

SEVEN TYPICALLY FRUIT AND SAP FEEDING NYMPHALID BUTTERFLIES RECORDED AT FLOWERS IN THE KUMAON HIMALAYA, INDIA

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Introduction

Based on feeding habits, butterflies can broadly be divided into those that visit flowers for nectar and those that do not. Bhuyan *et al.* (2014) recorded two species of typically fruit and sap feeding butterflies, i.e. *Sephisa dichroa* (Kollar, [1844]) and *Charaxes solon* (Fabricius, 1793), visiting flowers of *Prunus cerasoides* D. Don and *Lantana camara* L. respectively in India. This is seen as a major shift in behavior triggered by the lack of wild fruit, sap, dung and carrion during appropriate seasons in the area inhabited by these butterflies. As might be expected, such a shift would not be restricted to one or two species. In the present paper, we report further records of typically fruit and sap feeding butterflies feeding on flower nectar, thus confirming that the previous observations were not isolated events.

Observations were undertaken irregularly from March, 2014 to April, 2019 at the Butterfly Research Centre, Jones Estate, Bhimtal in Uttarakhand, India, mainly on several bushes of *Buddleia asiatica* Lour. growing together to form a spinney. The spinney was planted during the 1970s. Some butterflies were also recorded at flowers of *Ageratina adenophora* (Spreng) R.M. King & H. Rob., an invasive species which is a surprisingly popular plant for insect flower visitors.

Although the forest around the study site is relatively good, having been well protected over the last 70 years, yet forest and over grazing have decimated the herbs, shrubs and bushes that originally covered the area and perhaps offered a variety of options for butterflies. Tree sap usually oozed from wounds made by birds and beetle larvae in healthy trees. Perhaps there are fewer of these and therefore correspondingly fewer points where sap is available for butterflies.

Almost all the butterflies that do not normally visit flowers belong to the Nymphalidae and Lycaenidae. In the present study, we report several Nymphalidae that now often visit flowers. So far, we have not recorded any of the non-nectar feeding Lycaenidae at flowers.

Observations

Buddleia asiatica, which is also known as the Butterfly Bush, is a native plant that flowers from February to April in the Western Himalaya. Although it is a very popular plant with butterflies and moths, seeds do not form, indicating that the insect visits are nectar gathering events that do not lead to the production of fertile seeds. Care was taken to include only those species where it was possible to photograph the butterfly with its proboscis inserted into the flower. The identity of specimens of *Mycalesis mineus* were verified by examining the distinctive bands on their wings. Usually, the species listed below visited the flowers on more occasions

than listed, but only the photographed specimens are treated to reduce the possibility of misidentified species being included in the list.

On 4.iv.2014, a Banded Treebrown (*Lethe confusa* Aurivillius, 1898) was observed feeding on flowers of *Eupatorium adenophora* on three consecutive days, spending up to 20 minutes at each session during the morning hours.

On 4.iv.2014, a Dark Brand Bushbrown (*Mycalesis mineus* (Linnaeus, 1758)) was observed feeding on flowers of *Eupatorium adenophora* for up to 5 minutes at a session.

On 23.ii.2017, a Blue Admiral (*Kaniska canace* (Linnaeus, 1763)) was observed feeding on flowers in the buddleia spinney for over 20 minutes.

On 5.iii.2017, a male Gaudy Baron (*Euthalia lubentina* (Cramer, [1777])) was observed feeding on different sprays of buddleia blossoms for more than 30 minutes.

On 5.iii.2017, a Blue Admiral (*K. canace*) was observed feeding on the same bush for over 15 minutes.

On 16.iii.2017, a Common Evening Brown (*Melanitis leda* (Linnaeus, 1758)) was observed feeding on buddleia for 10 minutes.

On 21.iii.2017, a Dark Evening Brown (*Melanitis phedima* (Cramer, [1780])) was observed feeding on buddleia blossoms for 10 minutes.

On 28.iii.2017, a Banded Treebrown (*L. confusa*) was recorded at buddleia blossoms, where it fed for over 20 minutes.

On 2.iv.2017, a Dark Brand Bushbrown (*Mycalesis mineus*) was recorded at the buddleia blossoms, where it fed for over 20 minutes.

On 14.iii.2019 a Blue Admiral (*K. canace*) spent more than ten minutes on Buddleia flowers.

On 5.iv.2019, a male Siren *Hestina persimilis* (Westwood, [1850]) spent fifteen minutes probing Buddleia flowers.

On 6.iv.2019, a female Siren (*H. persimilis*) spent more than ten minutes on the flowers of Buddleia.

