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The Ephrin receptor: a potential actor in polerovirus transmission by aphids

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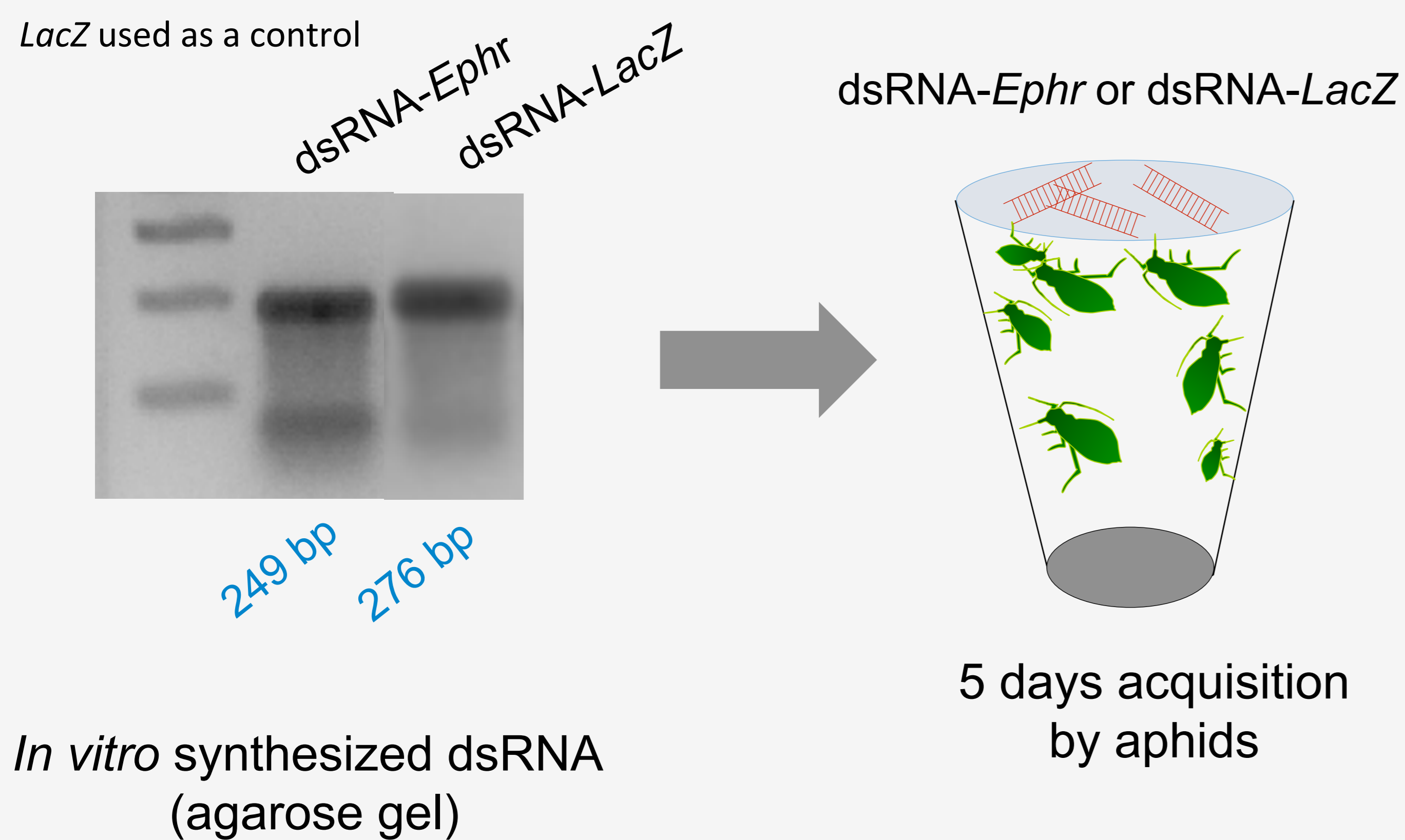
