THE MECHANISMS OF RESIN USE IN WOOD ANTS

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BACKGROUND:

- Wood ants *Formica paralugubris* introduce conifer resin into their nests
- Resin has antibiotic properties. Its presence increases the survival of workers and brood exposed to fungal or bacterial pathogens
- The use of resin is prophylactic rather than therapeutic
- Formic acid secreted by ants has antibiotic properties

Lab assays: pieces of resin, wood, or stones kept in boxes with or without ants.

1 Antifungal effect of resin: better if contact with ants?

Ant presence: ANOVA: DF= 1, F = 10.3861, $P = 0.001$
Material (resin vs wood vs stones): ANOVA: $df = 2$, $F = 38.9715$, $P < 0.0001$
Interaction material * ant presence: ANOVA: $df = 2$, $F = 9.1216$, $P < 0.0001$

Metarhizium brunneum:
generalist fungal entomopathogen

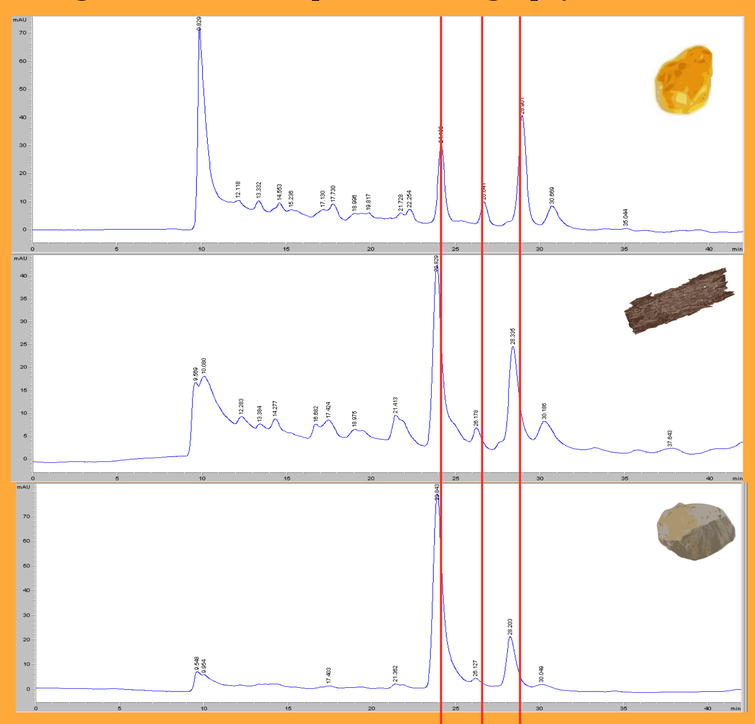
green = healthy fungus spores
white = sterile mycelium

YES !

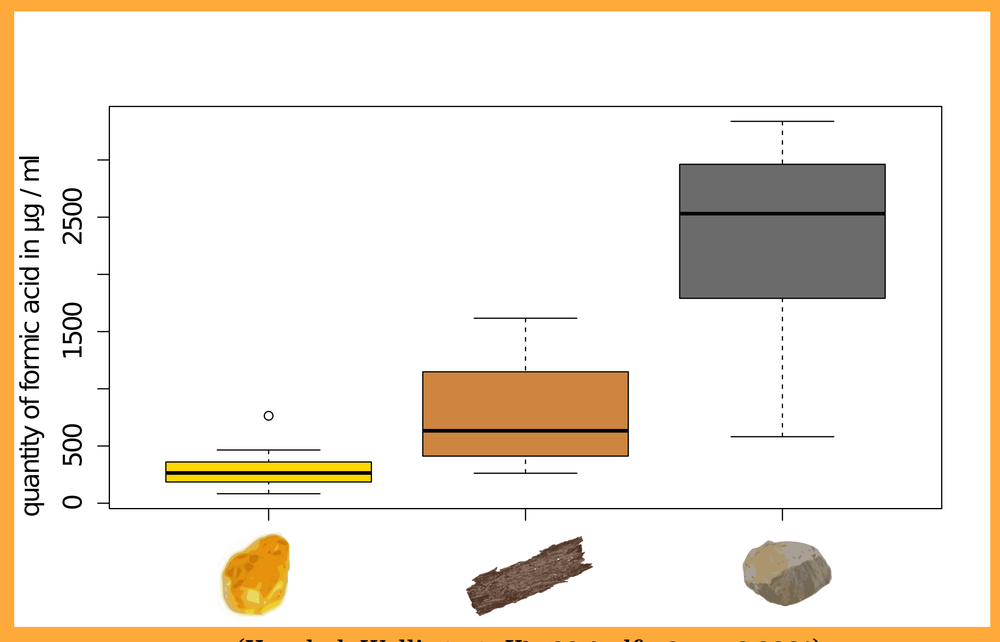
➡ Potential treatment of resin: Formic acid ?

2 Do we find formic acid / other acids on resin? on other types of material?

High Performance Liquid Chromatography (HPLC)



YES!
Formic acid
(and other acids)
are found everywhere: no specific treatment of resin



(Kruskal- Wallis test: $X^2 = 26.4$, $df = 2$, $p < 0.0001$)

Quantity of formic acid: resin < wood < stones
Chemical reaction between acid and resin?
Less absorption of acid on inert material (stones) ?

3 Does formic acid (and/or other acids) enhance the antifungal properties of resin? - in progress !

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