UNTANGLING INSECT RESPIRATION TO ADVANCE FUMIGATION

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Insects are one of the most diverse animal assemblages on the planet, inhabiting a broad range of altitudes, climates and biomes. As a result, they have developed a broad range of physiological and behavioural adaptations, which have enabled them to become the diverse and widespread taxon that they are today. Insect respiration is one example of a physiological process that varies among some insect taxa. The mechanisms behind differing respiratory responses across insect species are not fully understood and there is rigorous debate in the scientific community with regard to the drivers underpinning species-specific respiratory responses. In low oxygen and/or high carbon dioxide environments insects have been noted to go into a 'protective stupor' or narcosis, whereby they limit or cease gas exchange for a period of time, thus reducing hypoxic damage. This respiratory adaptation to hypoxic/hypercarbic atmospheres has been linked to a decrease in efficacy of some fumigants when applied in these types of environments. Hence, understanding the mechanisms behind insect respiratory protective measures will help to facilitate more effective pest control through fumigation. In this study we intend to investigate the respiratory responses to a range of atmospheric conditions of the golden-haired bark beetle, *Hylurgus ligniperda* (F.) (Coleoptera: Curculionidae), a forest insect that may be associated with New Zealand export logs. Respirometry experiments will use this beetle as a proxy to elucidate insect respiration in the presence of low oxygen environments. The information gained from this study will direct further experimentation under differing atmospheric conditions with the inclusion of fumigants.