




Original Article

New Mistletoe host for the butterfly herbivory in an island ecosystem

Neelam Purti ^{a,b}, Lal Ji Singh ^c  , Arun K. Pandey ^b


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Highlights

- New Mistletoe host for the butterfly herbivory has been recorded here for the first time from Andaman and Nicobar Islands, India by Neelam Purti, Lal Ji Singh and Arun K. Pandey.

Abstract

Hemi parasitic Loranth *viz.* *Dendrophthoe curvata* (Blume) Miq., *D. glabrescens* (Blak Barlow), *D. longensis* L.J. Singh and *Macrosolen andamanensis* L.J. Singh has been recorded here for the first time as new host plants for larvae of *Delias hyparete indica* (Wallace, 1867) of Pieridae and *Tajuria cippus cippus* (Fabricius, 1798) of Lycaenidae butterfly in the Andaman and Nicobar Islands, India. Impact of herbivory of these butterflies on Loranth host plants is assessed along with its life history and conservation status of hosts is

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described in great detail. *D.longensis* and *M.andamanensis* are critically endangered and endemic to the Andaman and Nicobar Islands.

Keywords

butterfly; conservation; herbivory; Loranthaceae; Lycaenidae; Pieridae

Introduction

Mistletoe is the well-known obligate hemi parasitic plants with a wide range of host trees or shrub in the sandalwood order Santalales. It is polyphyletic group of parasitic flowering plants with worldwide distribution except Antarctica and represented by five families Loranthaceae, Viscaceae, Mimosodendraceae, Erimolepidaceae and Santalaceae. Loranthaceae Juss. is well recognized showy mistletoe family, evolved on the Gondwanan supercontinent and subsequently spread from Antarctica to South America, Australia, New Zealand, Asia and Africa. Loranthids are diversified in host selection and most of the infestations have been recorded on dicotyledonous tree species worldwide in tropical and temperate region including India ([Singh, 2013a](#), [Singh, 2013b](#), [2015](#), [2021](#), [2023](#); [Sivaramakrishna et al. 2021](#)). Despite the hemi parasitic habit of Loranthids, it has severe threat by pests of insects ([Wynter-Blyth 1957](#); [Braby 1997,2005](#); [Igarashi and Fukuda 1997](#); [Veenakumari et al. 1997](#); [Kunte 2000](#); [Braby and Nishida 2007, 2010](#); [Jayasinghe et al. 2021](#); [Salaga et al. 2021](#), [Singh 2023](#)). Various studies analyses that the butterfly and their associations with host plants have a significant links with phylogeny ([Ferrer-Paris et al. 2013](#)) and the apprehensive need to conserve the butterfly's dependence on the host plants ([Marler et al., 2012a](#), [Marler et al., 2012b, 2017](#); [Purti et al. 2022](#), [Purti et al., 2023a](#), [Purti et al., 2023b, 2024](#)), however, relatively little is known about insects associated with the mistletoe species in India including the Andaman and Nicobar Islands (ANI). ANI is one of the hotspots of biodiversity with 572 Islands (N 6°45' to 13°41' and E 92°12' to 93°37' and recognized as a rich and unique phyto-geographical region in India with higher number of endemism ([Singh et al. 2014](#); [Singh and Misra 2020](#); [Singh and Ranjan 2021](#); [Singh et al., 2021a](#), [Singh et al., 2021b](#)) where more systematic explorations will be required to elucidate the behavior of the pest and their associations with mistletoes species offered as larval food. The study will influences fecundity which will be relevant for the study, management, and conservation of hemi parasitic plants as well as butterflies in India. Due to which the present study was undertaken.

According to recent taxonomic enumeration by [Singh \(2021\)](#) c. 80 genera recorded in Loranthaceae worldwide. In India the family is represented by 9 genera viz.: *Dendrophthoe* Mart., *Elytranthe* (Blume) Blume, *Helicanthes* Danser, *Helixanthera* Lour., *Macrosolen* (Blume) Rchb. *Scurrula* L., *Septemeranthus* L.J. Singh, *Taxillus* Tiegh., and *Tolypanthus* (Blume) Rchb. among them 5 genera are recorded from the ANI'. During the field study conducted during 2019–2023 observed that the most of the population of *Dendrophthoe* and *Macrosolen* on hosts' plants such as *Mangifera*, *Psidium*, *Ficus* species were recorded and which in turn were severely damaged by butterfly larvae.

In the ANI the genus *Dendrophthoe* is represented by 04 species *D. curvata* (Blume) Miq., *D. glabrescens* (Blakeley) Barlow, *D. lalji* P. Sivaramakrishna, P. Yugandhar & G.A. Ekka, and *D. longensis* L.J. Singh and *Macrosolen* represented by 05 species viz. *Macrosolen ampullaceus* (Roxb.) Van Tiegh, *M. andamanensis* L.J. Singh, *Macrosolen cochinchinensis* (Lour.) Van Tiegh., *M. globosus* (Roxb.) Van Tiegh., *M. melintangensis* (Korth.) Miq., ([Singh, 2013a](#), [Singh, 2013b](#), [2021](#), [2023](#); [Singh et al., 2021a](#), [Singh et al., 2021b](#); [Sivaramakrishna et al. 2021](#)). In the present study 3 species of *Dendrophthoe* and 01 species of *Macrosolen*, *M. andamanensis* L.J. Singh were observed to be infested by the larvae of butterflies of *Delias hyparete indica* ([Wallace 1867](#)) and *Tajuria cippus cippus* ([Fabricius 1798](#)) respectively. Insect herbivory in these mistletoes is described here in great detail for the first time from the ANI. The flora of Andaman group of Islands is closely related to the taxa of South-East Asia and mainland India while those of the Nicobar group of Islands exhibits general affinities towards the taxa of Malaysia ([Singh et al. 2014](#), [Singh et al., 2021a](#), [Singh et al., 2021b](#); [Singh and Misra 2020](#); [Singh and Ranjan 2021](#)).

