

Herbivore drool defeats fungal defence

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The saliva of grazing herbivores is shown in this report to interfere with the induced defences of some plants. Credit: Steve Jurvetson

A report in *Biology Letters* shows that the drool of herbivores might help defeat the toxic fungal defences of the plants they graze on.

Grazing or cutting some plants induces a noxious chemical to be produced which deters hungry plant-eaters from revisiting them. The chemicals, called alkaloids, are produced by fungi that have a mutually beneficial relationship with the plant.

One such <u>symbiotic relationship</u> is between the grass red fescue and the fungus it plays host to: Epichloë festcuae. The fungus produces the highly toxic alkaloid ergovaline when the plant is wounded, which if



consumed can cause disease which might lead to loss of a limb. Evolutionary pressure favours grazers who can chomp their way through the grasses while avoiding these nasty consequences.

Some studies report that herbivore saliva could have antifungal properties so the team set about working out if the saliva of grazing mammals was reducing the impact of the toxins and allowing them to consume fungus-infected crops without being harmed. The team collected saliva from moose and European reindeer and treated colonies of E.festucae fungus with it. After 12 hours fungal growth slowed down.

The team also artificially grazed specimens of red fescue to see how saliva effected the concentration of defensive ergovaline. They found that in grasses originating from Northern European locations the concentration of ergovaline dropped after saliva had been applied to cropped plants. These results showed that the drool of the herbivores was interfering with the <u>plants</u> defence systems which could enable grazers to revisit the scene and graze again without being caught out by the unpalatable alkaloids.

However, in grasses which originated from Southern Ontario, the most southerly point of the red fescue's range, ergovaline concentrations did not drop. These grasses had consistently high concentrations of ergovaline which did not rise after cropping. They grow in marginal conditions where water is scarcer than in European locations and so it may be evolutionarily favourable for their defences to be permanently in the 'on' position, say the researchers. Since the saliva couldn't disrupt the production of ergovaline in these specimens the scientists inferred that the major effect of herbivore <u>saliva</u> is to interfere with the signalling which switches on defence mechanism and alkaloid production.

'The exact mechanism of ergovaline suppression is unknown' say the researchers but they suggest that salivary secretions of large mammals



are more important than previously realised.

More information: Andrew J. Tanentzap, Mark Vicari, and Dawn R. Bazely. "Ungulate saliva inhibits a grass–endophyte mutualism." *Biol. Lett.* July, 2014 10 7 20140460; <u>DOI: 10.1098/rsbl.2014.0460</u> 1744-957X

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