

# Abundance and phenological model of *Harmonia axyridis* Pallas (Coleoptera: Coccinellidae) in field crops

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## □ Introduction



The **Multicolored Asian ladybeetle**, *Harmonia axyridis* (Pallas) (Coleoptera: Coccinellidae), was introduced into Western Europe in the late 1990s. This exotic and **invasive** species is known to thrive principally in shrubs and arboreal habitats. It is known to control aphids' populations and it is also a **voracious predator** of native aphidophages. We focus our work on *H. axyridis* **annual abundance** in various field crops and on its **phenological model**. An aphidophagous sampling was performed from 2009 to 2011 in four agrosystems: broad bean, wheat, corn and potato.



## □ Material and Methods

- Sampling from 2009 to 2011
- Observation period: March to September
- Crops: wheat, broad bean, corn and potato

- Sampling method: visual observations with quadrats of 1m<sup>2</sup> on transect (48 quadrats per crop and per week)
- Determination and counting of aphidophagous species (eggs, larvae, adults) and aphid species

## □ Results

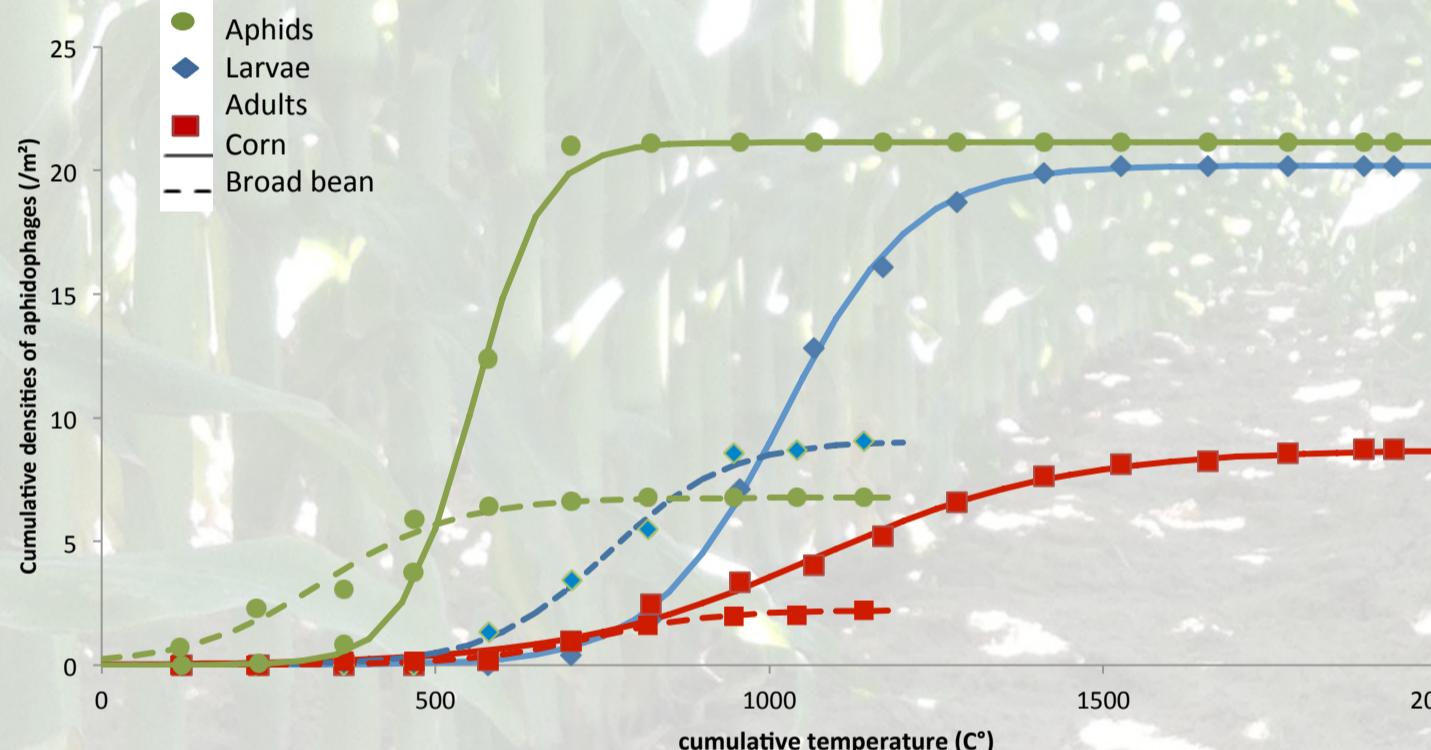


Fig1: Relationship between temperature (°C) and cumulated population of larval and adult stages of *H. axyridis* and aphids in broad bean and corn.