D. curvata, *D. glabrescens*, *M. andamanensis* represents the first record of Loranth mistletoes as larval food for butterfly herbivory. Although the preliminary account on first record of a mistletoe species in Indian Island's serving as the host plant and offered as larval food influences fecundity of caterpillars of *Delias eucharis* was recorded on *Dendrophthoe longensis* by [Singh \(2023\)](#).

Material and methods

We observed live plant and butterfly specimens through eight field trips to localities where natural populations occur Memyo, Manglutan, Guptapara, Nayasahar, Little Andaman, Wandoor, Long Island, Shaheed Dweep, Swaraj Dweep, Wrightmyo, Haddo throughout 2019–2023. Eggs/larvae along with the infested parasitic plants of *Dendrophthoe curvata*, *D. glabrescens*, *D. longensis*, and *Macrosolen andamanensis* were collected. Field surveys were conducted to quantify the impact of the larvae herbivory in the type localities. GPS of the

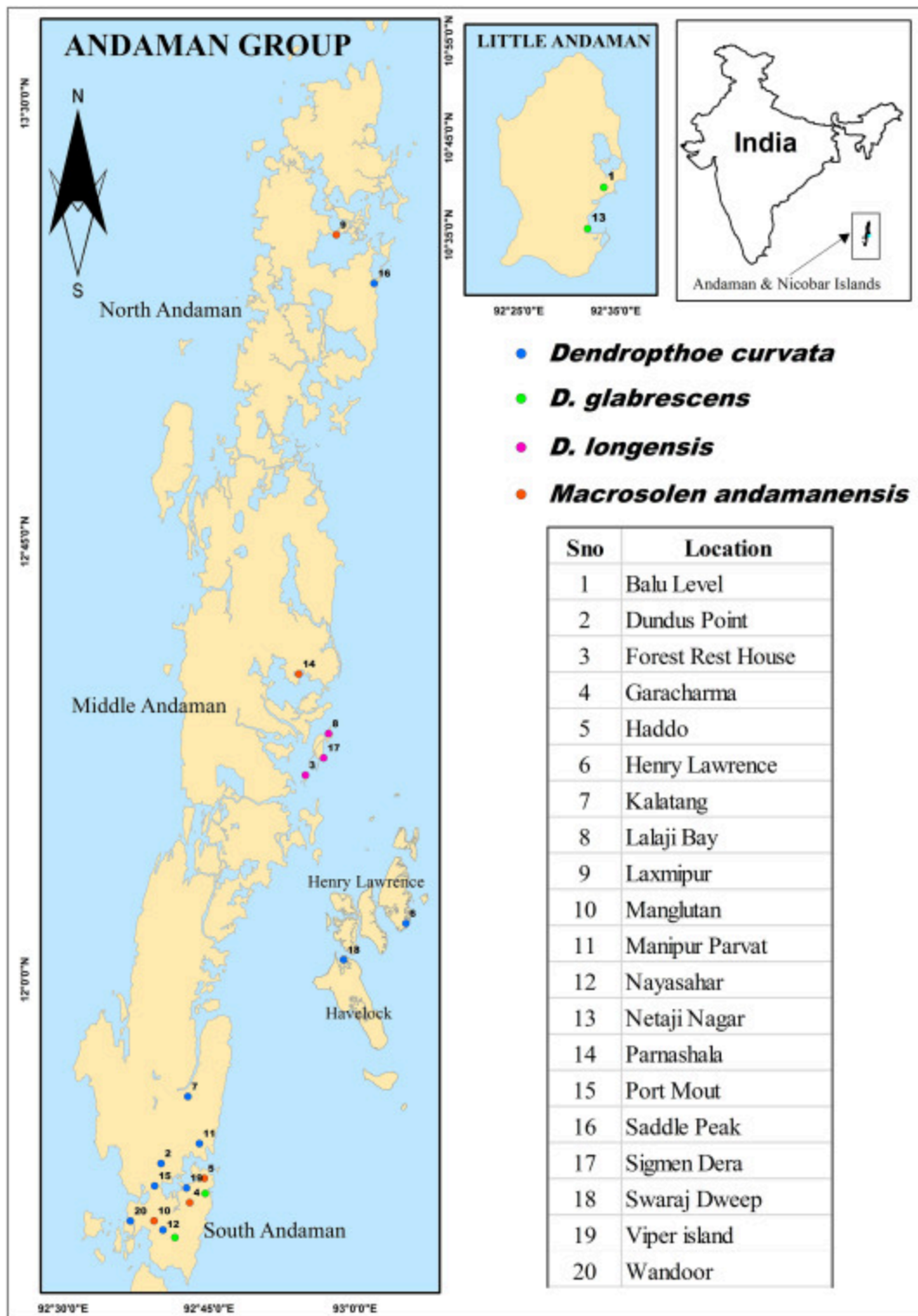
localities of wild population in the ANI, India were recorded using Garmin Montana 680. Eggs/larvae along with the host plants were placed in a separate sterile labeled plastic container. The droppings of the larvae were cleaned periodically and fresh young leaves of the host plants were replaced. The immature stages of the larvae were monitored daily, documented, and photographed. The eggs and the larvae on the host plants were observed and photographed under a stereomicroscope (Olympus SZ 61) at the Andaman and Nicobar Regional Centre of Botanical Survey of India.

