Insects demonstrate color preferences

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(Phys.org) —Insects prefer to eat green leaves rather than red ones, research from Victoria University has shown.

Ignatius Menzies, who will be awarded a PhD in Ecology and Biodiversity next week, tested a long-standing hypothesis that plants use red foliage as a visual warning to deter approaching insect pests.

"The possibility that plants use a visual warning system as a defence has been discussed in the literature for over 10 years," he says, "but there hasn't been a lot of data collected in this area."

Ignatius was part of an international team of researchers from Victoria University of Wellington, the Plant Extracts Research Unit (Plant & Food Research) in Otago and the University of Freiberg in Germany, which carried out the study using horopito, the New Zealand native pepper tree.

"It's an ideal species to test," says Ignatius, "because of its vibrant colour."

Earlier work on the topic had shown that redder leaves contain higher levels of an unpalatable defence compound—"the redder the leaf, the more peppery the taste," says Ignatius.

His research involved spending a lot of time in the hills of Lower Hutt's Belmont Regional Park, an area with a rich population of horopito. He studied 30 pairs of plants that were identical except for one being coloured red and one green.

Ignatius checked every leaf for caterpillars, quantified leaf damage and counted the fruit produced by the plant.

Back in the laboratory, he examined levels of pigment and the defence compound, assessed whether the leaves had nutrient deficiency and carried out choice tests with typical eaters including leaf-roller caterpillars, stick insects and weta.

"The redder plants had 20 percent fewer caterpillars—it was clear the caterpillars much preferred to eat the green leaves," he says.

His research concluded that although redder-leaved bushes can defend themselves better against insect attacks, contrary to expectations, they do not produce more fruit or seeds than the green bushes.

"We found that the redder plants photosynthesise less than the green plants," says Ignatius, "so, there seems to be cost to the plant. Red plants are eaten less, but the green plants have more energy to put into the formation of new leaves."

Professor Kevin Gould, who supervised Ignatius's research, says: "This work makes a significant contribution to our knowledge of how plants can defend themselves from the incessant onslaught from insect herbivores.

"Simply by changing the colour of their leaves, plants can better protect themselves from hungry caterpillars."

Provided by Victoria University of Wellington