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Characterising volatile organic compound emission changes in native black poplar under elevated carbon-dioxide (CO_2), elevated ozone (O_3) and herbivory

Laura James[1], Christian Pfrang[1], Robbie Girling[2], Scott Hayward[1], and Rob MacKenzie[1]
[1]University of Birmingham, GEES, United Kingdom of Great Britain – England, Scotland, Wales
[2]University of Reading, Reading, United Kingdom of Great Britain - England, Scotland, Wales

Plants communicate information about their status, intra- and inter- plant, and with other ecosystem members, through the release of volatile organic compounds (VOCs). The effects of rising CO_2 in conjunction with ozone (O_3) on plant VOC emissions is not yet fully understood, but research suggests that some herbivore-induced VOCs are degraded by O_3, potentially reducing their signalling function. Furthermore, elevated CO_2 has been shown to attenuate induced VOC responses to herbivory in *Brassica oleracea*.

We are using two tri-trophic model systems; black poplar [*Populus nigra betulifolia*], winter moth [*Operophtera brumata*] and a tachinid fly parasitoid of winter moth, *Cyzenis albicans;* and oil seed rape [*Brassica napus*], diamond back moth [*Plutella xylostella*] (DBM), and a parasitoid of DBM, braconid wasp, *Cotesia plutella.* Additionally, we are working within two ground-breaking facilities; the Birmingham Institute of Forest Research (BIFoR)'s free-air carbon enrichment (FACE) experiment, and University of Reading's free-air diesel and ozone enrichment experiment. We will also collect some data from lab-based experiments.

Our project seeks to characterise the volatile organic compound (VOC) profiles emitted for both plants under herbivory, examine how these VOC profiles differ under combined elevated CO_2 and O_3, and explore whether changes to VOC profiles impact key ecological relationships, e.g, the ability of plants to signal to herbivore enemies.