Observations and result

([Figure 1](#), [Figure 2](#), [Figure 3](#), [Figure 4](#), [Figure 5](#), [Figure 6](#), [Table 1](#)).

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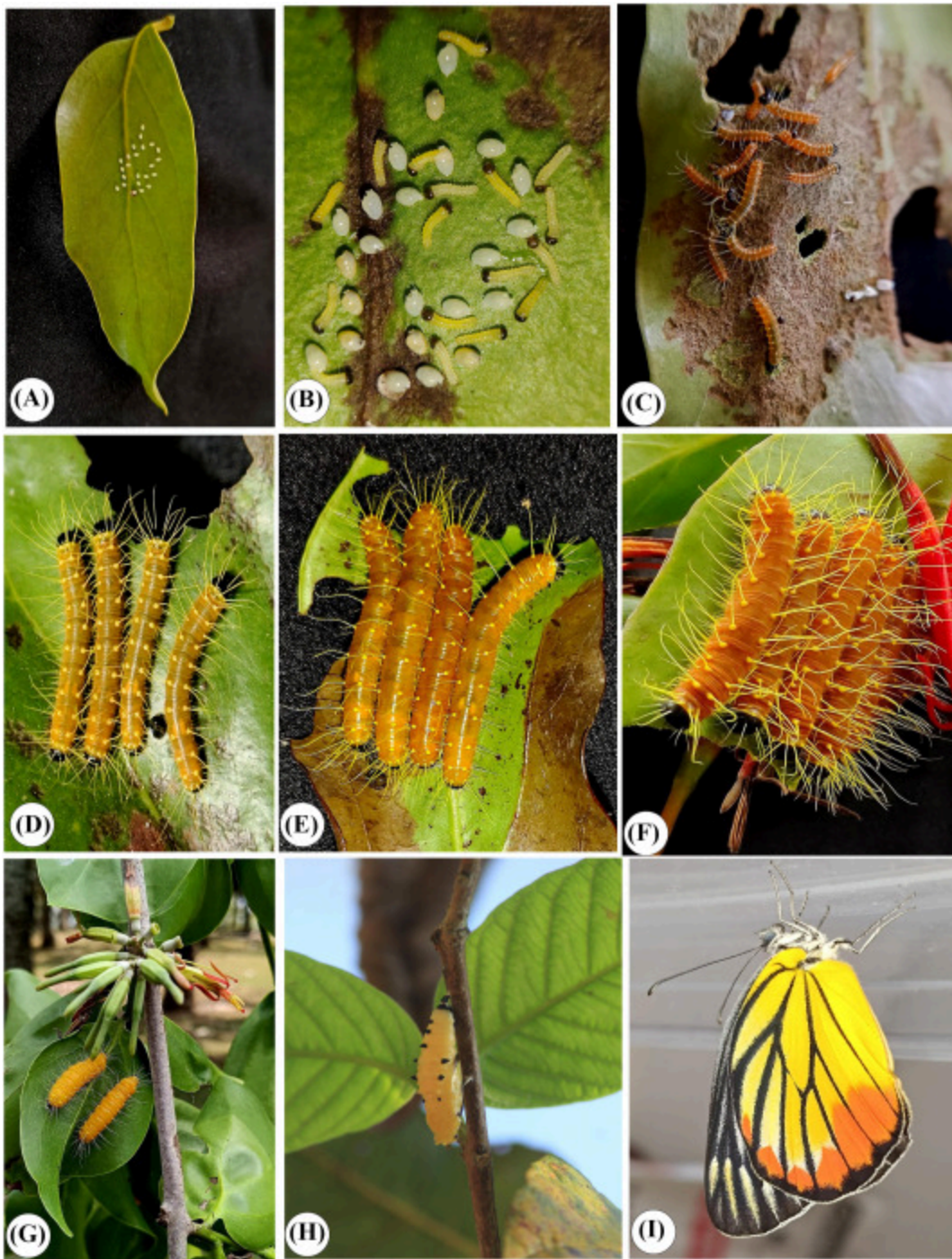
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Figure 1. Distribution and study localities of *Mistletoe* species in the present study.

