

# **Spatio-Temporal Variation in Pollinators and their Efficiency: A Case Study in Cardamoms**

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In flowering plants, pollination is the basis of genetic exchange between plants and populations, and is also a prerequisite for fruit and seed set. In a majority of flowering plants, pollination is brought about by animals. One of the important outcomes of recent studies on pollination ecology has been the realization that plant-pollinator interaction is dynamic and pollinator assemblages show spatial and temporal variations. However most of the studies on pollination ecology are limited to investigating the pollination biology of the target species at a given flowering time (mostly peak of flowering) and location. A specific pollinator or a group of pollinators have been identified to a plant species more as a fixed character rather than a dynamic one.

We studied pollination ecology of *Elettaria cardamomum* (L.) Mason (cardamom) at seven locations along the Western Ghats and *Amomum subulatum* Roxb. (large cardamom) at two locations in the North-East Himalayas, to bring out temporal and spatial variation, if any, on pollinators and their pollination efficiency. *E. cardamomum*, attracted 18 floral visitors in different study sites; of these seven species are effective pollinators, *Apis cerana*, *A. dorsata* and *Trigona iridipennis* being the major ones. They showed marked variation across locations and the flowering season (early, peak and late flowering). *E. cardamomum* is thus a typical generalist attracting a number of species for pollination services. This gives the species flexibility to withstand spatio-temporal fluctuations in pollinator abundance or availability. *A. subulatum* attracted only two visitors, bumblebee (*Bombus haemorrhoidalis*) and one of the honeybee species (*Apis cerana*). In both the study sites, bumblebees were the only effective pollinators and *A. cerana* was a pollen robber. Thus this species is a specialist attracting only one species for pollination services and did not show spatial and temporal variations. Implications of these studies on pollination ecology of these two species are discussed.

**Key words:** *Amomum subulatum*, cardamom, *Elettaria cardamomum*, large cardamom, pollination ecology.