The circadian rhythm of corn (Zea mays L.) pollen dispersal into the atmosphere and its relation with local meteorological conditions

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Abstract

Pollen sampling tower of 6m height containing:
- 4 Rotordod samplers mounted at z/h = 1, 1.25, 1.5 and 2 where h = 3m is the canopy height
- Cup anemometers at same height as Rotordods.

Meteorological Tower containing:
- 2 Campbell Scientific 3D Sonic Anemometers (CSAT), z/h = 1 and 1.5
- 2 Vaisala Thermometers/Hygrometers (VTH), z/h = 1 and 1.7
- 1 Young Propeller windvane (RMY), z/h = 2
- 1 Krypton hygrometer
- 1 Rain gauge
- 2 Vaissala Thermometers/Hygrometers (VTH), z/h = 1 and 1.7

Setup

Pollen release peak is correlated with direct radiation hitting the anther, assuming it is oriented vertically with the stomatic opening on the bottom. Furthermore, on four consecutive days from the 14th to the 17th of July, bi-modal diurnal pollen release patterns were obtained with a second peak in pollen concentration occurring at the same time each day. In the afternoon pollen release tapered off and negligible night time pollen concentrations were measured except for one night with low relative humidity and high wind speeds.

Fieldsite

Eastern shore of the Chesapeake Bay, Maryland

Correlation of first peak in pollen release with radiation

The pollen release peak is correlated with direct radiation hitting the anther assuming it is vertically hanging down, i.e. when the sun is at its highest position direct radiation on the anther is minimized.

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