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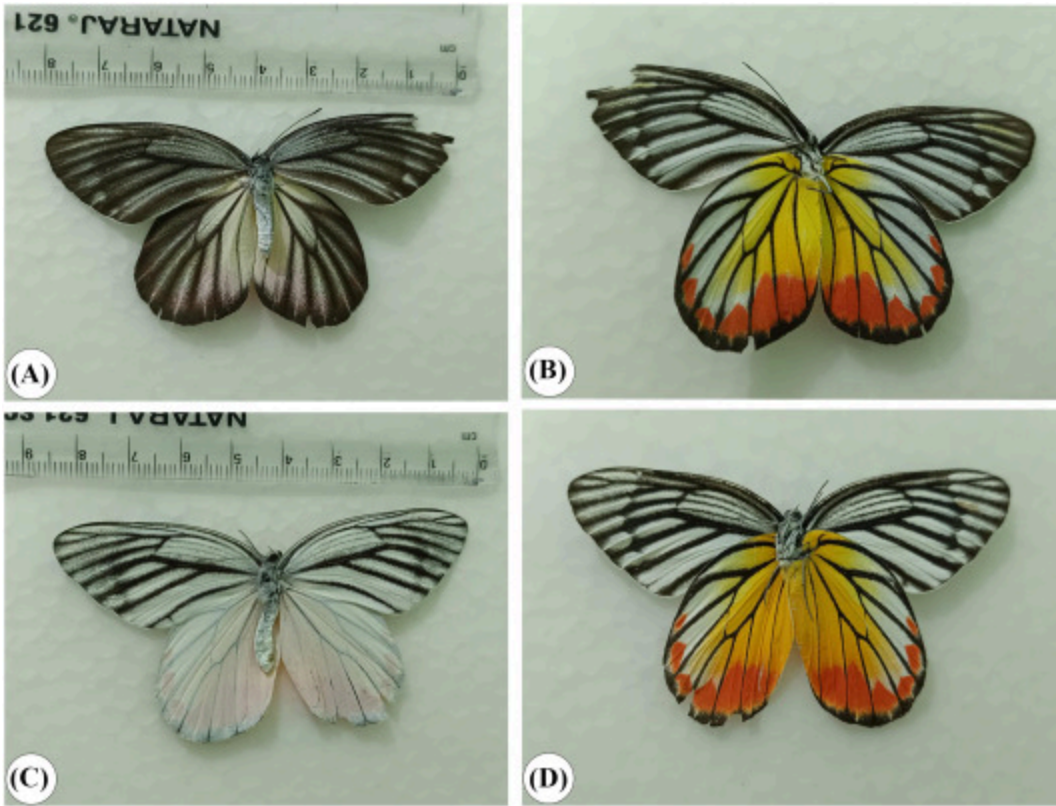
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Figure 2. Life history of *Delias hyparete indica*. (A) Eggs on upper side of leaf lamina of *Dendrophthoe curvata*. (B) First instar larva. (C) Second instar larva. (D) Third instar larva. (E) Fourth instar larva. (F) Fifth instar larva. (G) Pre pupa. (H) Pupa. (I) Adult butterfly.



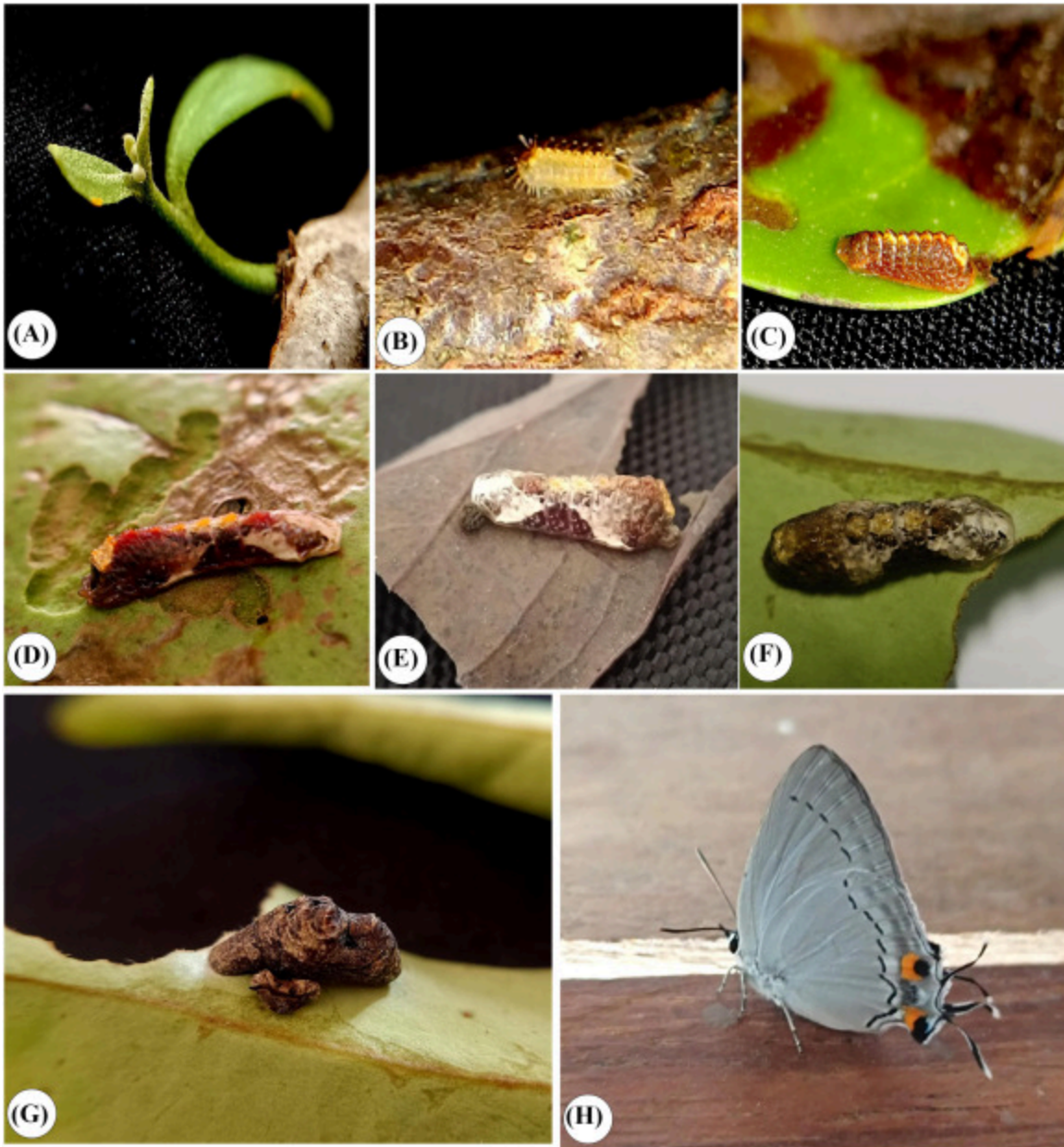
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Figure 3. *Delias hyparete indica*. (A) Female upperside. (B) Female underside. (C) Male upperside. (D) Female underside.

