Previously unknown details of aphids in flight to contribute to improved crop security

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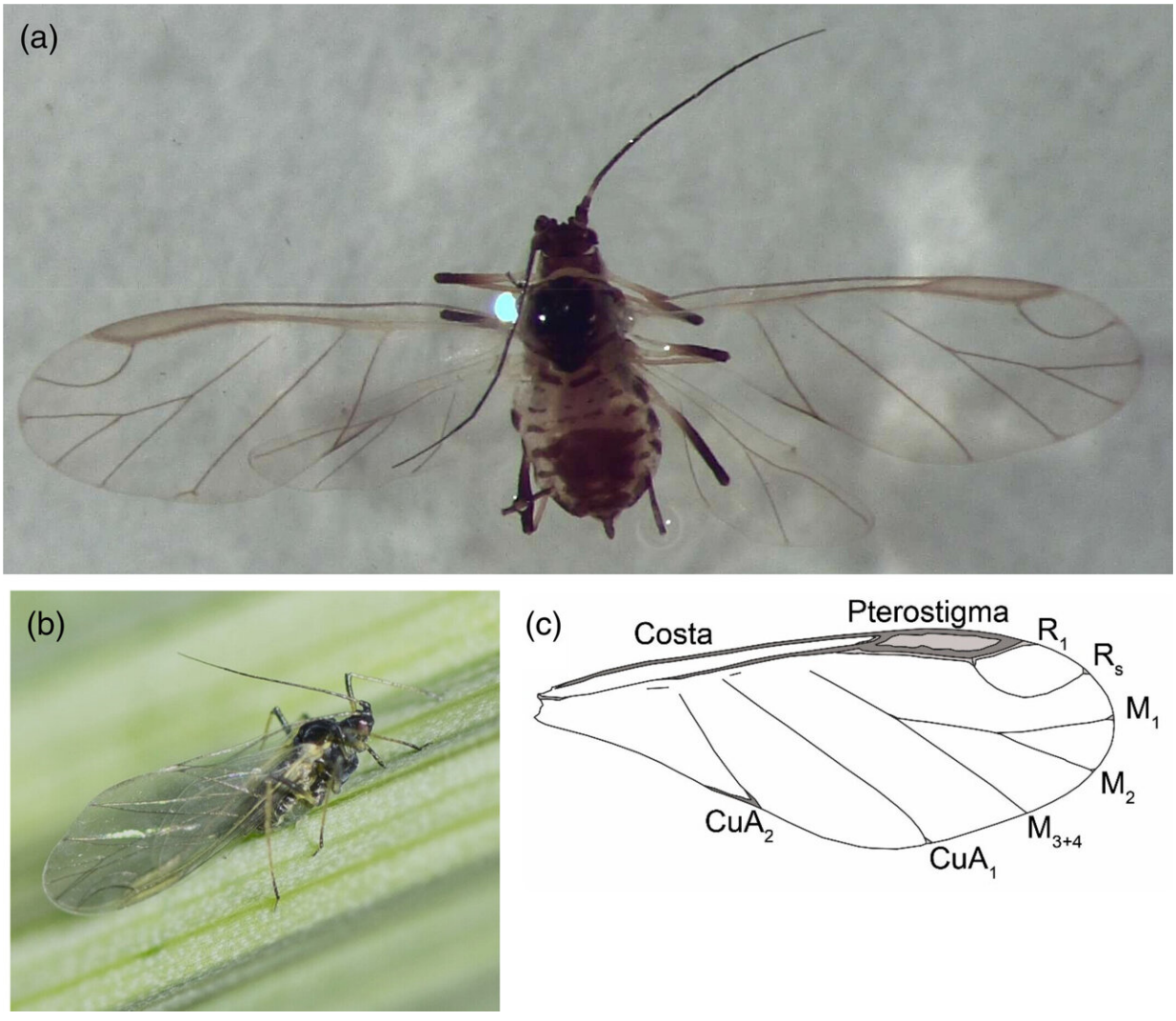

Myzus persicae forewing, hindwing and body (a), posture at rest (b) and annotated wing venation (c). Credit: *Agricultural and Forest Entomology* (2024). DOI: 10.1111/afe.12623

Researchers led by a scientist at Keele University in Staffordshire have studied the previously unknown flight mechanisms of a common crop pest, to learn more about their movements in a bid to improve food security and prevent the spread of disease. The research has been published in the journal *Agricultural and Forest Entomology*.

Using state-of-the-art camera technology, the research team including researchers from Rothamsted Research took ultra slow-motion videos of aphids in flight to learn more about the biomechanics and physical mechanisms which they use to fly, much of which was previously unknown despite being crucial to understanding their migratory behavior.

The resulting footage will help researchers understand more about aphids' flight patterns and behavior, which in turn will help them learn more about how aphids are affected by diseases and viruses which can cause crop losses.

Aphids often don't affect plants directly by their feeding behavior. Instead, the damage is indirectly caused by viruses that are transmitted by the aphids during feeding. These can stunt growth, yellow leaves, and thus reduce yields. Some species of aphids are also known to excrete honeydew, a sticky, sugary substance that can attract other insects and promote the growth of mold. Often, we only become aware of this after our parked car succumbs to the sticky rain of honeydew that falls from

the tree canopy above.

It's been estimated that crop losses caused by aphids could be as high as £190 million every year, and although methods to control their populations already exist, these often involve killing the aphids off, depriving birds and other species of an important food resource.

Researchers are therefore studying new methods of managing these pests that do not involve lethal force such as pesticides, and by studying the movements and mechanisms involved in helping these insects to fly, scientists believe they could use footage like this to better identify which insects are carrying disease or viruses, and deploy control strategies accordingly to manage them.

Professor James Bell from Keele's School of Life Sciences, who led the research, said, "Aphids are as beautiful and as graceful in flight as their colorful distant cousins, the butterflies. But, if we are to make progress in improving food security, major challenges must be overcome to protect our crops. In particular, to inform the risk of virus transmission, we need to build on this research to understand the energetic cost of flight for aphids over short and long distances."

More information: James R. Bell et al, How aphids fly: Take-off, free flight and implications for short and long distance migration, *Agricultural and Forest Entomology* (2024). DOI: 10.1111/afe.12623

Provided by Keele University