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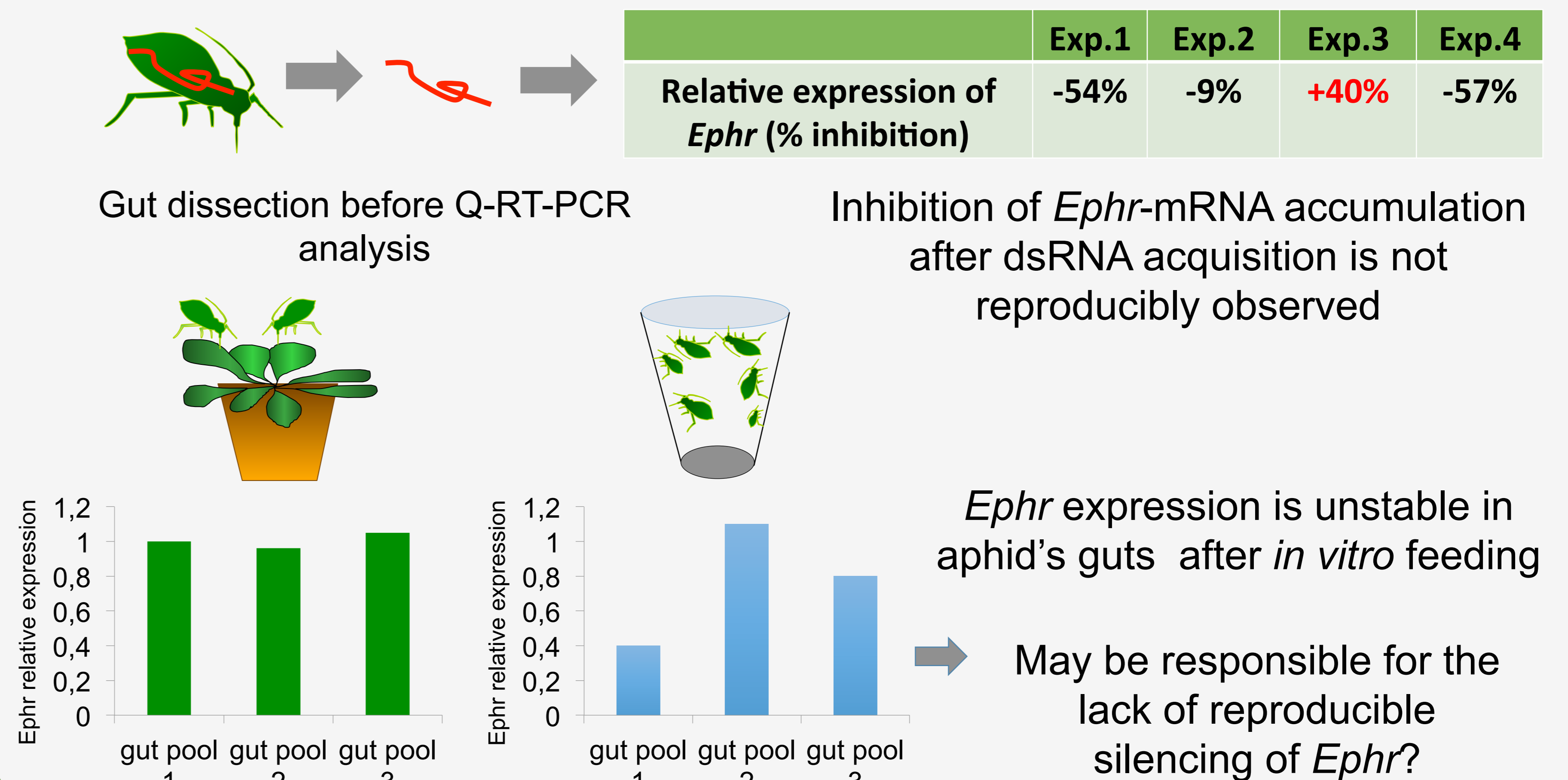
The Ephrin receptor: a potential actor in polerovirus transmission by aphids