Discussion

Butterflies are attracted to plants whose nectar contains between 10 to 30% sugar, since the viscosity of thicker solutions will reduce the efficiency of the proboscis (Kingsolver, 1985). Butterflies that inhabit shady areas, such as the Morphinae and Satyrinae, tend to obtain their nutrition in the adult stage from tree sap and over ripe fruit, while butterflies with thick thoraxes housing powerful flight muscles, especially the Charaxini and Apaturinae, prefer odorous substances like carrion and animal droppings in addition to overripe fruit and tree sap (de Niceville, 1886, Wynter-Blyth, 1957). However, there are exceptions within the Apaturinae, such as *Hestinalis nama* (Doubleday, 1844), which visits flowers regularly, in addition to tree sap, over ripe fruit and rotting substances (*pers. obs.*). The Nymphalinae are usually sun loving flower feeders, but *Kaniska canace* never visits flowers while *Nymphalis xanthomelas* (Esper, 1781) visits both flowers and tree sap. Agnihotri *et al.* (2020) reported *K. canace* on flowers of *Rhododendron arboreum* in the Kumaon Himalaya. In the Limenitidinae, the *Euthalia* Huebner, [1819] genus usually avoids flowers and feeds on tree sap and fallen fruit. The appearance of *E. lubentina* on buddleia is certainly unusual. Among the Satyrinae, the visits of three genera to flowers is unusual, for *Mycalesis* Huebner, 1818, *Melanitis* Fabricius, 1807 and the white striped *Lethe* Huebner, [1819] species (*L. rohria* (Fabricius, 1787), *L. europa* (Fabricius, 1775), *L. confusa*, *L. isana* (Kollar, [1844]), *L. verma* (Kollar, [1844])) never visit flowers but prefer tree sap and over ripe fruit. The Apaturinae usually do not visit flowers, with the exception of species like *Hestinalis nama*. Bhuyan *et al.* (2014) added *Sephisa dichroa* to this list. The present paper shows both sexes of *H. persimilis* visiting flowers. It is noteworthy

that these butterflies have not been found at flowers at other times of the year. In the western Himalaya, there are no trees or bushes that would produce fruit in February, March and the first half of April (Osmaston, 1927). They might have obtained their nutrition from tree sap in earlier years, but now they appear to have shifted to flower nectar.

Conclusion

The shift of energy sourcing in the adult stage of some Nymphalid butterfly species in the western Himalaya suggests that their traditional sources of energy, vis., tree sap and over ripe fruit, are not available any more in the first quarter of the year. In the present study, the butterflies have been reported on *Buddleia asiatica*, a native plant, and *Eupatorium adenophora*, an exotic plant. Efforts to re-establish forests on degraded lands should take into consideration the requirements of all parts of the native community, so that native plants that supplied nutrients to spring species are discovered and re-introduced.

References

Agnihotri, A., A. Daniel & P. van der Poel. 2020. Preliminary observations on visitor spectrum of *Rhododendron arboreum* in the

Kumaon Himalaya, India. *Bionotes*. 22(1):29-31.

Bhuyan, R., P. B. Pandhakar & P. Smetacek. 2014. Two typically fruit and sap feeding Indian butterflies shift to flower nectar (Lepidoptera: Nymphalidae) *Nachr. entomol. Ver. Apollo*, N. F. 34 (4): 218–220.

de Nicéville, L. 1886. *The butterflies of India, Burmah and Ceylon, Vol. 2*. Calcutta Central Press, Calcutta. 332 pp., 24 pls.

Evans, W. H. 1932. *The Identification of Indian Butterflies*. 2nd ed. *Bombay Natural History Society, Bombay*. x + 454 pp., 32 pl.

Kingsolver, J. G. 1985. Butterfly engineering. *Scientific American* 253: 106–113.

Peile, H. D. 1937. *A guide to collecting butterflies of India*. Staples Press, London. 14 + 312 pp., 25 pls.

Woodhouse, L. G. O. 1950. *The butterfly fauna of Ceylon*. Government Publications Bureau, Colombo. 133 pp., 48 pls.

Wynter-Blyth, M. A. 1957. *Butterflies of the Indian region*. *Bombay Natural History Society, Bombay*. xx + 523 pp., 72 pls.

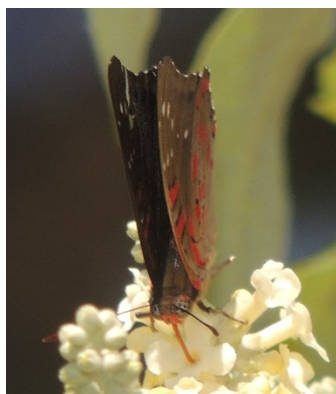


Fig.1: *Euthalia lubentina*



Fig.2. *Kaniska canace*



Fig.3. *Hestina persimilis* female



Fig.4. *Hestina persimilis* male



Fig.5. *Letho confusa*



Fig.6. *Melanitis leda*



Fig.7. *Melanitis phedima*



Fig.8. *Mycalesis mineus*