

Floral biology and breeding system of *Osbeckia octandra* (L.) DC.

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Heen Bowitiya (*Osbeckia octandra*- Melastomataceae) is an endemic, medicine plant in Sri Lanka. Due to paucity of reproductive biological information, the present study aimed to investigate the floral biology of *O. octandra* in relation to pollination and to identify its breeding system. Floral level phenological changes; timing and duration of anther dehiscence, stigmatic receptivity; UV color attractants and movement of the style were investigated from 25 flowers in 10 individuals. Pilikuththuwa forest and abandoned lands. Effective pollinators were observed and identified among collected floral visitors. Pollen histochemistry was analyzed using Iodine, Sudan III and Ninhydrin solutions. Viability of pollen after anther dehiscence and under storage conditions (at 4 °C and 0 °C); and *in vitro* pollen germination was tested using sucrose series (0 - 25%). Breeding system was estimated by Pollen Ovule (P:O) ratio, Out Crossing Index (OCI) and controlled pollination experiments with minimum of 60 replicate flowers for each treatment.

Purple color petals and yellow anthers increased pollinator attraction. Yellow anthers were clearly visible under UV which enhanced attraction of pollinators. While inflorescences of *O. octandra* borne with mirror image flowers, the flowers were monomorphic enantiostyous and herkogamous. Monomorphic enantiostyly did not significantly affect natural pollination success (one way ANOVA, $p < 0.05$). While flexistyly at closing stage of flower facilitated autogamy, geitonogamy was facilitated by simultaneous occurrence of pistillate and staminate phase flowers within an individual.

Pollen of *O. octandra* were strachless, however, it contained lipids and amino acids. Stigma was papillate. The optimum sucrose concentration and required duration for the highest pollen germination was 15 % and 3 hrs respectively. Pollen collected at 8.30 a.m. showed the highest pollen germination. Pollen storage at 4 °C and 0 °C were not appropriate. The effective pollinators were bees (*Amegilla* spp; Hymenoptera). The OCI value (4) and P:O ratio (1951 .89+23.45) indicated flowers were partially self-compatible, very high demand for pollinators and its facultative xenogamy. The highest fruit set was obtained from natural pollination (66.67+3.40) and was not significantly different with controlled cross pollination (61.67+1.69). Artificial autogamy (3.33+1.69) was not significant different from geitonogamy (3 1.67+1.69). The *index of self-incompatibility* value of *O. octandra* (0.63) revealed that flowers were partially self incompatible. The findings of this study strengthened the knowledge of reproductive biology and breeding system of *O. octandra*.

Keywords: *Osbeckia octandra* / Floral biology / breeding system / pollination / pollen germination