

NECTAR RETRIEVAL BY INSECT SWARM DOES NOT RESULT IN POLLINATION OF *LYONIA OVALIFOLIA* FLOWERS IN THE KUMAON HIMALAYA, INDIA

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Introduction

Lyonia ovalifolia (Wall) Drude (Ericaceae) is a deciduous woody shrub or small tree. It has oval leaves and white hermaphrodite pendulous flowers. It attains a height upto 7 metres. It is native to the Himalaya in India, Nepal and Bhutan (Brandis, 1874) and Pakistan, Bangladesh, Myanmar, China, Cambodia, Thailand, Vietnam and Malaysia (KEW B.D. accessed on 20.ix.2020).

In the Kumaon Himalaya, it is known as *Aiyar* and grows in the belt between 600 m to 3,500 m (Osmaston, 1927). It is found in subtropical evergreen forests with rhododendron (*Rhododendron arboreum* Smith) and oak (*Quercus leucotrichophora* A. Camus) as dominant species.

Maheshkhan Reserve Forest is a subtropical broadleaf evergreen forest in the Gagar range of Nainital district in Uttarakhand. *L. ovalifolia* is a common plant at Maheshkhan Reserve Forest (2080 m), Nainital district. The plants are scattered singly in the forest with other species including *Aesculus indica* (Wall. ex Cambees.) Hook.Sapindaceae), *Myrica esculenta* Buch. Ham. ex D. Don (Myricaceae), *Pinus roxburghii* Sarg. (Pinaceae), *Daphne papyracea* Wall.ex G. Don (Thymelaeaceae), *Indigofera heterantha* Brandis (Fabaceae), etc. The forest is in good condition with perennial streams and therefore, high humidity.

Methodology

The forest was visited on 11.vi.2020, 12.vi.2020 and 27.vi.2020 when the flower visitors were observed and studied. On

11.vi.2020, Maheshkhan forest was visited between 10 am to 4 pm and a flowering *Lyonia* tree was observed with hundreds of bugs of a single species, *Physopelta gutta* (Burmeister, 1834) (Hemiptera: Largidae) on it. The bugs were largely restricted to a single tree, although other trees of the species were flowering nearby. On the next visit to Maheshkhan, i.e.12.vi.2020 from 10 am to 4 pm, some more trees of *Lyonia* were flowering but most of the bugs were on the original tree. In addition, two butterfly species were also feeding on the flowers. Only a few bugs were present on another tree which was about 30 m away from the original tree.

On the third visit, i.e. 27.vi.2020 from 3 pm to 6 pm, the flower petals of the original tree had fallen and the calyces of all the flowers were still attached to the plant. All the bugs had moved on to the next tree, which earlier had only a few bugs despite being in full bloom. It was unchanged to superficial view, yet the bugs had suddenly found it attractive and moved to it.

On 7.viii.2020, during the visit to Maheshkhan, the fruit set of the two trees was observed and photographed. There were no flowers and therefore no insects on the trees.

All the visitors were photographed with their proboscises inserted into the flowers. The bugs were on the flowers from 10 am when observations began till 6 pm. Experience with moth trapping in the western Himalaya confirms that these bugs are also active throughout the night, since they tend to arrive

in large numbers throughout the night at moth traps (Peter Smetacek, *pers. comm.*).

Remarks

The observations here show that in *L. ovalifolia*, the flowers bloom together but mature asynchronously on trees and the insects are attracted accordingly and feed on them. So, in a way, cross pollination is effected, so that all the insects are on one tree for a few days and then move on to the other, taking with them the pollen from the first tree.

The fruit set was low; most racemes contained 15 to 25 flowers, but the fruit set was 0 to 10 fruit per raceme. The racemes with 5< calyces were very few. This was not proportionate to the huge number of bugs on the first *Lyonia* tree nor was fruit set on the second tree found to be any better.

The trees were not observed at night.

Discussion

The large number of *P. gutta* with pollen on their mouthparts suggested that there would be a proportionately large fruit set, but observations belied these assumptions.

It therefore seems that *P. gutta* is not the pollinator of choice of *L. ovalifolia*. This confirms what is often observed, that a large

number of insects visit flowers without performing any useful task for the flower. In the case of *L. ovalifolia*, the pollinator of choice is as yet unknown, but it is certainly not *P. gutta*, regardless of the quantity of individuals swarming over the flowers. Except for the two butterflies, who were also probing the flowers for more than twenty minutes, no other insects were observed on the flowers. The possibility of the pollinator being nocturnally active cannot be ruled out.

Acknowledgement

The author is grateful to the Officers and Staff of the Uttarakhand Forest Department for permission and support in this study.

References

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Table1: The insect visitors found in *Lionia*

S.N	Visitor	Scientific name	Common name	Family
1	Butterfly	<i>Dodona durga</i> (Kollar, [1844])	Common Punch	Riodinidae
2	Butterfly	<i>Rapala manea</i> (Hewitson, 1863)	Slate Flash	Lycaenidae
3	Bug	<i>Physopelta gutta</i> (Bu rmeister, 1834)	Gutta bug	Largidae



Fig.1: *Dodona durga* on *Lyonia*



Fig.2: *Rapala manea* on *Lyonia*



Fig.3: *Physopelta gutta* on *Lyonia ovalifolia*



Fig.4: Fruit set after pollination in *Lyonia ovalifolia*



Fig.5: *Physopelta gutta* with proboscis inserted in flower



Fig.6: Racemes with no calyces, showing low pollination success



Fig.7: Racemes showing calyces after petals shed



Fig.8: Racemes with sepals remaining after unpollinated calyces were shed



Fig.9 &10: *Physopelta gutta* attracted to artificial light, Mussoorie