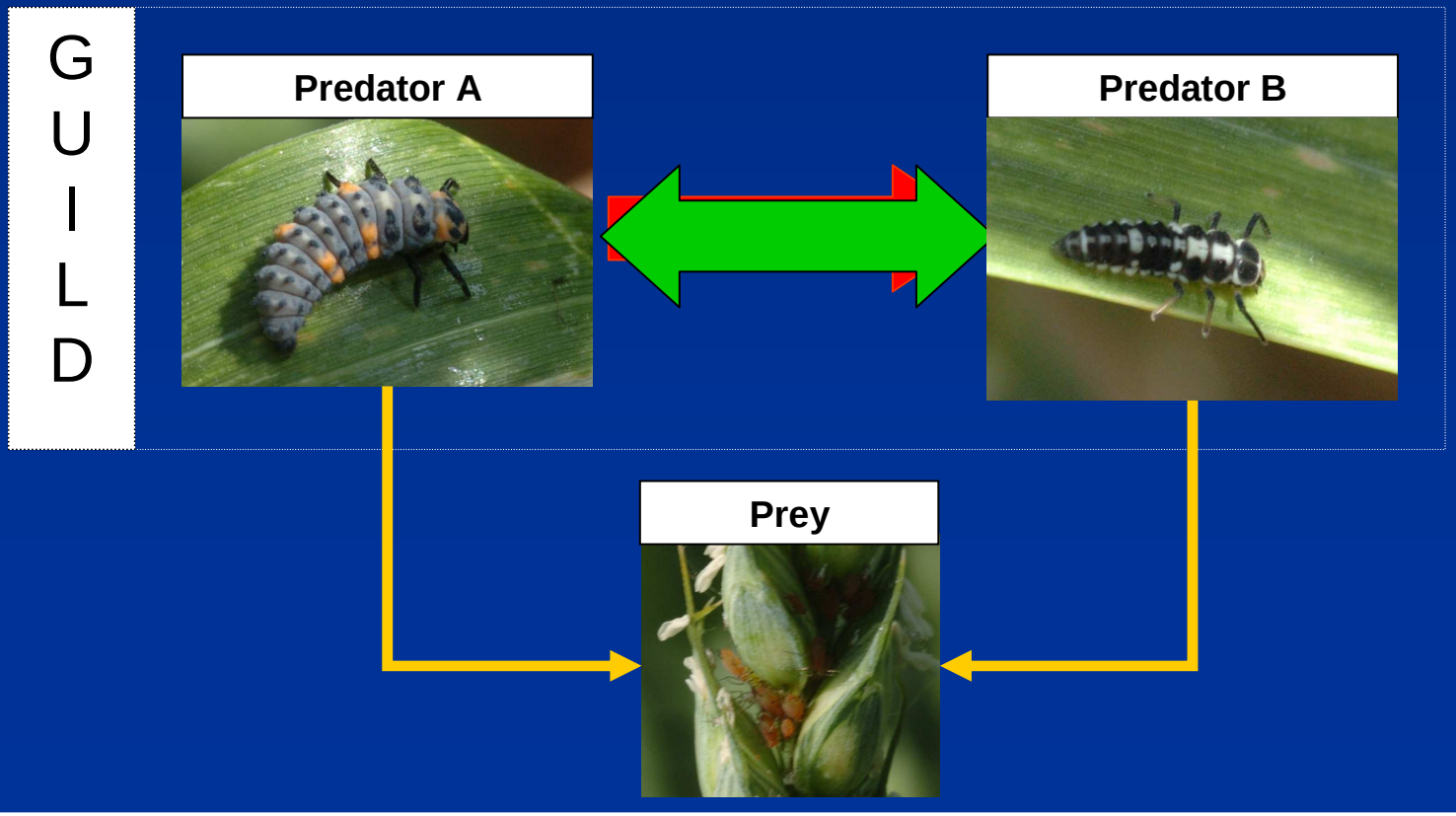
- Why this fast invasion ?

