

Global Climate Change and Insect Pollinators

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Abstract : The foundation of human life on earth relies on many ecosystem services provided by insects of which pollination owes a vital role. The pollination service offered by insects has annual worth of approximately €153 billion. The majority of the flowering plants depends on entomophiles pollination for their reproduction and formation of seeds and fruits. The quantity and quality of insect pollination have multiple implications for stable ecosystem, diverse species level, food security and climate change resilience. The rapidly mounting human population, depletion of natural resources and the global climate change forced us to enter an era of pollination crisis. Climate change not only alters the phenology, population abundance and geographic ranges of different pollinators but also hinders their pollination activities. The successful pollination process relies heavily on the synchronization of biological events of pollinators with the phenological stages of the flowering plants. However, there are possibilities that impending climatic changes may result in asynchrony between plant-pollinators interactions and also mitigate the extent of pollination. The trophic mismatch mostly occurs when pollinators and plants inhabiting the same environment use different environmental cues to regulate their biological events, as these cues are not equally affected by climate change. Synchrony has also been disrupted when one of the interacting species has migratory nature and depend on cues for migration. Moreover, irregular rainfalls and up-surfing temperature also disrupts the foraging behaviour of pollinators resulting in reduced flowers visits by insect. Climate change has a direct impact on the behavior and physiology of honey bees, the best known pollinators owing to their extreme floral fidelity. Rising temperature not only alleviates the quantity and quality of floral environment but also alters the bee's colony harvesting and development ability. Furthermore, a possible earlier decline of flowers is expected in a growing season due to this rising temperature. This may also lead to disrupt the efficiency bumblebee queen that require a constant and adequate nectar and pollen supply throughout the entire growing season for healthy colony production. Considering the role of insect pollination in our ecosystem, their associated risks regarding climate change should be addressed properly for devising a well-focused research needed for their conservation.

Keywords : climate change, phenological, pollination, synchronization

Conference Title : ICSAPPT 2017 : International Conference on Sustainable Agriculture and Plant Protection Technologies

Conference Location : Melbourne, Australia

Conference Dates : November 29-30, 2017