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The Impact of CO2 on Learning and Memory Duration of Bombus terrestris

Authors : Gholizadeh F. F., Goldansaz S. H., Bandani A. R., A. Ashouri

Abstract : This study aimed to investigate the direct effects of increasing carbon dioxide (CO_2) concentration on the behavior of Bombus terrestris bumblebees in laboratory conditions to understand the outcomes of the augmentation of this gas in the Earth's atmosphere on the decline of populations of these pollinators. Learning and memory duration of bumblebees were evaluated as two main behavioral factors in social insects at different concentrations of CO_2. In both series of experiments, the behavior of bees under the influence of CO_2 changes compared to the control. Insects kept at high CO_2 concentrations learn less than control bees and spend more time identifying and navigating to discover their food source and access time (nectar consumption). These results showed that bees maybe lose some of their food resources due to poorer identification and act weaker on searching due to less memory and avoiding the enemy in higher CO_2 concentration. Therefore, CO_2 increasing concentration can be one of the reasons for the decline of these pollinating insects' populations by negatively affecting their fitness.

Keywords : Bombus terrestris, CO_2, learning, memory duration
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