The importance of tea green leafhopper *(Empoasca onukii*) density to induced metabolite blends in tea plants (*Camellia sinensis*) and implications for tea quality.

Plant metabolic responses to herbivory are generally elucidated using experiments that compare the metabolite concentrations in damaged and undamaged plants. Experimental herbivore density is often arbitrary or uncontrolled and may only elicit one possible set of responses by plants. In nature, however, plants experience continuous variation in degree of herbivory. Studies that explicitly manipulate herbivore density often find substantial variation in the responses of individual metabolites. Some metabolites have dose-dependent responses, while others may be induced in an “all-or-nothing” manner, resulting in a change in metabolite ratios with increasing herbivory. Experimentally exposing plants to only one density of herbivores may result in an incomplete understanding of downstream effects. For example, the ratio of volatile compounds in blends can carry information for parasitoids and may change tritrophic interactions as herbivore density increases. Additionally, the quality of many crop plants, such as tea (*Camellia sinensis*), depends greatly on metabolite blends that are impacted by herbivory. For example, leafhopper damage has been reported to have a positive influence on tea quality. With manipulative experiments using both potted plants and mature plants in the field, we show that the effect of leafhopper (*Empoasca onukii*) herbivory on the metabolite profile of tea is dependent on leafhopper density with responses varying by metabolite. Furthermore, tea plant genotype may influence the effects of leafhopper herbivory on volatile metabolite blends, leading to different optimal densities for improving tea quality depending on cultivar.