Plants discover the benefits of good neighbors in strategy against herbivores

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Scandinavian Scientists have discovered that a species of tree defends itself from herbivore attack by using chemicals emitted by neighbouring plants. The study, published today in *New Phytologist*, reveals how a species of birch tree adsorbs chemical compounds from neighbouring marsh tea plants, *Rhondodendron tomentosum*, in a unique 'defence by neighbour strategy.'

The team from Finland, led by Prof. Jarmo Holopainen from the University of Eastern Finland, were conducting studies into emissions of forest and peat land plants when they discovered previously unreported compounds for mountain birch from their foliage emissions. The compounds were emitted by a species of rhododendron growing nearby.

"It is well known that many plant species start to emit chemical compounds after damage by herbivores," said the co-author Dr. Sari Himanen, from Agrifood Research Finland. "In an earlier study we accessed the compounds emitted from mountain birch following Moth feeding damage and we found that some of the trees growing next to *Rhondodendron tomentosum* also emitted residual amounts of the compounds ledene, ledol and palustrol. This resulted in the idea to experimentally test whether these sticky semivolatiles could actually protect neighbouring birch trees from the attention of attacking herbivores such as feeding moths. Based on experimentation in the field, in a natural habitat and in the laboratory, we discovered that a novel, potentially also ecologically meaningful effect for neighbour-emitted foliage-adsorbed semi-volatiles might take place in a boreal

environment."

Plant emissions can have several roles, including the attraction or deterrence of herbivores. Some cause an indirect defence by attracting a herbivorous natural enemy, but it is extraordinary for one plant to benefit directly from another plant's emissions.

The study also seems to confirm Scandinavian folklore which held that rhododendrons can be used to protect clothes.

"In earlier times branches of R. tomentosum were collected and put together with woolly winter clothes for summer storage in the attic," said Professor Holopainen. "Clothes and furs adopted the distinctive smell and were also protected against damage from clothes moths and fur moths."

"Our results show that interactions between species through emissions are a good example of the ecological effects that need to be considered more from a plant community than from a individual plant point of view" concluded Himanen. "Passive adsorption of compounds by a neighbouring plant might be an important, but understudied, way for these compounds to act in a natural environment and could be an important factor in plant fitness and species distribution."

Provided by Wiley

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