  Good colonizer and very competive species:

  - Wide trophic niche
  - Phenotypic plasticity
  - Strong dispersal capacity
  - High voracity => Intraguild Predation

2. Intraguild Predation (IGP)

« Killing and eating of species that use similar ressources »

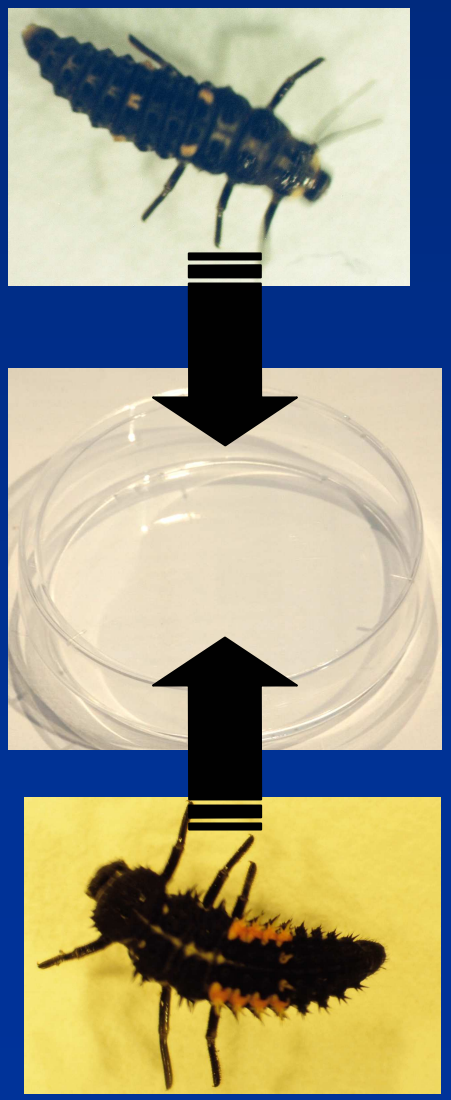


2. Intraguild Predation (IGP)

- IGP = competition + predation or parasitism
- Double benefits :
  - Suppresion of a competitor
  - Immediate energy gain
- Very frequent in aphidophagous guild:
  - Aphid colonies are transients food ressources

3. IGP assesment in laboratory

- Assessment of IGP between *H. axyridis* and *A. bipunctata*
- In Petri Dish, to put together larva L4 (starved during 24h) with eggs, L1, L2, L3, L4



