

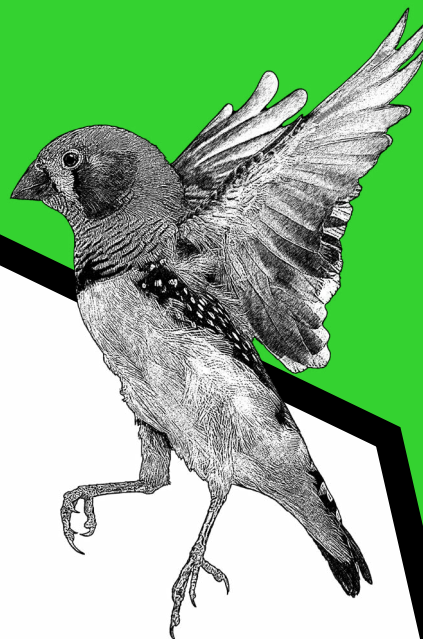
ABSTRACT BOOK

SEB ANNUAL CONFERENCE

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SOCIETY FOR EXPERIMENTAL BIOLOGY

study investigated the influence of *Botrytis cinerea* infection on VOC emissions and quality attributes across three developmental stages: unripe, ripe, and overripe, in comparison with healthy bananas. VOCs were analysed using gas chromatography–mass spectrometry (GC/MS) to characterise metabolite changes associated with natural ripening and pathogen-driven decay. Healthy bananas exhibited a clear metabolic transition during ripening, with ester concentrations increasing markedly from 0.07% (unripe) to 36.54% (ripe) and 81.31% (overripe), accompanied by a decline in aldehydes, alcohols, and other volatiles ($p \leq 0.05$). This indicates ripening and senescence-associated esterification via alcohol acyltransferase (AAT) activity, consistent with the climacteric fruit ripening process. In contrast, infected bananas showed a slower increase in esters across developmental stages (0.12% to 54.67% from unripe to ripe), with elevated alcohol levels (6.47% to 12.83% from unripe to ripe, respectively). The presence of microbial/stress-related volatiles observed in this work including acetic acid, 1-octen-3-ol, and ethyl acetate, suggests a volatilome which is indicative of pathogen-driven decay rather than normal physiological ripening. This shift was consistent with the physiological responses, changes in measured physical and biochemical parameters in banana fruit. *B. cinerea* infected fruit exhibited a pronounced increase in ethylene production and respiration rate across all the maturity stages. The infected fruit respiration rate was ≈ 5.2 , ≈ 1.3 and ≈ 2 times higher than healthy fruit on unripe, ripe and overripe, respectively. Thus, reinforcing the pathogen-driven disruption.

P3.6 VOLATILE ORGANIC COMPOUNDS EMITTED BY PLANTS AND THEIR MULTIPLE BIOLOGICAL AND ENVIRONMENTAL ROLES

Tuesday 7th July 2026 14:00

Francesco Loreto (University of Napoli Federico II, Italy)

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Plants produce and emit volatile organic compounds (VOCs). Plant-emitted VOCs: a) interact with major biogeochemical cycles and with the formation of ozone, particulate matter, and other atmospheric pollutants; b) protect plants from abiotic stresses, particularly high temperatures and water or oxidative stress; c) alter hormonal balance, modifying plant growth and the allocation of biomass between shoots and roots; d) guide plant communication with other organisms, attracting pollinators, but also triggering direct or indirect defence responses against herbivores and pathogens; e) enable communication among plants, likely inducing defence responses even in plants that receive VOCs before experiencing any stress themselves (priming). Plant-plant communication would require the presence of unknown VOC perception mechanisms (sensing) in receiving plants. Recent advances about VOC sensing and priming will be presented. Discovering how plants sense VOCs would allow better use of these compounds as plant-growth regulators and for sustainable crop and forest protection practices.

P3.7 HOW JASMONATE MEDIATED DISTRESS SIGNALS REGULATING PLANT RESPONSES TO DEVELOPMENTAL AND ENVIRONMENTAL CUES

Tuesday 7th July 2026 14:15

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Plant development and stress responses are regulated by complex signalling networks that mediate specific and dynamic processes. Jasmonates (JAs) mediate responses to stress and act like growth inhibitors. A key part of the stress response is the growth-defence trade-off, whereby a plant induces costly large scale transcriptional and metabolic changes associated with protection, at the expenses of growth and development. The latest work has identified new regulatory nodes regulating diverse plant responses to developmental and environmental cues. In my laboratory, we are interested in discovering the cellular components linking stress responses to growth processes with the aim to improve yield and adaptation of plants to their environment. We analyze the effects of JAs on priming through genome-wide studies at the organ, tissue, and cell levels. We also exploit the ability of JAs to induce protective specialized metabolites to develop novel functional screenings platforms, to improve the understanding of key pathways leading to the production of economically important compounds. A review of the state of the art and the latest results will be presented.

P3.8 PUTRESCINE-TRIGGERED CHANGES IN VOLATILE ORGANIC COMPOUND PROFILES CONFER RESISTANCE AGAINST *BEMISIA TABACI* IN NEIGHBOURING CUCUMBER PLANTS

Tuesday 7th July 2026 14:30

Andrea Secchiero (Roma Tre University, Italy), Ilaria Fraudentali (Roma Tre University, Italy), Pietro Di Primo (AGRIGEOS SRL, Italy), Giuseppe Forte (AGRIGEOS SRL, Italy), Vittoria Pettinato (AGRIGEOS SRL, Italy), Silvia Oliveri (AGRIGEOS SRL, Italy), Susanna Cialli (Scuola Superiore Sant'Anna, Italy), Carsten Müller (Cardiff University, United Kingdom), Robert Herbert (Cardiff University, United Kingdom), Hilary Rogers (Cardiff University, United Kingdom), Alessandra Cona (Roma Tre University, Italy)

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Volatile organic compounds (VOCs) are key mediators in plant-environment and inter-plant communication. Polyamines (PAs) are organic compounds found in all living organisms. As endogenous signalling molecules, PAs modulate various physiological and pathological processes, and have been increasingly applied as biostimulants (BSs) in sustainable agriculture.