Poleroviruses are phloem-limited RNA viruses strictly transmitted by aphids in a circulative and non-propagative mode. Virus particles, acquired by aphids on infected plants, successively cross intestinal and accessory salivary gland cells by transcytosis before being released, together with saliva, into a plant during aphid feeding. Virus transport through the epithelia relies on the presence of specific virus receptors. The Ephrin receptor (*Ephr*) from *Myzus persicae* has been identified as a potential partner of the structural proteins of the polerovirus *Turnip yellows virus* (TuYV). In order to address its function in TuYV transmission by *M. persicae*, we developed an RNA interference-based strategy to inhibit *Ephr* expression in *M. persicae*. When fed on a viral source, the *Ephr*-silenced aphids showed a lower internalization of viral genomes into their body and a reduced ability to transmit the virus. Taken together, these experiments strongly suggest implication of *Ephr* in TuYV acquisition by *M. persicae*.

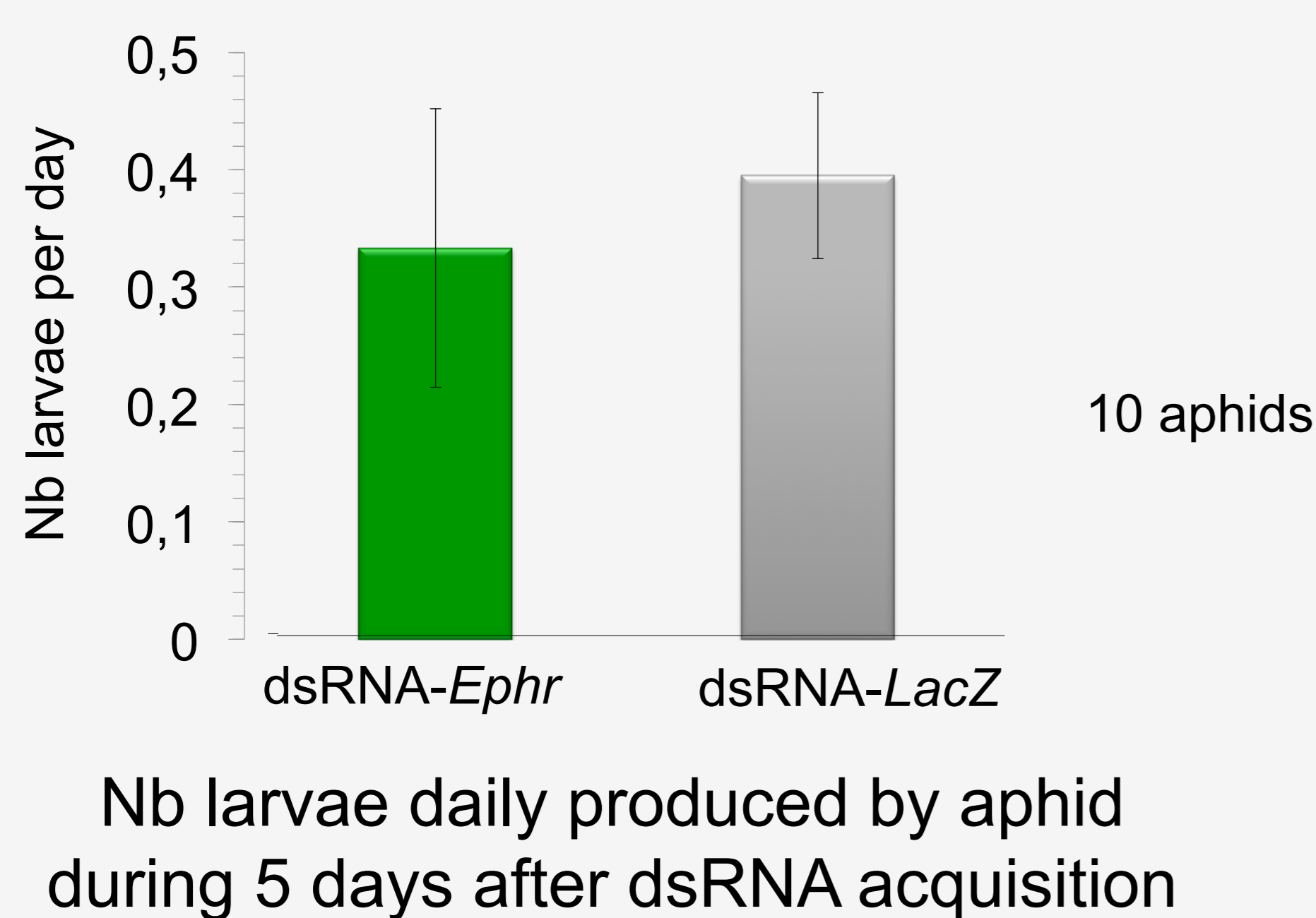
Oral acquisition by aphids of *in vitro* synthesized dsRNA targeting *Ephr*