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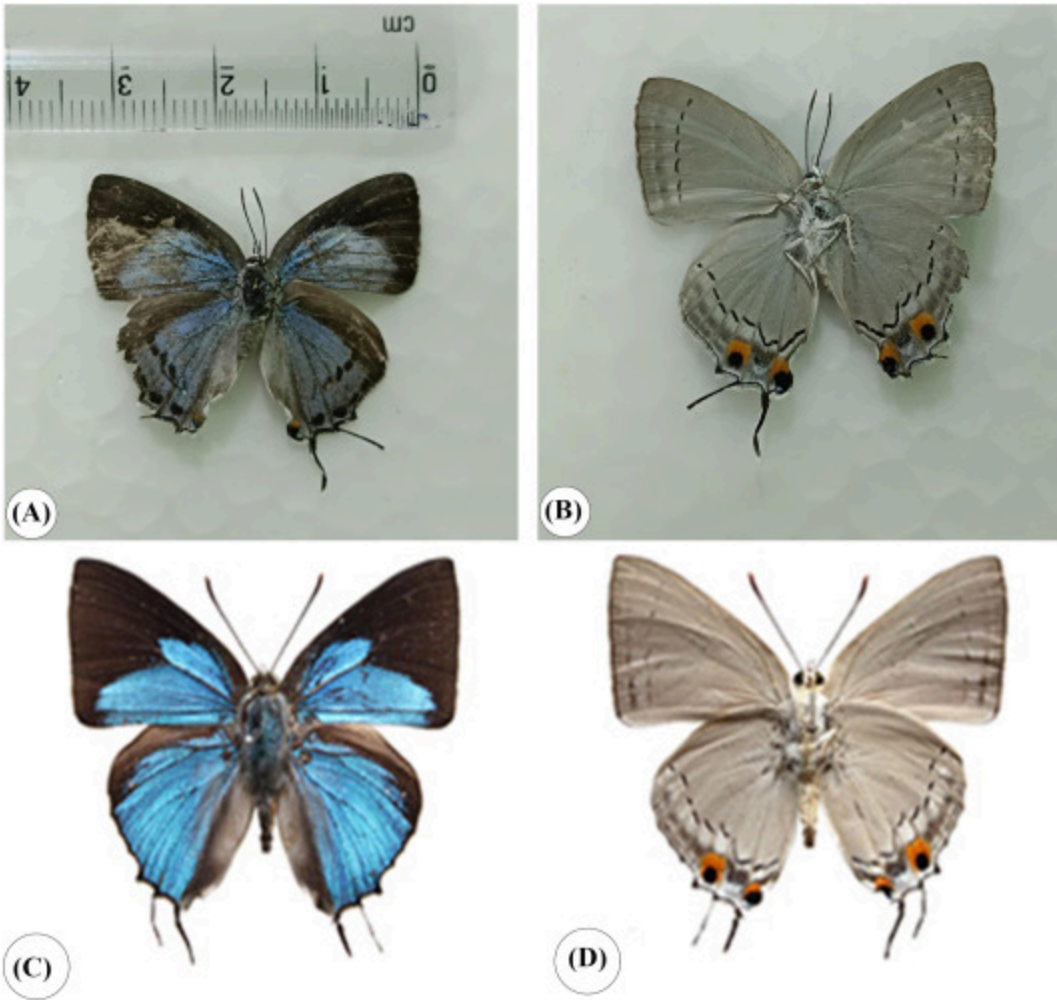
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Figure 4. Life history of *Tajuria cippus cippus*. (A) Egg on the leaf axis. (B) First instar larva. (C) Second instar larva. (D) Third instar larva. (E) Fourth instar larva. (F) Pre pupa. (G) Pupa. (H) Adult butterfly.