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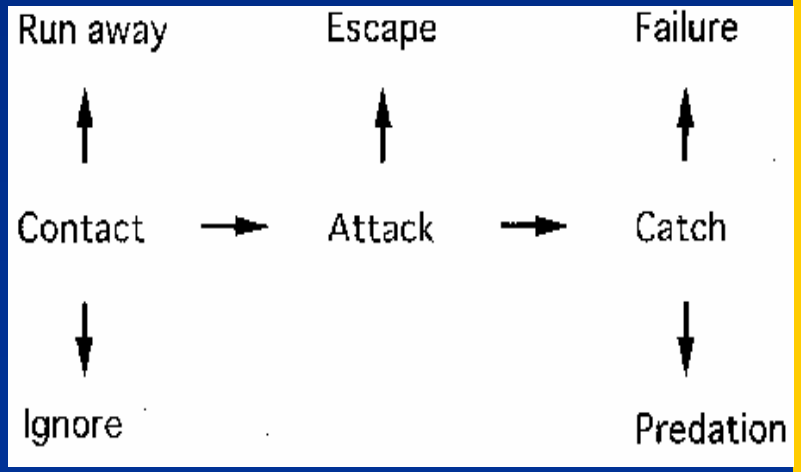
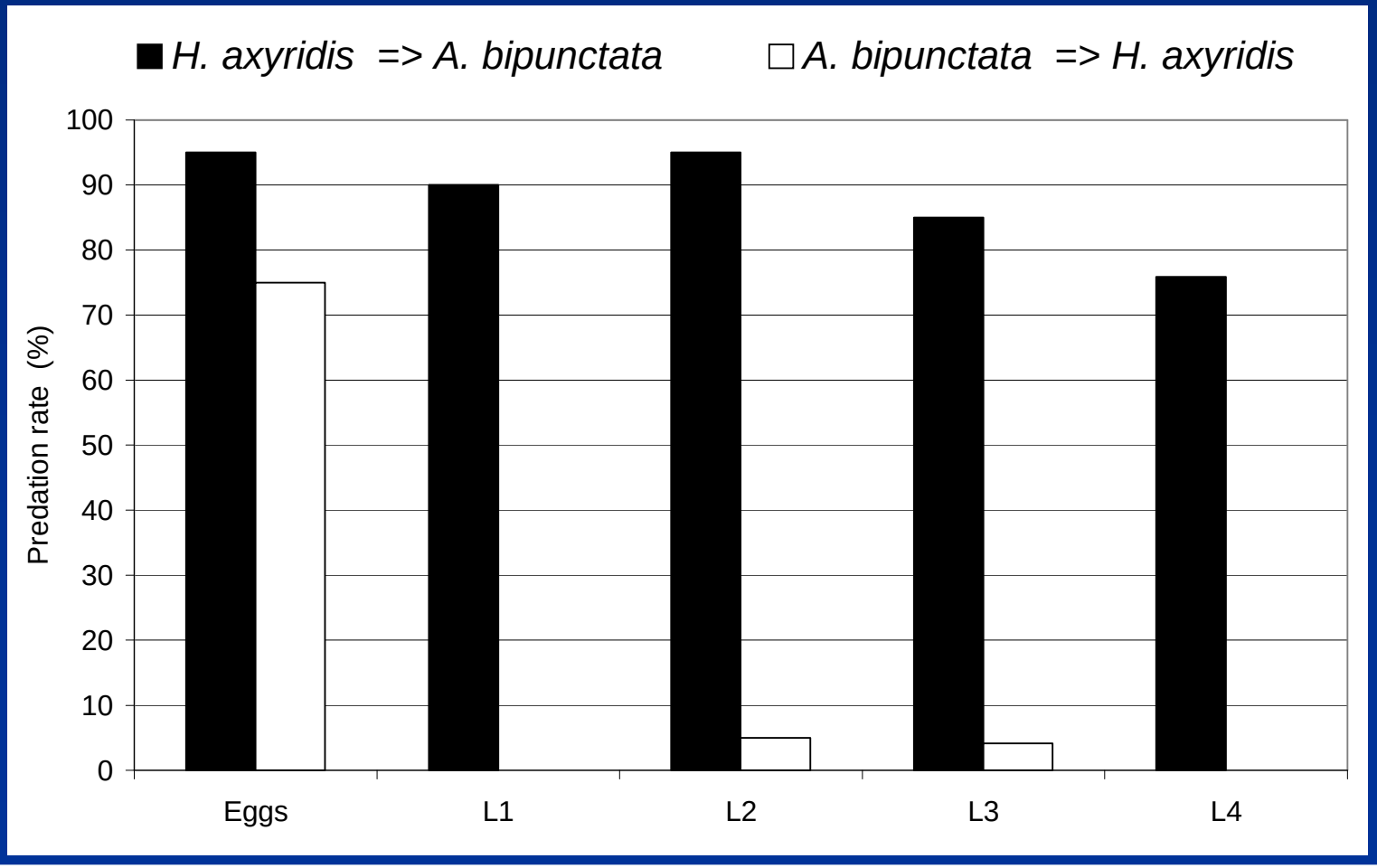
3. IGP assesment in laboratory

- In Petri Dish, to put together larva L4 (starved during 24h) with eggs, L1, L2, L3, L4
- 30 minute behavior observation according to ethogramme (Yasuda *et al.*, 2001), 20 repetitions
- Mortality observation after 30 minutes and 24 h



