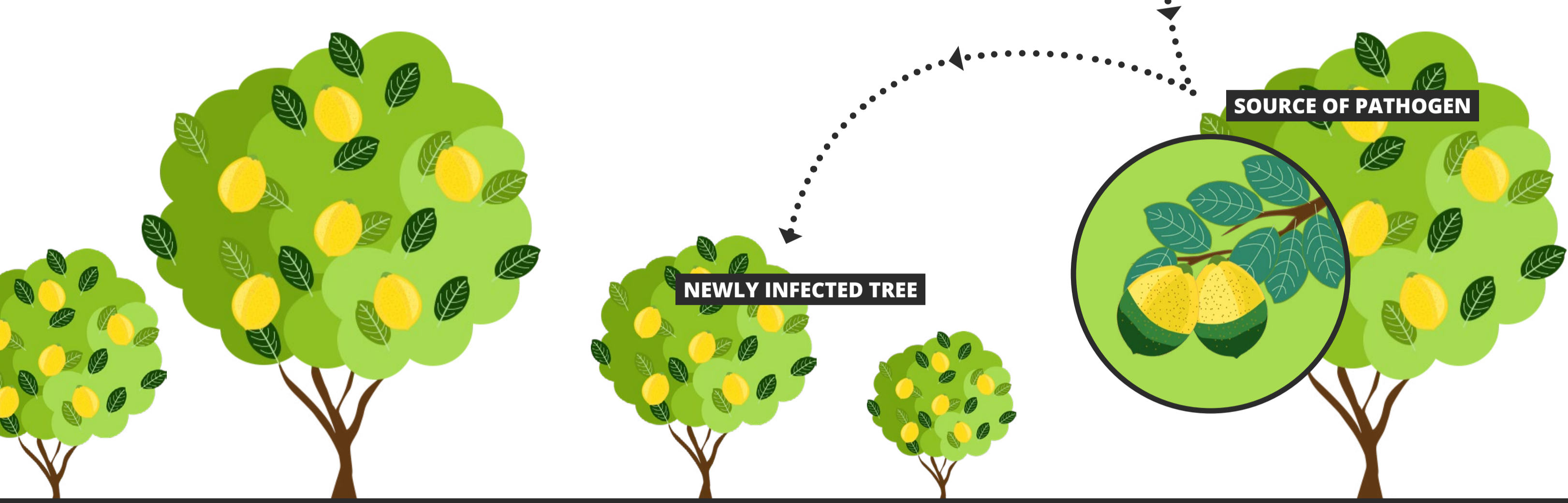


Evaluation of $\delta^{15}\text{N}$ analysis to trace the origin of *Diaphorina citri* (Hemiptera: Liviidae) to citrus orchard fertilization management



BACKGROUND

We attempted to **track disease vectors from their capture point to the point they acquired the disease**. This was achieved using stable isotopes to identify sources of infection. Specifically, we investigated the variability of nitrogen stable isotope ratios $^{15}\text{N}/^{14}\text{N}$ (expressed as $\delta^{15}\text{N}$) in citrus orchards with different fertilization management practices (organic versus conventional) and its correlation with the $\delta^{15}\text{N}$ values of the citrus pest, *Diaphorina citri*.



