Rising temperatures impact on major pest of rice

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(PhysOrg.com) -- Rice crop plaguing insects may struggle to survive in a warming climate, scientists from the University of Birmingham have found.

The brown planthopper is the most serious rice pest across the world, widespread in tropical climates, and commonly devastates rice fields across Asia. The insects not only damage rice directly through feeding but by transmitting viruses, which stunt the growth of the crop.

During the study, the researchers exposed the insects to high temperatures to determine their upper thermal thresholds at which they become immobilised by heat stress and those that were fatal. Experiments were carried out on both young and adult brown planthoppers collected in Pilau Pinang in Malaysia, where the annual mean temperature is approximately 27.5 degrees (81.5F).

Results from the study indicate that the brown planthopper is living at temperatures close to its upper thermal limits in parts of its current distribution. For that reason, climate warming in tropical regions and occasional extreme high temperatures are likely to become important limiting factors affecting the survival and distribution of the insect.

Aside from the lethal effects, the research shows that higher temperatures impact the insects' mobility meaning that the annual migratory behaviour could be affected.

Professor Jeffrey Bale, Professor of Environmental Biology, at the University of Birmingham, said:

“It seems that in most countries, summer high temperatures are lower than those that would kill brown planthoppers, but high enough to limit their mobility. We have a basis by which to identify rice-growing regions in Asia where the insect is likely to become more or less of a problem through future changes in climate.”

“We are now researching whether insects, such as the brown planthopper, will be able to adapt and survive the further heat stress, and whether reproduction will still be possible.”

The research group consists of Doctoral researcher Jiranan Piyaphongkul, Dr Jeremy Pritchard and Professor Jeffrey Bale from the University of Birmingham’s School of Biosciences.

More information: Paper: Can tropical insects stand the heat? A case study with the brown planthopper Nilaparvata lugens (Stål). Published in the journal *PlosOne* (January 2012).

Provided by University of Birmingham