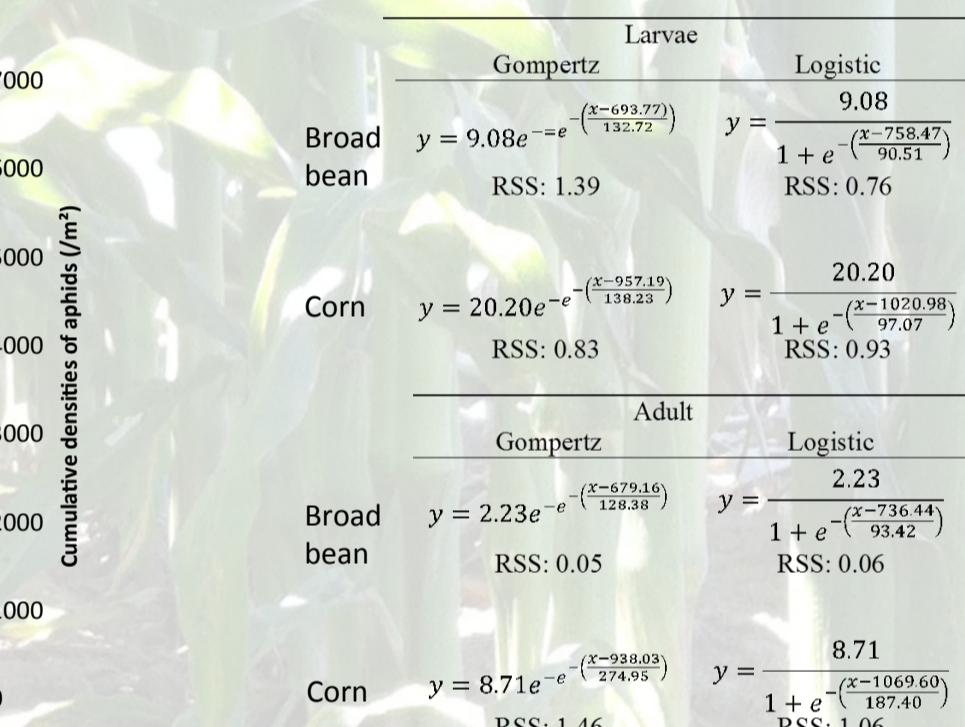


Fig2: Phenological Logistic model of *H. axyridis* (adults and larvae) in corn and broad bean.