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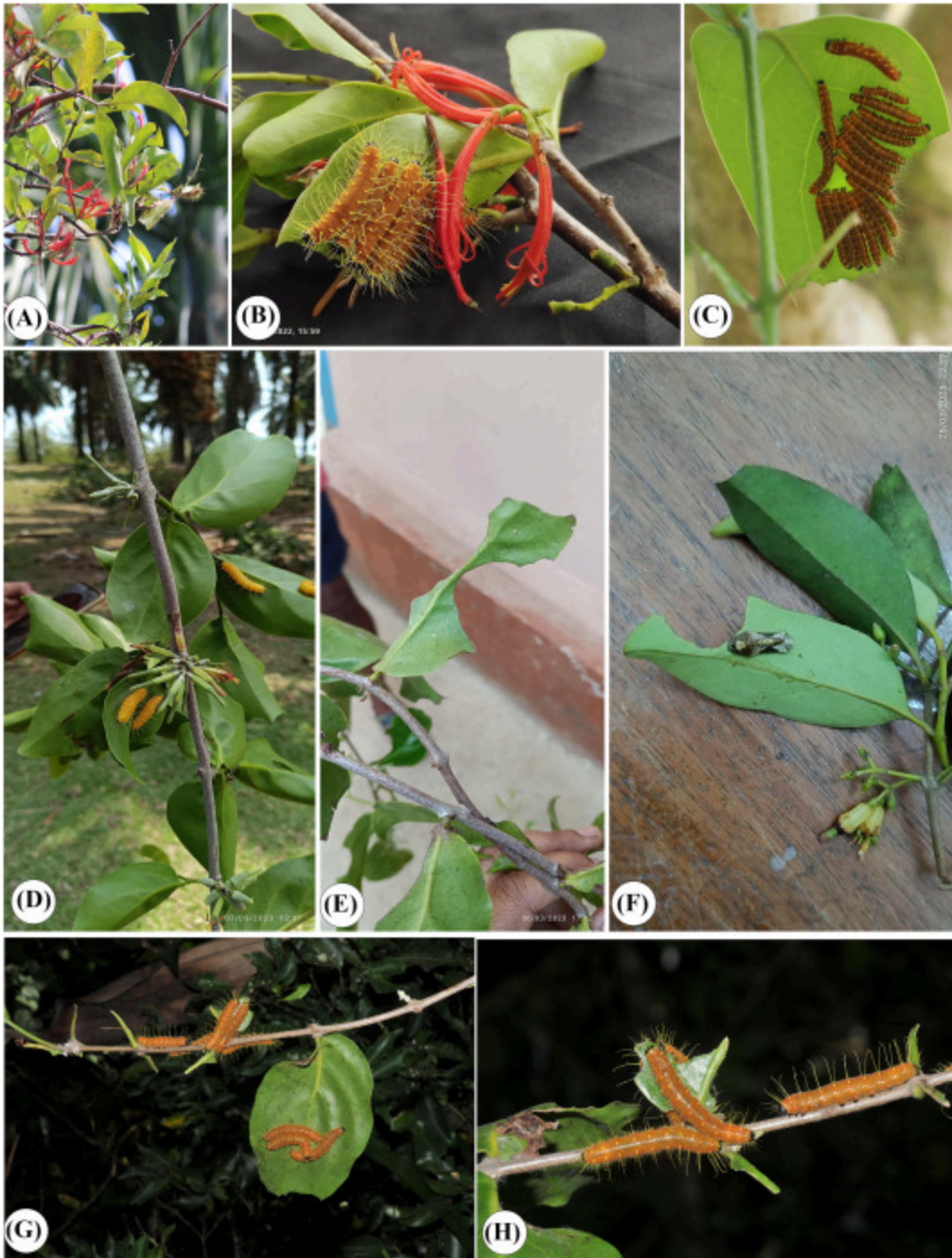
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Figure5. Upperside view of *Tajuria cippus cippus* (A) & (B) female. (C)–(D) Male.

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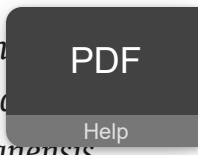


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Figure 6. Impact of larvae on Mistletoe host plants. (A–C) Larvae of *Delias hyparete indica* damaging the leaves of *Dendroepthoe curvata*. (D–E) Larvae of *Delias hyparete indica* on *Dendroepthoe glabrescens*. (F) Larvae of *Tajuria cippus cippus* on *Macrosolen andamanensis*. (G–H) Larvae of *Delias hyparete indica* feeding on *Dendroepthoe longensis*.

Table 1. Butterfly species that are recorded for Mistletoe host plants.