Ephr-mRNA accumulation in aphids after dsRNA-*Ephr* acquisition



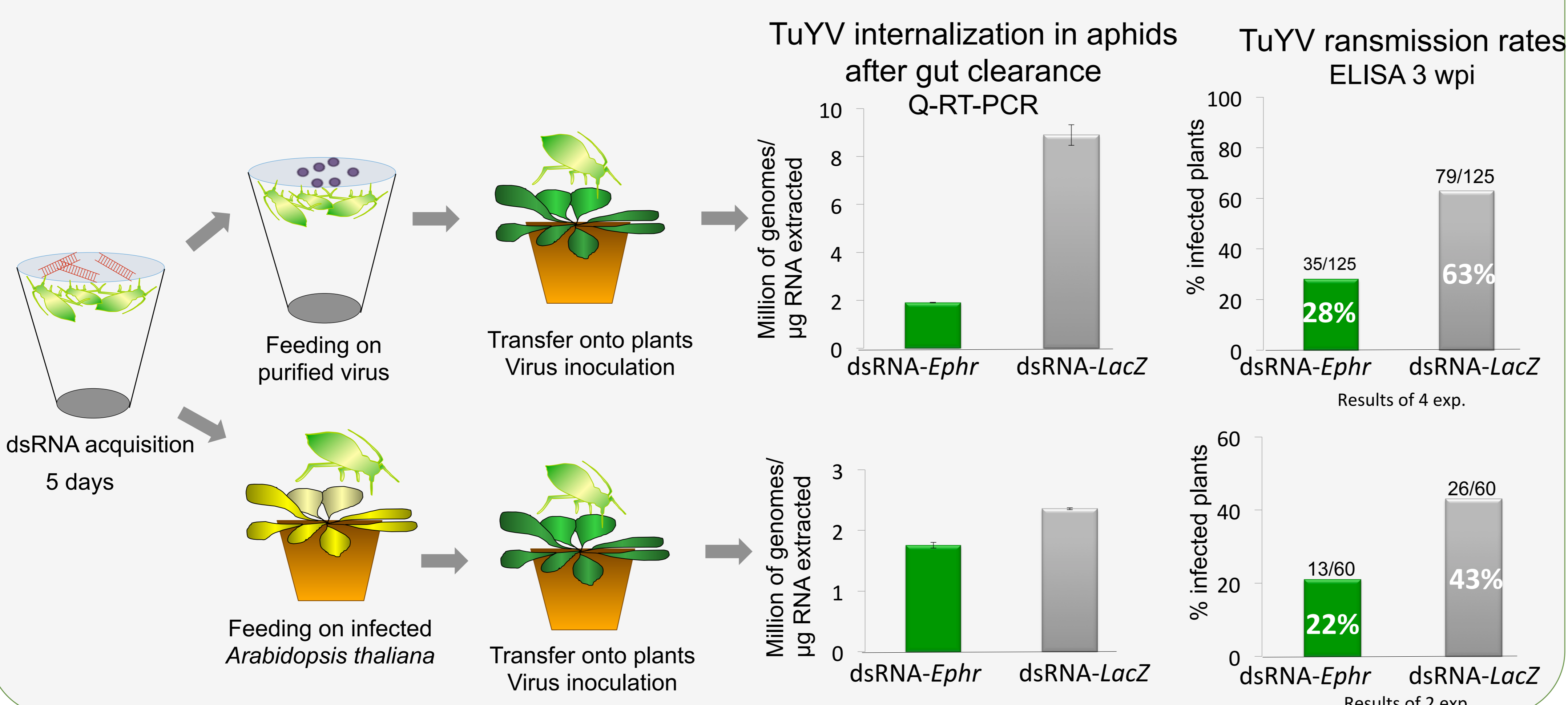
Aphid fecundity is not affected by dsRNA-*Ephr* acquisition



