

Radhika, V., Kost, S., Bartram, S., Heil, M. & Boland, W. (2008) Testing the optimal defence hypothesis for two indirect defences: secretion of extrafloral nectar and emission of volatile organic compounds. *Planta* 228, 449-457

**Abstract.** Many plants respond to herbivory with an increased production of extrafloral nectar (EFN) and/or volatile organic compounds (VOCs) to attract predatory arthropods as an indirect defensive strategy. In this study, we tested whether these two indirect defences fit the optimal defence hypothesis (ODH), which predicts the within-plant allocation of anti-herbivore defences according to trade-offs between growth and defence. Using jasmonic acid-induced plants of *Phaseolus lunatus* and *Ricinus communis*, we tested whether the within-plant distribution pattern of these two indirect defences reflects the fitness value of the respective plant parts. Furthermore, we quantified photosynthetic rates and followed the within-plant transport of assimilates with <sup>13</sup>C labelling experiments. EFN secretion and VOC emission were highest in younger leaves. Moreover, the photosynthetic rate increased with leaf age, and pulse-labelling experiments suggested transport of carbon to younger leaves. Our results demonstrate that the ODH can explain the within-plant allocation pattern of both indirect defences studied.