3. IGP assesment in laboratory

- Predation rate : *H. axyridis – A. bipunctata*



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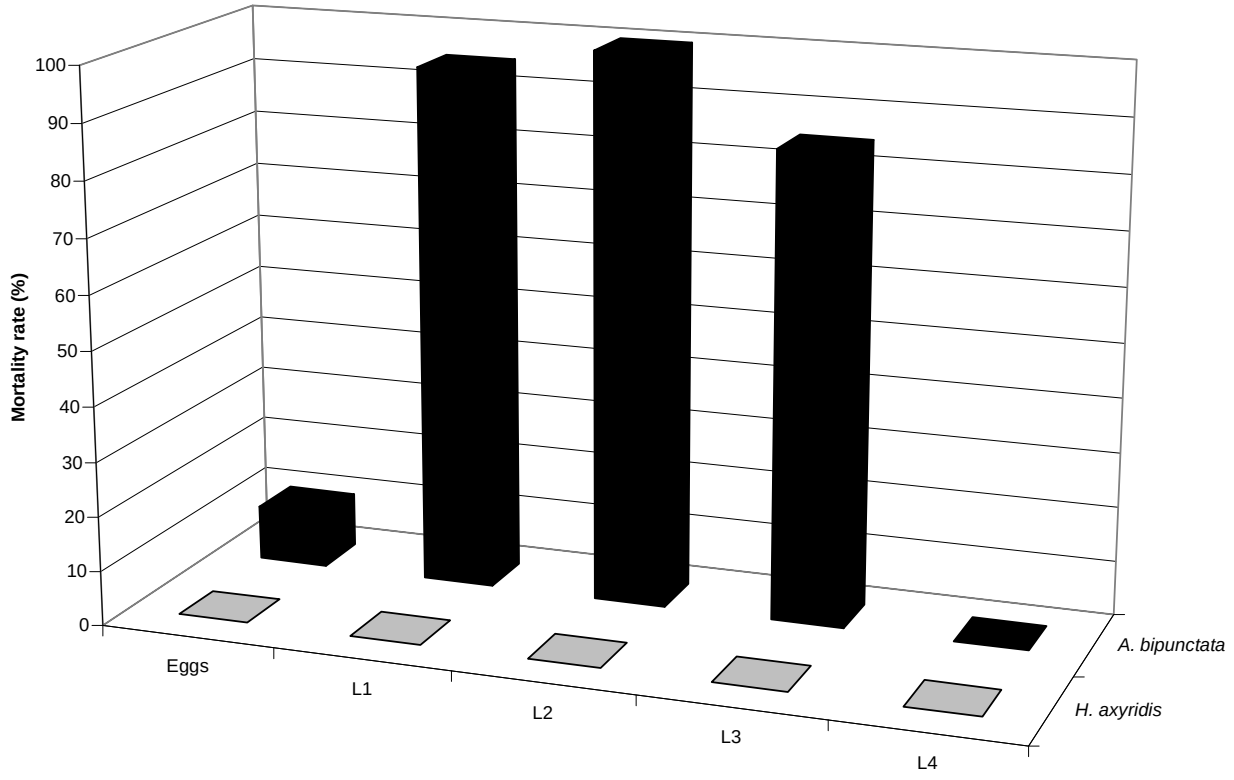
3. IGP assesment in laboratory