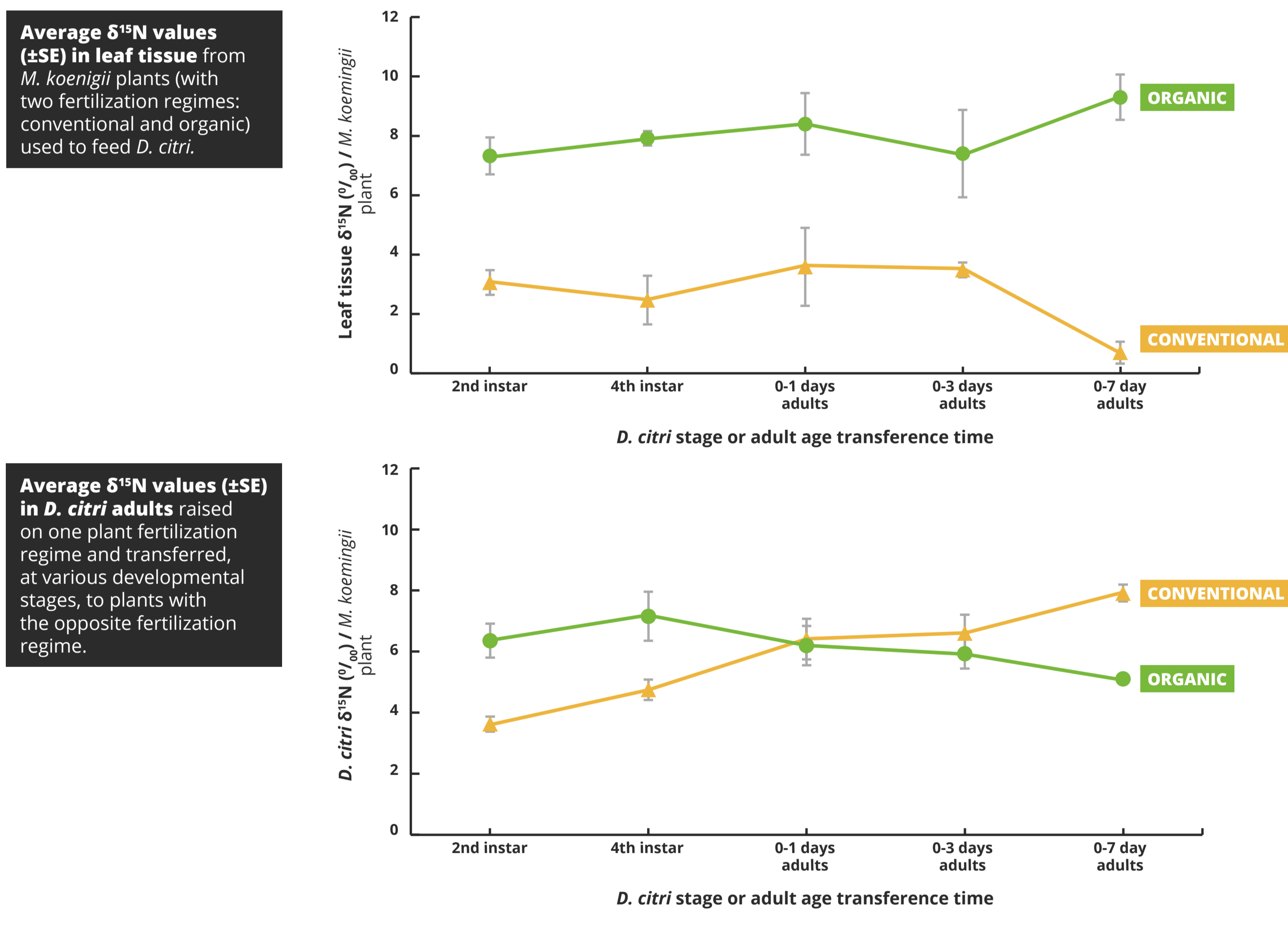
HLB DISEASE

Tracing the origin of this pest in open field is crucial since **the insect is a vector for the incurable and devastating citrus disease known as Huanglongbing (HLB)**.

THE STUDY

We hypothesized that the origin (natal tree) of the pest may be deduced by correlating the $\delta^{15}\text{N}$ values obtained from the young citrus leaves and the *D. citri* adults raised on them. Our study included:

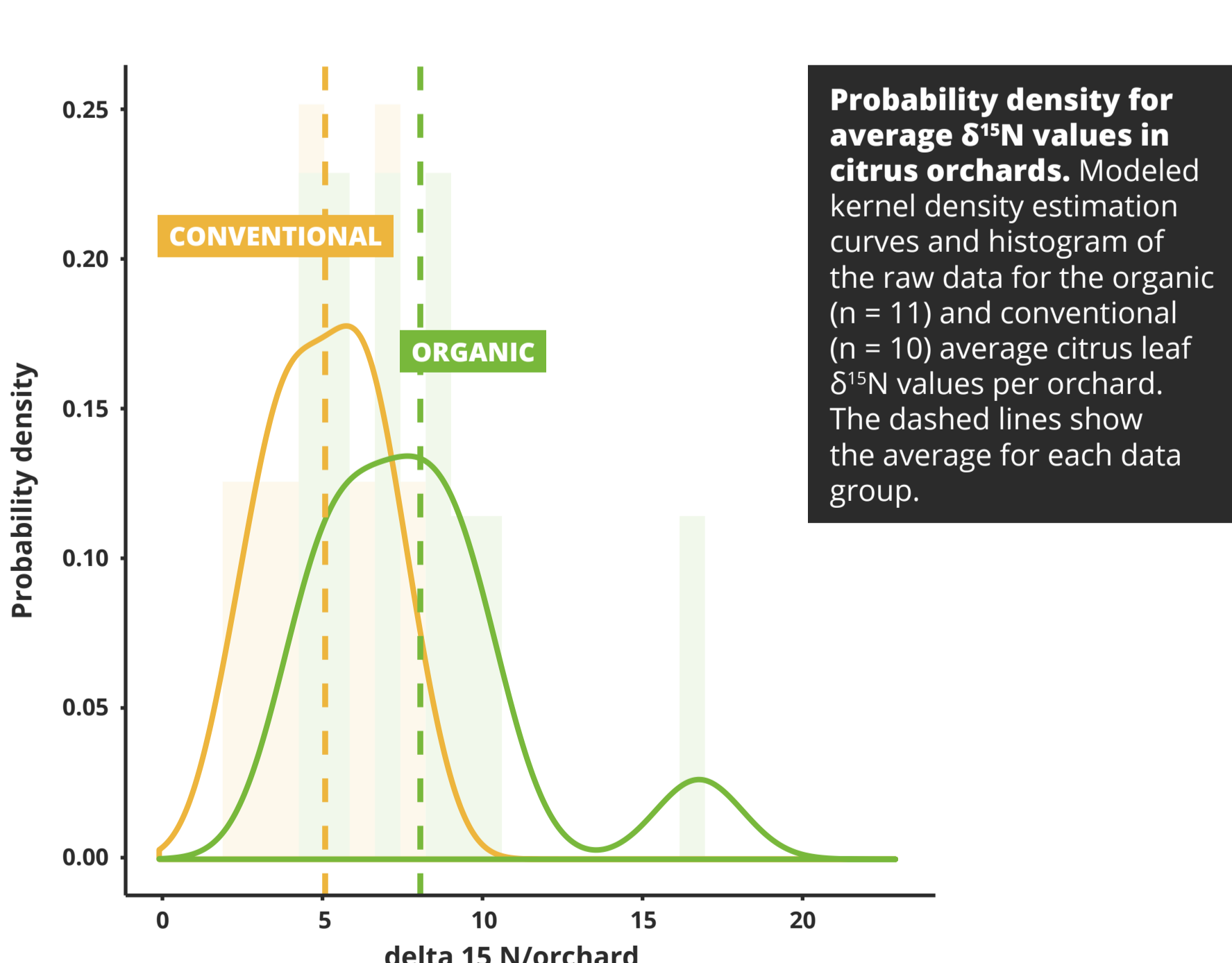
- Laboratory experiments** to understand the acquisition and incorporation of the $\delta^{15}\text{N}$ values by *D. citri*.



- Confirming the positive correlation** between the $\delta^{15}\text{N}$ values in the young citrus leaves and *D. citri*, by using exclusion bags in 4 orchards.



- Field sampling in 21 citrus orchards** from Southern California to study $\delta^{15}\text{N}$ value variability in organic and conventional commercial citrus orchards.



CONCLUSION

Laboratory results suggest that the analysis of $\delta^{15}\text{N}$ values can be regarded as a useful method to trace the origin of the pest. However, the **high variability in nitrogen resources used by growers** in both fertilization management practices (especially in organic orchards) **makes this technique unfeasible in pinpointing the origin of *D. citri*** in citrus agroecosystems.