Family	Scientific name	Mistletoe plant species	Place where reported	Reference
Lycaenidae	<i>Arhopala centaurus</i> (Fabricius 1775)	<i>Dendrophthoe vitellina</i> (F. Muell.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>Candalides gilberti</i> (Waterhouse 1903)	<i>Decaisnina signata</i> (F. Muell. ex Benth.)	Australia	Orr & Kitching 2010
Lycaenidae	<i>C.margarita</i> (Semper 1879)	<i>Amyema congener</i> (Sieber ex Schult. & Schult. f.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>C.margarita</i> (Semper 1879)	<i>Amyema conspicua</i> (F.M. Bailey) Danser	Australia	Orr & Kitching 2010
Lycaenidae	<i>C.margarita</i> (Semper 1879)	<i>Amyema miquelii</i> (Lehm. ex Miq.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>C.margarita</i> (Semper 1879)	<i>Amylothecha dictyophleba</i> (F. Muell.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>C. margarita</i> (Semper 1879)	<i>Benthamina alyxifolia</i> (F. Muell. ex Benth.)	Australia	Orr & Kitching 2010
Lycaenidae	<i>C.margarita</i> (Semper 1879)	<i>Dendrophthoe curvata</i> (Blume) Miq.	Australia	Orr & Kitching 2010
Lycaenidae	<i>C.margarita</i> (Semper 1879)	<i>Dendrophthoe vitellina</i> (F. Muell.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>C.margarita</i> (Semper 1879)	<i>Muellerina celastroides</i> (Sieber ex Scult & Scult. f.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>Catapaecilma major myosotina</i> (Fruhstorfer 1912)	<i>Dendrophthoe falcata</i> (L.f.) Ettingsh.	Sri Lanka	Jayasinghe et al. 2021
Lycaenidae	<i>Creon cleobis</i> (Godart 1824)	<i>Loranthus elasticus</i> Desv.	India	Robinson 2023
Lycaenidae	<i>C.cleobis</i> (Godart 1824)	<i>Loranthus parasiticus</i> (L.) Merr.	Hong Kong	Robinson et al. 2023

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Family	Scientific name	Mistletoe plant species	Place where reported	Reference
Lycaenidae	<i>C. cleobis</i> (Godart 1824)	<i>Macrosolen cochinchinensis</i> (Lour.) Tiegh.	Hong Kong	Robinson et al. 2023
Lycaenidae	<i>C. cleobis cleobis</i> (Godart 1824)	<i>Helicanthes elasticus</i> (Desv.) Danser	India	Davidson et al. 1896 , Bell 1919, Wynter-Blyth 1957 , Robinson et al. 2010 , Nitin et al. 2018
Lycaenidae	<i>C. cleobis queda</i> (Corbet 1938)	<i>Loranthus elasticus</i> Desv.	Hongkong	Robinson et al. 2023
Lycaenidae	<i>Deudorix jacksoni</i> (Talbot 1935)	<i>Phragmanthera usuiensis</i> (Oliv.) M. G. Gilbert	East Africa	Robinson et al. 2023
Lycaenidae	<i>Eliotia jalindra</i> (Horsfield 1829)	<i>Loranthus elasticus</i> Desv.	India	Robinson et al. 2023
Lycaenidae	<i>E. jalindra burbona</i> (Hewitson 1878)	<i>Loranthus elasticus</i> Desv.	West Malaysia	Robinson et al. 2023
Lycaenidae	<i>E. jalindra</i> (Horsfield 1829)	<i>Dendrophthoe elastica</i> (Desr.) Danser	India	Kasambe 2016
Lycaenidae	<i>Hypochrysops cyane</i> (Waterhouse & Lyell 1914)	<i>Amyema miquelii</i> (Lehm. ex Miq.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>H. digglesii</i> (Hewitson 1874)	<i>Amyema congener</i> (Sieber ex Schult. & Schult. f.) Tiegh.	Australia	Orr & 2010
Lycaenidae	<i>H. digglesii</i> (Hewitson 1874)	<i>Dendrophthoe homoplastica</i> (Blakely)	Australia	Braby 1997

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Family	Scientific name	Mistletoe plant species	Place where reported	Reference
		Danser		
Lycaenidae	<i>H. digglesii</i> (Hewitson 1874)	<i>Amyema bifurcata</i> (Benth.) Tiegh.	Australia	Braby 1997 Orr & Kitching 2010
Lycaenidae	<i>H. digglesii</i> (Hewitson 1874)	<i>Amyema conspicua</i> (F.M. Bailey) Danser	Australia	Orr & Kitching 2010
Lycaenidae	<i>H. digglesii</i> (Hewitson 1874)	<i>Amyema miquelii</i> (Lehm. ex Miq.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>H. digglesii</i> (Hewitson 1874)	<i>Amyema sanguine</i> (F. Muell.) Danser	Australia	Orr & Kitching 2010
Lycaenidae	<i>H. digglesii</i> (Hewitson 1874)	<i>Amyema sanguine</i> (F. Muell.) Danser	Australia	Braby 1997
Lycaenidae	<i>H. digglesii</i> (Hewitson 1874)	<i>Dendrophthoe curvata</i> (Blume) Miq.	Australia	Orr & Kitching 2010
Lycaenidae	<i>H. digglesii</i> (Hewitson 1874)	<i>Dendrophthoe vitellina</i> (F.Muell.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>H. digglesii</i> (Hewitson 1874)	<i>Muellerina celastroides</i> (Sieber ex Scult. & Scult.f.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>H. narcissus</i> (Fabricius 1775)	<i>Dendrophthoe vitellina</i> (F.Muell.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>H. narcissus</i> (Fabricius, 1775)	<i>D. tomentosa</i> Barlow	Australia	Orr & Kitching 2010
Lycaenidae	<i>Hypolycaena erylus andamana</i> (Moore 1877)	<i>Dendrophthoe falcata</i> (L.f.) Ettingsh.	India	Veenakumari et al. 1
Lycaenidae	<i>H. erylus andamana</i> Moore 1877	<i>Helixanthera coccinea</i> (Jack) Danser	India	Veena et al. 1997
Lycaenidae	<i>H. philippus</i> (Fabricius 1793)	<i>Englerina woodfordioides</i> (Schweinf.) Balle	East Africa	Robinson et al. 2023

