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Stellingen
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Phytochemical background matters for bioactivity of plant metabolites: a case study with pyrrolizidine alkaloids

1. Structurally related pyrrolizidine alkaloids (PAs) vary in their effects on thrips. In most cases, PA N-oxides are less bioactive than their corresponding free bases in warding off insect herbivores when tested as single compounds (this thesis).

2. Metabolites that are weakly active or inactive alone may become potent in concert with other metabolites, and positively contribute to the overall defensive efficacy. This may explain why plants store PAs as PA N-oxides (this thesis).

3. Given the enormous number of metabolites in a given plant, antagonistic interactions are likely to occur. However, such interactions and their consequences on insect herbivores have been largely overlooked and from an evolutionary point of view they are not easily explained (this thesis).

4. Spiking a natural chemical background, e.g. a plant extract or a fraction of an extract, provides a natural combination treatment and therefore is an effective step to measure the effect of a compound in combination with the other metabolites present in the plant (this thesis).

5. Plant-insect interactions can be addressed at the level of gene expression, the metabolomic profile, the whole plant or at the community level (Stam et al. 2014, Annu. Rev. Plant Biol.). Not one of them can be considered as more important than any other.

6. The way forward to study interactions between plant metabolites is to develop high throughput screening systems.

7. Interactions between plant metabolites have yet to be explored by plant breeders to increase natural plant resistance.

8. Metabolite analyses are mostly carried out on whole plants or plant organs. To understand the importance of interactions, metabolite analyses should be targeted at cell layers, cells or cell organelles.

9. Life is like the isolation and purification of pure compounds: dilute your sorrow, evaporate your worries, filter your mistakes, boil your ego, and you will get the crystal of happiness (http://www.worldgeneralknowledge.com/goldenwords.html).

10. One should be educated in accordance with not only ones aptitude and ability but also ones background.

11. An important lesson for a Chinese PhD student coming to The Netherlands is to be independent not only in life but also as a researcher.

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