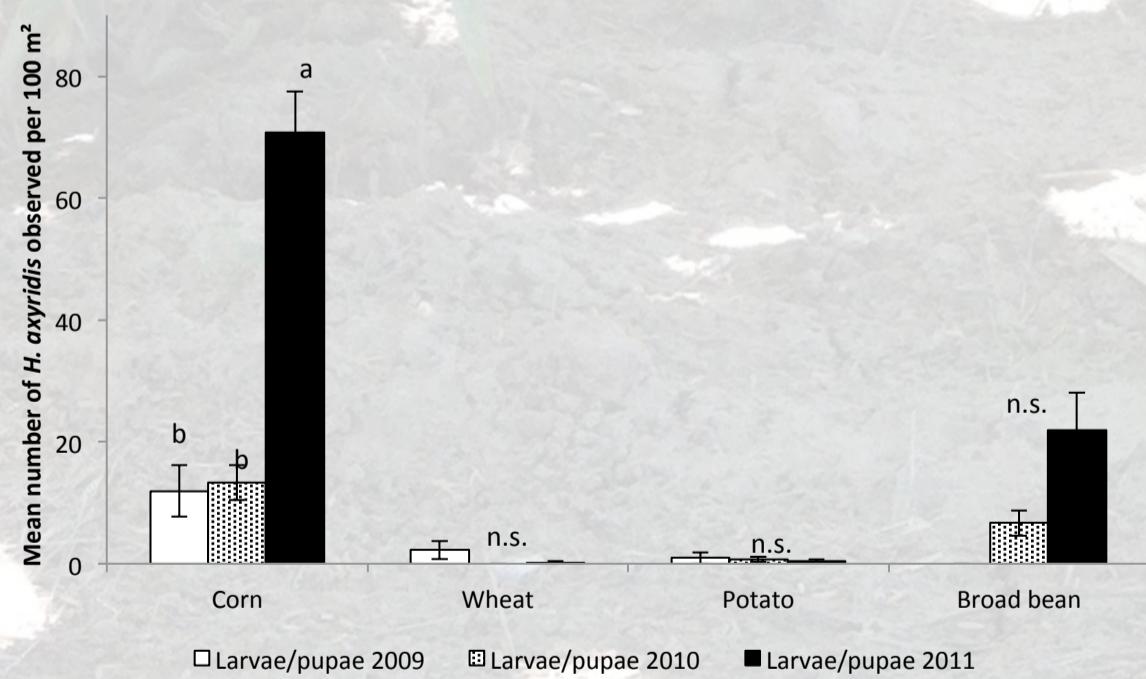


Fig3: Mean number ( $\pm$ SE) of *H. axyridis* larvae observed in corn, wheat, potato and broad bean from 2009 to 2011.

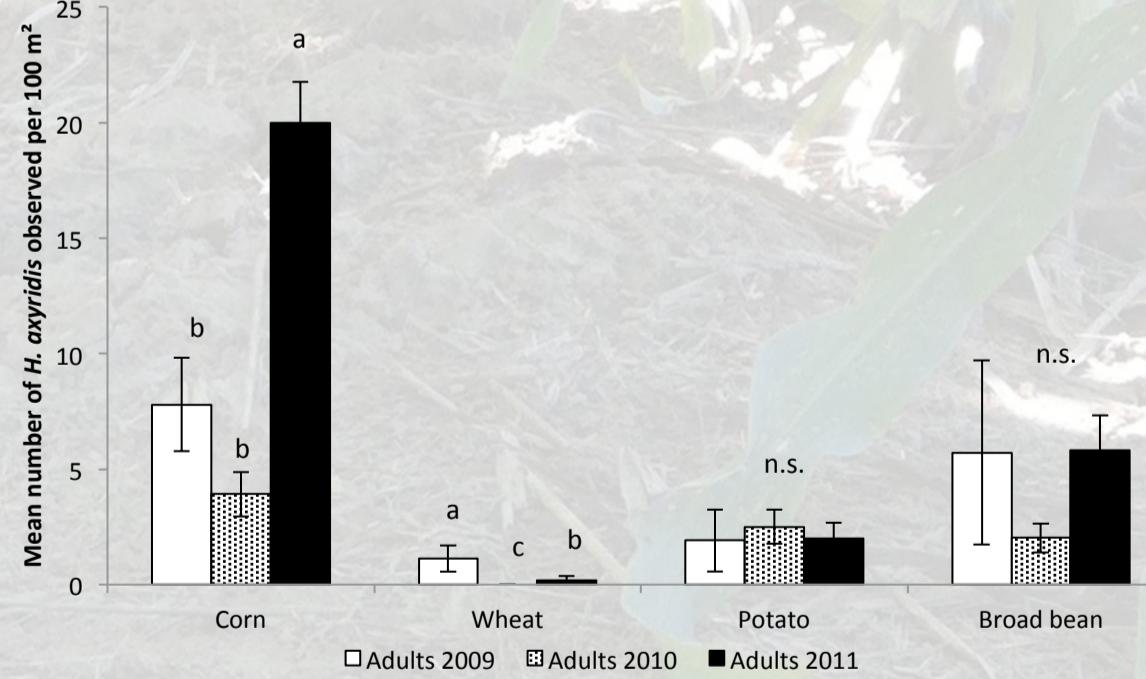


Fig4: Mean number ( $\pm$ SE) of *H. axyridis* adults observed in corn, wheat, potato and broad bean from 2009 to 2011.

## □ Conclusion

*Harmonia axyridis* densities in these four field crops showed that (1) *H. axyridis* is able to complete its development cycle in corn and in broad bean; (2) larvae and adults densities raised significantly (more than 3 times) from 2009 to 2011 in corn. The population dynamics of aphids and *H. axyridis* were characterized by a symmetric logistic function (S-shape) based on the cumulative population size. Temperature could be an other factor which impact on *H. axyridis* abundance. The logistic curves showed a sigmoid shape with an inflection point earlier in broad bean than in corn for aphids, larvae and adults of *H. axyridis*.

This study appears to strengthen the hypothesis that *H. axyridis* is also an invasive species of field crops.