- Mortality rate : *H. axyridis* – *A. bipunctata*

After 30 minutes



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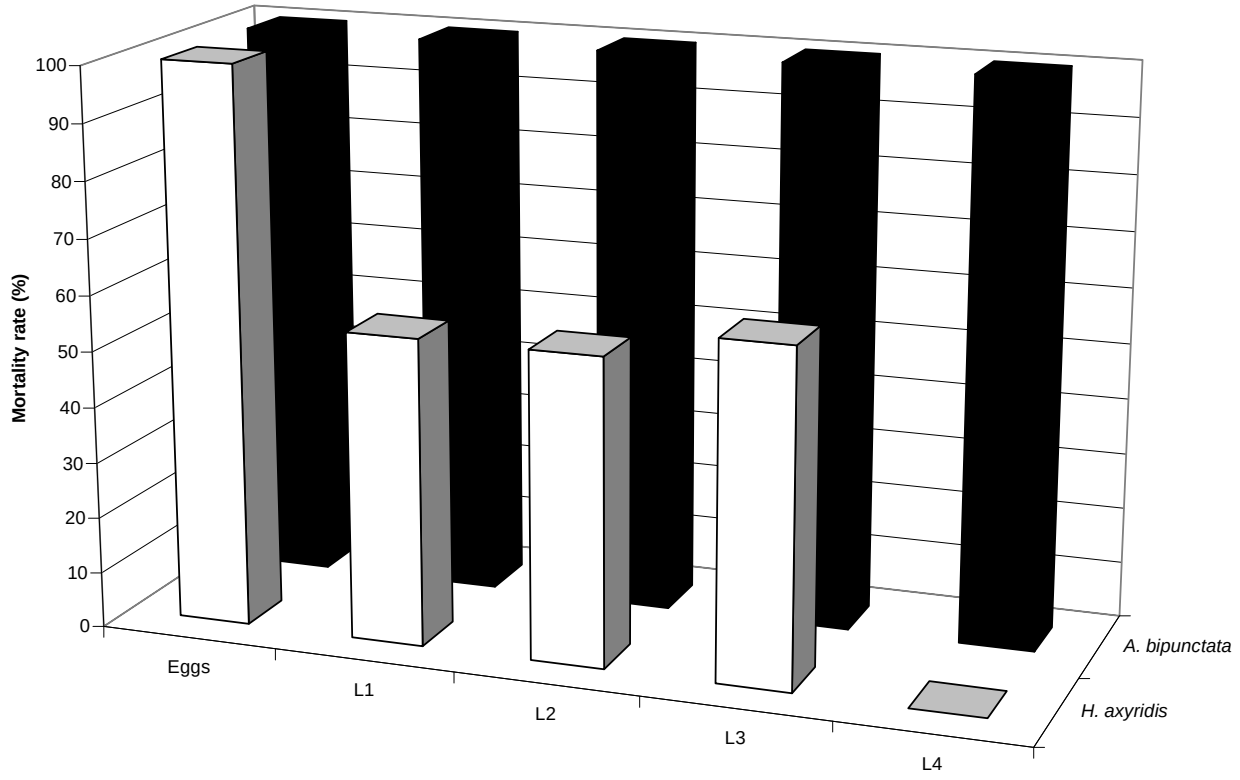
3. IGP assesment in laboratory

- Mortality rate : *H. axyridis* – *A. bipunctata*

After 24 h



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3. IGP assesment in laboratory

- L4 *H. axyridis* vs L1 *A. bipunctata*

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3. IGP assesment in laboratory

- L4 *H. axyridis* vs L1 *A. bipunctata*

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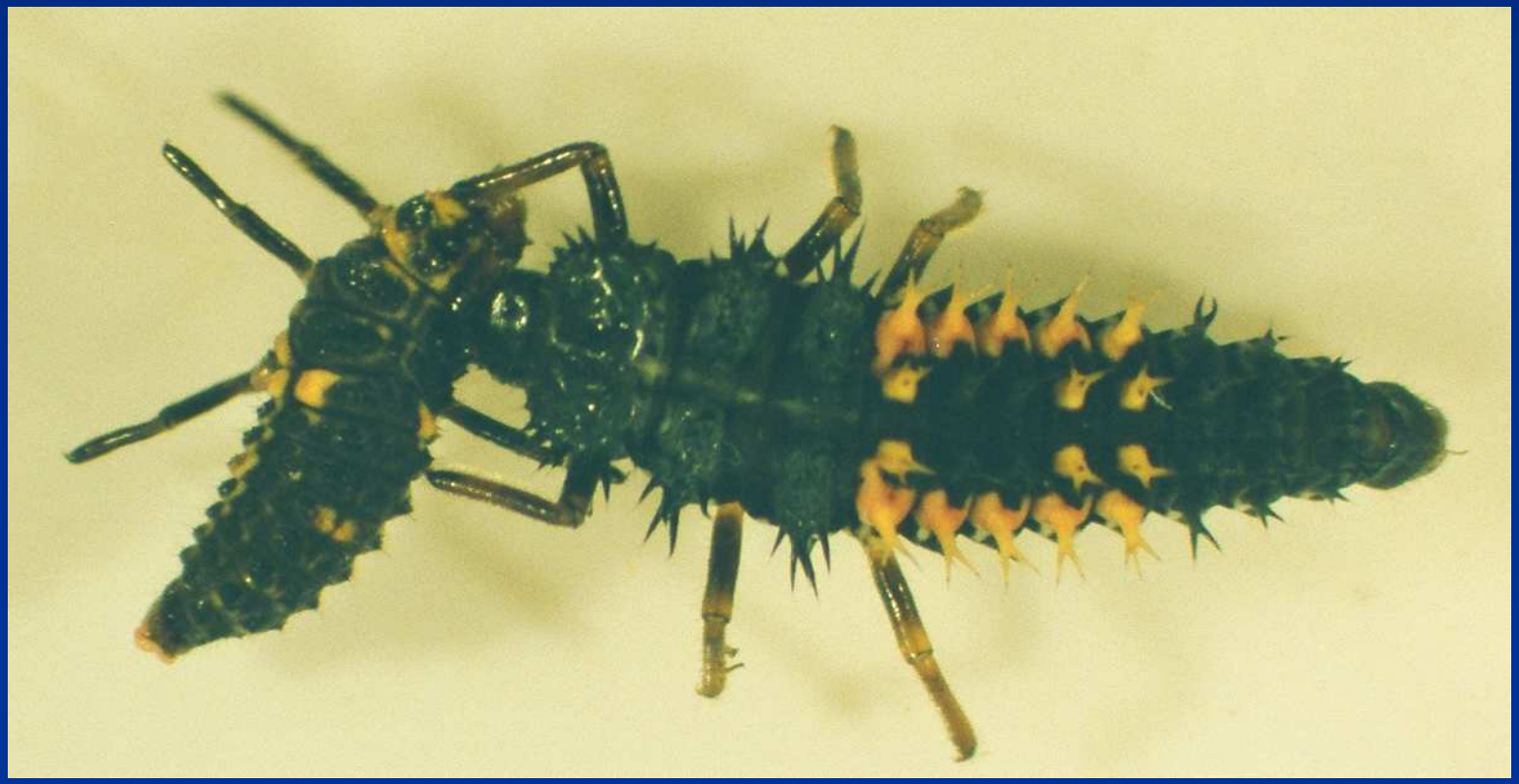
3. IGP assesment in laboratory