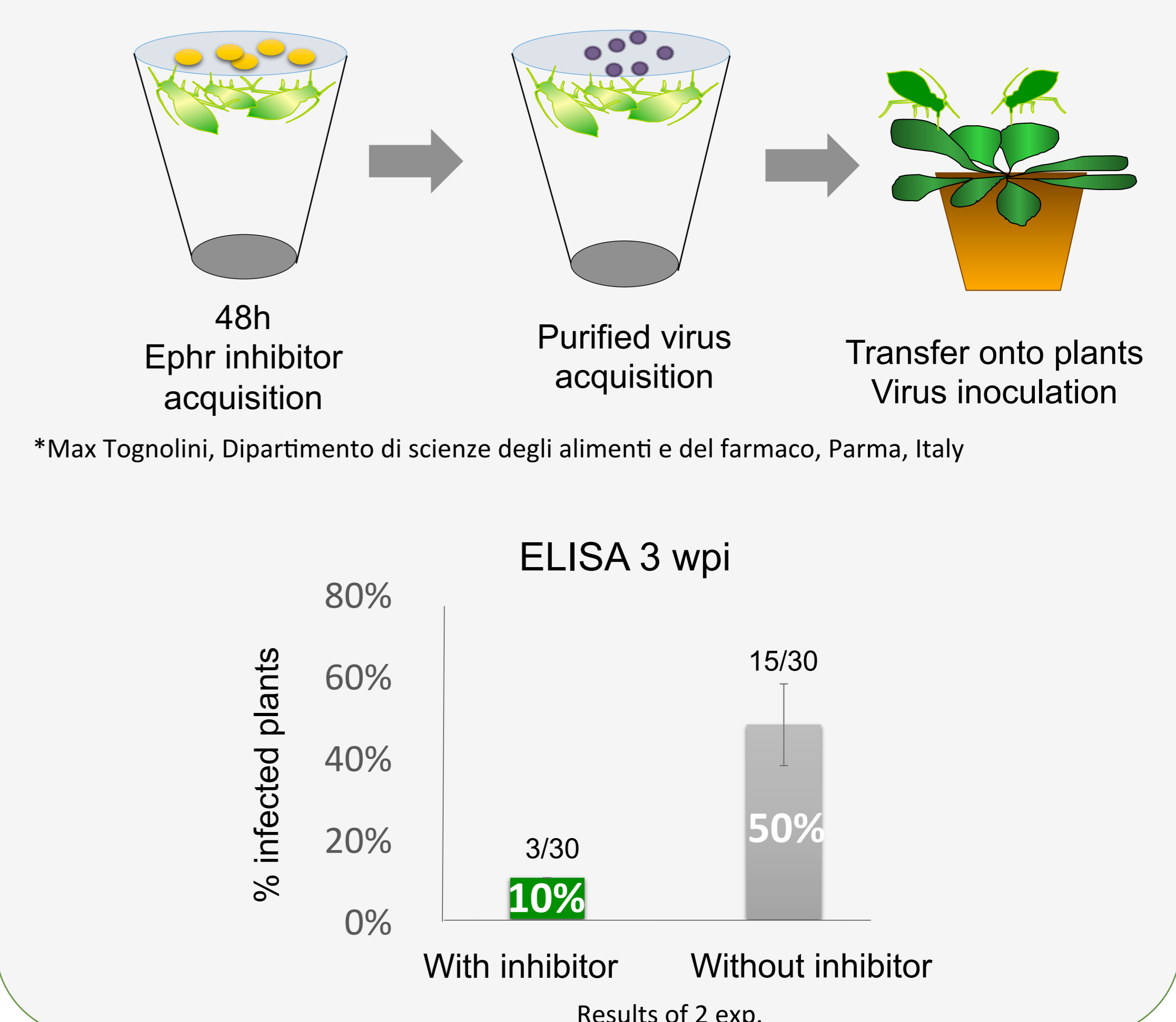
Aphid feeding is positively affected by dsRNA-*Ephr* acquisition



Acquisition of dsRNA-*Ephr* reduces virus internalization in aphids and virus transmission to plants



Virus transmission is decreased after acquisition of mammalian *Ephr* inhibitor*



Conclusions

A 5 day-acquisition of dsRNA-*Ephr* by aphids reproducibly induced a lower internalization of TuYV genome into aphid's body, although reduction of *Ephr*-mRNA accumulation could not be systematically confirmed. Aphids fed on dsRNA-*Ephr* reproducibly transmitted TuYV with a lower efficiency while their feeding behavior was not reduced and their fecundity not altered. Feeding aphids on *Ephr* inhibitor before virus acquisition also reduces virus transmission. Taken together, these experiments strongly suggest implication of *Ephr* in polerovirus transmission. Whether *Ephr* encodes a true virus receptor or a co-receptor still needs to be elucidated.