Session 4

Quantitative variation of the glucosinolate pattern of *Brassica oleracea* var. *acephala* influences the performance of generalist and specialist lepidopterans

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Glucosinolates may act as a potent feeding deterrent for generalist insect species, as their toxicity causes developmental and fitness damage. For insects specialized in brassicaceous plants, however, they may act as oviposition and feeding stimulants, because the toxic effects are circumvented by excretion, detoxification or sequestration mechanisms. We performed a two-year field study to investigate whether the abundance of the generalist *Mamestra brassicae* (Lepidoptera, Noctuidae) and the specialist *Pieris rapae* (Lepidoptera, Pieridae), was affected by the glucosinolate patterns of six genotypes of *Brassica oleracea* var. *acephala* (kale), selected from the same cultivar for having high or low foliar content of sinigrin, glucoiberin and glucobrassicin. Field data were corroborated by laboratory bioassays, which showed the impact of plant genotype and plant age on larval development time, body weight, mortality and feeding rate. In the field, *M. brassicae* larvae and eggs were significantly less abundant on the high sinigrin genotype, whereas *P. rapae* abundance was not affected by plant genotype. In the laboratory, larval weight of *M. brassicae* increased on young plants selected for high content of sinigrin, which also were those more consumed. On mature plants, *M. brassicae* larvae mostly consumed plants selected for low glucoiberin content and the larval weight increased on plants with low content of sinigrin, glucoiberin and glucobrassicin. The highest larval weight for *P. rapae* were found on young plants with high glucoiberin content, and on mature plants selected for low sinigrin and low glucoiberin content. The leaf consumption rate was higher on young plants with high sinigrin concentration, and on mature plants with low glucoiberin content. In conclusion, variation of glucosinolate concentration, and particularly of sinigrin, significantly affects the performance of both insects. Because the concentration of glucosinolates increased over time, kales experience a window of vulnerability of their defensive strategy of during early developmental stages.