- L4 *H. axyridis* vs L4 *A. bipunctata*



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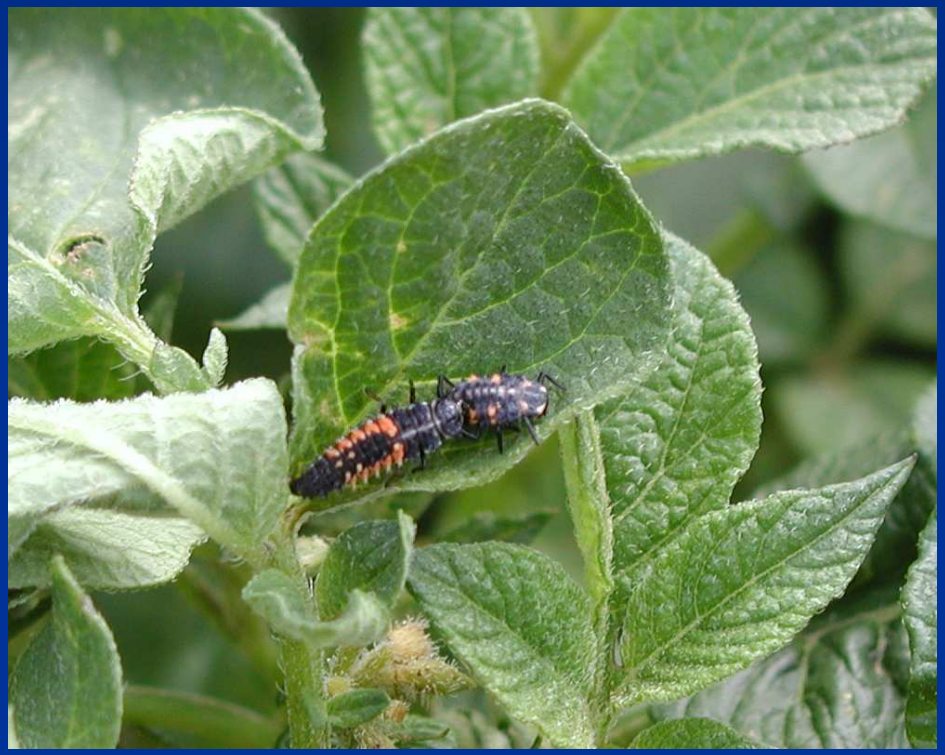
3. IGP assesment in laboratory