Here, we investigated the effect of foliar Putrescine (Put) application on *Bemisia tabaci* (whitefly) resistance and VOC emission in cucumber plants. We also assessed priming of defence responses in neighboring plants exposed to Put-induced VOCs under whitefly infestation.

VOC emissions were quantified in non-infested unprimed, non-infested Put-primed, infested unprimed, and Put-primed infested plants. Relative quantification of VOCs via gas chromatography mass spectrometry (GC-MS), followed by Canonical Analysis of Principal Coordinates (CAP) and Random Forest (RF) were used

to assess changes in VOC profiles. A targeted CAP on the six most significant VOCs identified via RF revealed a marked convergence between Put-primed and infested plant volatiles. This suggests that Put treatment may induce a VOC signature resembling that triggered by natural pest attack, consistent with a priming effect. To assess the functional relevance of these emissions, Put-induced VOCs were evaluated for their ability to confer resistance to whitefly. Infested receiver plants positioned adjacent to Put-primed VOC-emitting donors displayed a significant reduction in whitefly populations.

Collectively, these findings indicate that Put priming reshapes VOC emissions, promoting *Bemisia* resistance in neighboring plants. This opens the potential to exploit PA-primed plants as trigger plants to prime surrounding crops, offering an eco-friendly strategy to mitigate pest infestation in the field.

P3.9 THE HIDDEN LANGUAGE OF CARNIVORY: BVOC EMISSIONS IN *DROSELA ROTUNDIFOLIA* L. ACROSS CONTRASTING PRECIPITATION REGIME

📅 Tuesday 7th July 2026 ⌚ 14:45

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Carnivorous plants represent an evolutionary adaptation to nutrient-poor environments, where limited resources availability constrain plant growth. Through specialised trapping structures and digestive mechanisms, these plants capture and assimilate nutrients from arthropods. In addition to these morphological traits, chemical signalling mediated by volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) is increasingly recognised as an important component of plant-insect interactions in carnivorous species. VOCs may function as long-range attractants, whereas SVOCs can accumulate on trap surfaces and potentially influence short-range interactions with visiting organisms. Environmental conditions, including precipitation and humidity, are known to influence VOC emissions, yet the relationship between variation in chemical emissions and prey capture efficiency remains poorly understood.

Here we investigated this relationship in the widespread carnivorous plant *Drosera rotundifolia* L., a species typical of acidic peatlands across the Holarctic region and characterised by adhesive traps formed by glandular leaf tentacles. We combined measurements of prey capture with the characterisation of VOC and SVOC emissions in natural populations occurring under contrasting climatic conditions in north-western Spain. While prey capture rates were comparable between sites, plants from the drier region exhibited higher total VOC emissions. In contrast, SVOC emissions showed limited variation among sites, and multivariate analyses revealed no significant differences in chemical composition.

These results suggest that emission intensity may respond plastically

to environmental conditions, whereas the qualitative structure of the chemical profile remains conserved. This balance between plasticity and compositional stability may contribute to maintaining effective foraging performance in *D. rotundifolia* across environmentally heterogeneous habitats.

P3.10 HERBIVORE-INDUCED PLANT VOLATILES (HIPVS) ARE SENSED BY BRASSICA RAPA PLANTS AND PRIME DEFENCES AGAINST FORTHCOMING *ATHALIA ROSAE* INFESTATIONS.

📅 Tuesday 7th July 2026 ⌚ 15:00

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Herbivore-induced plant volatiles (HIPVs) mediate plant-plant communication, often triggering defence responses in neighbour undamaged receiver plants. Receivers can respond immediately upon signal perception (signalling) or become sensitised for enhanced defensive responses upon subsequent herbivore attacks (defence priming). This study investigates signalling and priming in *Brassica rapa* subsp. *pekinensis* exposed to HIPVs from *Athalia rosae*-infested conspecifics, (1) identifying immediate physiological changes in receivers following volatile exposure, and (2) determining whether pre-exposure enhances defensive capacity against herbivory. A full factorial design with 30 biological replicates per treatment ($n = 120$) was established. Receivers were exposed for 72 hours to airflow carrying either constitutive compounds from undamaged emitters or HIPVs from *A. rosae*-damaged emitters. Subsequently, half of the receivers of both treatments were challenged with *A. rosae* larvae for 24 hours. In the receivers of the four resulting treatments the following parameters were measured: (1) photosynthetic rates, photosynthetic electron transport, transpiration and stomatal conductance by gas exchange and chlorophyll fluorescence (Li-6400 XT); (2) emissions of constitutive volatiles and HIPVs by (2a) gas chromatography-mass spectrometry (GC-MS) and (2b) real-time proton transfer reaction time-of-flight mass spectrometry (PTR-ToF-MS); and (3) quantitative leaf damage. Receivers exposed to HIPVs emitted alarm and anti-herbivore volatiles. Upon subsequent herbivore challenge, HIPV-primed receivers demonstrated stronger resistance than controls, including increased defence-related and reduced stress-related volatile emissions, higher stomatal conductance, and significantly reduced leaf area damage. These findings support a role for HIPVs sensing and defence-priming in naïve receivers.