**RRES Press Release 9th April 2025** [**Bean beetle sex pheromone could deliver targeted crop protection**](https://www.rothamsted.ac.uk/news/bean-beetle-sex-pheromone-could-deliver-targeted-crop-protection)

*New insights into molecular structure of signalling chemical could boost pest control options*

Subtle differences in the molecular structure of a beetle sex pheromone could help farmers protect vital stored legume crops from the destructive dried bean beetle, Acanthoscelides obtectus, according to a new study.

The beetle is a serious threat to Phaseolus beans (a group including the common bean) and a severe threat to crops in many global regions. However, the challenge in tackling this pest lies in its cryptic larval stage, which remains hidden within seeds, making traditional control methods less effective. Detecting the pest in storage or field would help provide more timely interventions.

The new study has focussed on the beetle's major male-produced pheromone, methyl (E,R)-2,4,5-tetradecatrienoate, which plays a crucial role in attracting females. The pheromone was first identified 50 years ago, but commercial application has been hindered by difficulties in its production and stability.

*This research offers fresh hope for reducing losses and improving yields. The next step will be to refine the pheromone synthesis and optimize trap design for field application.*

Scientists have now examined the behavioural responses of female beetles to different enantiomers of this pheromone. Enantiomers are compounds that have the same atoms connected to each other, but differently arranged in space. This means that they can often have very different biological properties.

The new findings confirm that only one form of the molecule (the (R)-enantiomer) is effective in eliciting a response from females. It’s mirror image ((S) – enantiomer) appears to be inactive; however, its presence in equal proportion appears to enhance female attraction to the (R)-enantiomer. Interestingly, the (S)- enantiomer only synergized behaviour when mixed in the right amount with R—too little or too much would make it ineffective.

These discoveries mark a significant step towards the development of a reliable pheromone trap-based surveillance system, because a mix of the pheromone enantiomers is easier to produce than the pure (R)- enantiomer.  If successful, such a system could be used to monitor beetle populations, thereby providing farmers with a sustainable and targeted method to protect their crops from this highly damaging pest.

“With bean crops playing a crucial role in global food security, this research offers fresh hope for reducing losses and improving yields,” said Rothamsted’s Anusha Mohan-Kumar who led the research. “The next step will be to refine the pheromone synthesis and optimize trap design for field application."

**Publication**

**Mohan-Kumar, A., Thomas, G., Withall, D.M., Caulfield, J.C. & Vuts, J. (2025) Pheromone stereochemical specificity in the biology of the bean beetle *Acanthoscelides obtectus*. *Agricultural and Forest Entomology*, 1–9. Available from:**[**https://doi.org/10.1111/afe.12685**](https://doi.org/10.1111/afe.12685)

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