- IGP by *H. axyridis vs A. bipunctata* is
  - symmetric for egg instar
  - asymetric for larvae instars

- IGP by *H. axyridis* was also recorded in laboratory towards (Koch, 2003):
  - others ladybird species (*Adonia variegata, Coleomegilla maculata, Coccinella septempunctata, Cycloneda sanguinea, Propylea japonica, Propylea quatuordecimpunctata*)
  - lacewing species (*Chrysoperla carnea*)

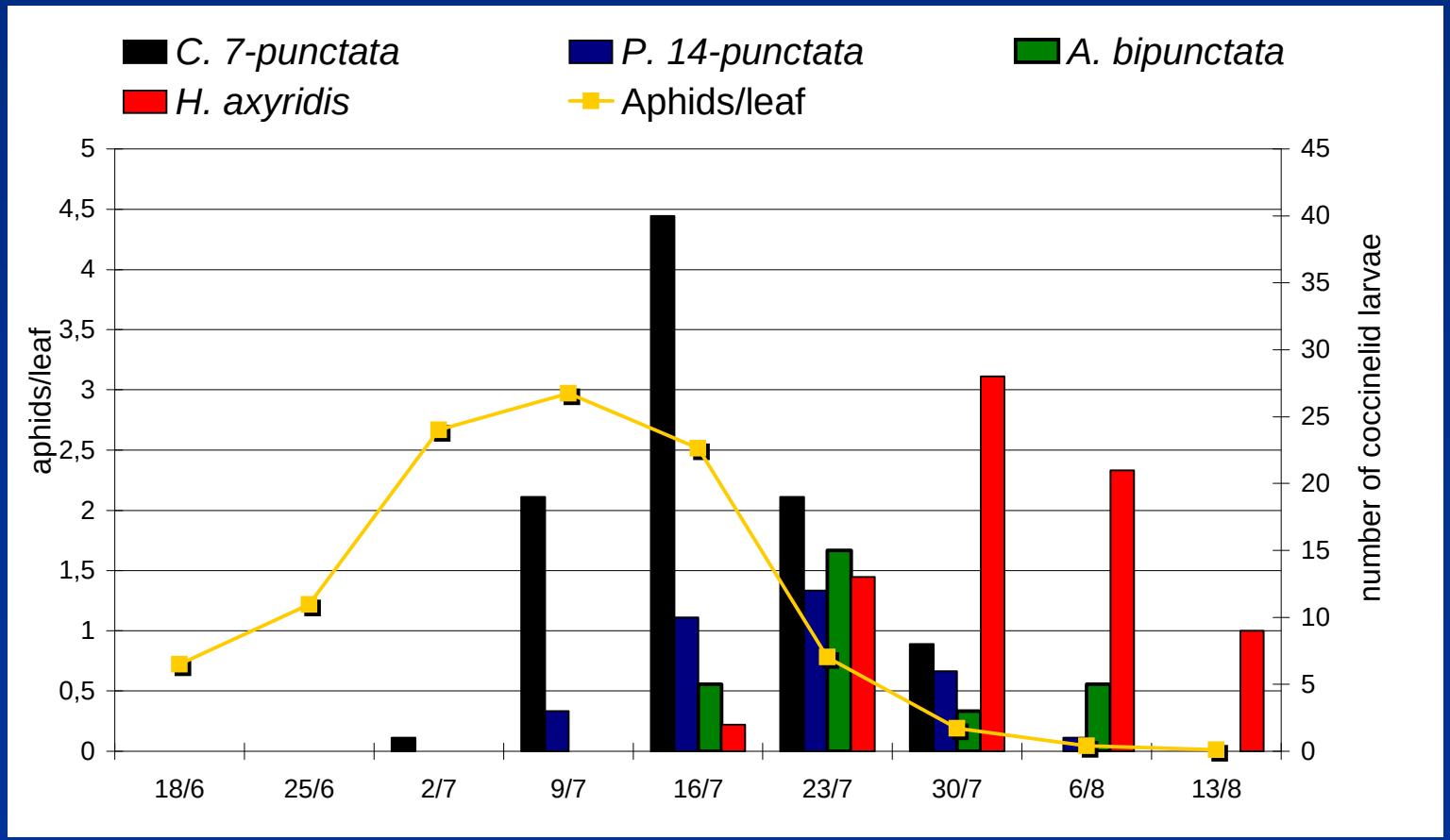
4. IGP observations in field condition

- In Belgium potato field : IGP between *H. axyridis* and *C. septempunctata*



4. IGP observations in field condition

- Coccinellid phenology in potato fields



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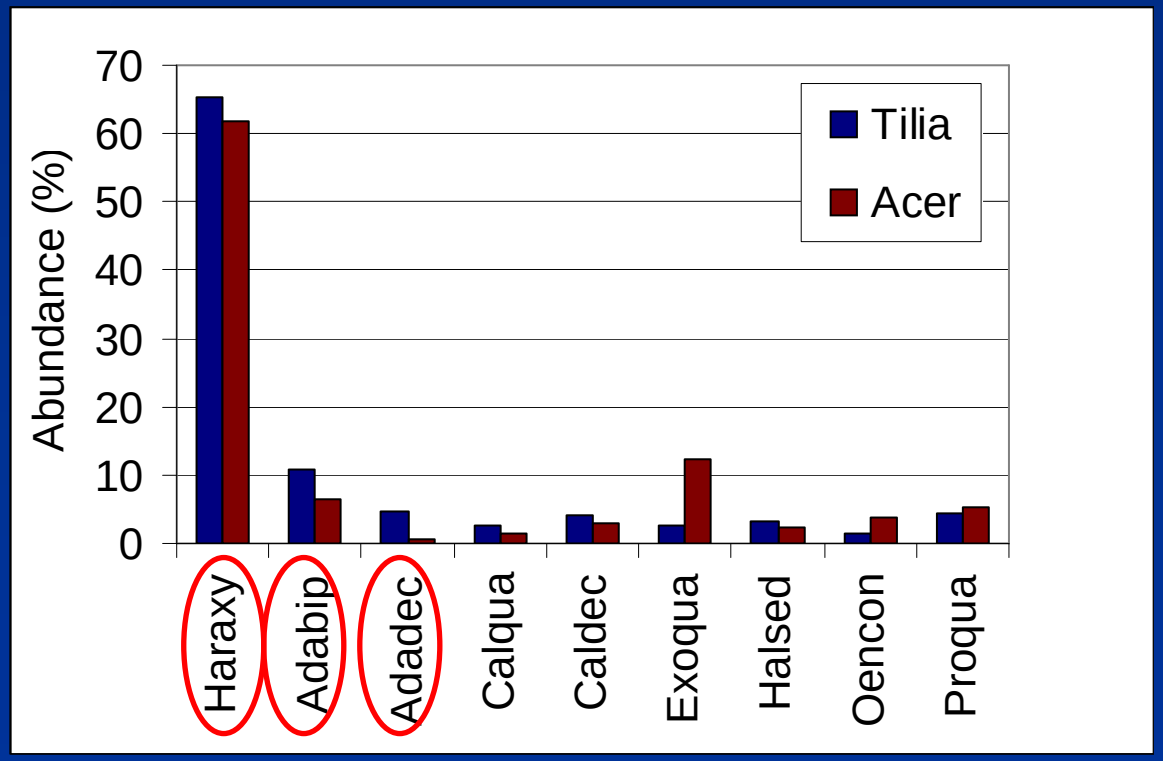
5. Impacts of *H. axyridis* invasion

- Ladybird monitoring in 2003 and 2005 in Brussels (SAN MARTIN and OTTART, ULB)

2005



6. Conclusion

- The Multicolored Asian Lady Beetle, *H. axyridis,* acts as an intraguild predator of native aphidophaga and has the potential to reduce the abundance of ladybird offspring.
- But today, it is difficult to say if *H. axyridis* will lead to displacement of native species in some of Belgium habitats.
- In view of this invasion, it appear urgent to build a regulation framework and to use a risk assessment before the import and the release all exotic biological control agents.

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