Tropical insectivorous birds can smell trees calling for help

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Herbivorous insect feeding on a plant trigger various chemical reactions that lead to secretion of volatile compounds from damaged plant cells.

Insect predators are able to use these volatile compounds as a clue when searching for prey.

In the last few years, the scientists are trying to simulate herbivorous damage experimentally in labs:
- **(A) MECHANICALLY**
- **(B) CHEMICALLY**

Our aim is to prove functioning of the simulated herbivory in practice in tropical areas, and compare the two methods.
Plasticine caterpillars resembled those of a common genus *Choreutis*

**Ficus hahliana** in chemical experiment along elevational gradient in Wanang

- 24 saplings per treatment
- Sprayed 4x
- 5 caterpillars per sapling

**Ficus phaeosyceae** in chemical *preliminarily* experiment in Wanang

- 10 saplings per treatment
- Sprayed 2x
- 10 caterpillars per sapling

Trees involved in mechanical experiment along gradient

- 15 saplings per treatment/leaf area removed 5x/
- 10 caterpillars per sapling

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<thead>
<tr>
<th>Tree species/Altitude m</th>
<th>200</th>
<th>700</th>
<th>1200</th>
<th>1700</th>
<th>2200</th>
<th>2700</th>
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<td><em>Chionanthus ramiflora</em></td>
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<td><em>Cryptocarya multiculata</em></td>
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<td><em>Dilleniu papuana</em></td>
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<td><em>Ficus wassa</em></td>
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Preliminary experiments Wanang 150 m a. s. l.

Chemically simulated herbivory attracted significantly more predators only up to ca. 24 hours after application of methyl-acetate jasmonic acid.
Chemical herbivory along an elevational gradient
Predation on dummy caterpillars in reaction to chemically simulated herbivory along an elevational gradient.
Predators along gradient

Control

Experiment - MeJa

Predators along gradient
Summary

• Experimentally simulated herbivory **succeeds fully attracts** predators of herbivorous insect.

• Mechanically and chemically simulated herbivory brings almost equally strong response.

• Dummy caterpillars exposed on treated trees are twice more likely predated than dummy caterpillars exposed on control trees without herbivorous damage.

• Herbivorous insects in tropical lowland forest are more likely predated by other insect predators, while they have relatively higher chance to be predated by birds at higher elevations (above ca. 1700 m a. s. l.).
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