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Family	Scientific name	Mistletoe plant species	Place where reported	Reference
Lycaenidae	<i>H.phorbas</i> (Fabricius 1793)	<i>Dendrophthoe vitellina</i> (F.Muell.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>Iolaus arborifera</i> (Butler 1901)	<i>Englerina woodfordioides</i> (Schweinf.) Balle	East Africa	Robinson et al. 2023
Lycaenidae	<i>I.arborifera</i> (Butler 1901)	<i>Loranthus friesiorum</i> K.Krause	East Africa	Robinson et al. 2023
Lycaenidae	<i>I.bansanayalae</i> (Riley 1928)	<i>Englerina woodfordioides</i> (Schweinf.) Balle	East Africa	Robinson et al. 2023
Lycaenidae	<i>I.bowkeri</i> (Trimen 1864)	<i>Englerina woodfordioides</i> (Schweinf.) Balle	East Africa	Robinson et al. 2023
Lycaenidae	<i>I.carpenteri</i> (Stempffer 1946)	<i>Oncocalyx fischeri</i> (Engl.) M.G.Gilbert	East Africa	Robinson et al. 2023
Lycaenidae	<i>I.crawshayi</i> (Butler 1901)	<i>Englerina woodfordioides</i> (Schweinf.) Balle	East Africa	Robinson et al. 2023
Lycaenidae	<i>I.crawshayi</i> (Butler 1901)	<i>Phragmanthera usuiensis</i> (Oliv.) M.G.Gilbert	East Africa	Robinson et al. 2023
Lycaenidae	<i>I.mimosa haemus</i> (Talbot 1935)	<i>Oncocalyx fischeri</i> (Engl.) M.G. Gilbert	East Africa	Robinson et al. 2023
Lycaenidae	<i>I.mimosa haemus</i> (Talbot 1935)	<i>Loranthus recurviflora</i>	East Africa	Robinson et al. 2023
Lycaenidae	<i>I.pallene</i> (Wallengren 1857)	<i>Englerina woodfordioides</i> (Schweinf.) Balle	East Africa	Robinson et al. 2023
Lycaenidae	<i>I.pallene</i> (Wallengren 1857)	<i>Oncocalyx fischeri</i> (Engl.) M.G. Gilbert	East Africa	Robinson et al. 2023
Lycaenidae	<i>I.sidus</i> (Trimen 1864)	<i>Tapinanthus kraussianus</i> Tiegh.	Southern Africa	Robinson et al. 2023
Lycaenidae	<i>I.sidus</i> (Trimen 1864)	<i>Tapinanthus terminaliae</i> (Engl. & Gilg) Danser	Southern Africa	Robinson et al. 2023

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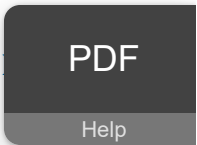
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Family	Scientific name	Mistletoe plant species	Place where reported	Reference
Lycaenidae	<i>I.silas</i> (Westwood 1851)	<i>Englerina woodfordioides</i> (Schweinf.) Balle	Southern Africa	Robinson et al. 2023
Lycaenidae	<i>I.tajoraca</i> (Walker 1870)	<i>Oncocalyx fischeri</i> (Engl.) M.G. Gilbert	East Africa	Robinson et al. 2023
Lycaenidae	<i>Jacoona anasuja anasuja</i> (C.Felder & R. Felder 1865)	<i>Scurrula ferruginea</i> (Jack) Danser	West Malaysia	Robinson et al. 2023
Lycaenidae	<i>Ogyris abrota</i> (Westwood 1851)	<i>Amyema congener</i> (Sieber ex Schult. & Schult. f.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.abrota</i> (Westwood 1851)	<i>Dendrophthoe vitellina</i> (F. Muell.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.abrota</i> (Westwood 1851)	<i>Muellerina celastroides</i> (Sieber ex Scult. & Scult. f.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.abrota</i> (Westwood 1851)	<i>Muellerina eucalyptoides</i> (DC.) Barlow	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.aenone</i> (Waterhouse 1902)	<i>Amyema linophylla</i> (Fenzl) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.aenone</i> (Waterhouse 1902)	<i>Dendrophthoe vitellina</i> (F.Muell.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.aenone</i> (Waterhouse 1902)	<i>D.tomentosa</i> Barlow	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.aenone</i> (Waterhouse 1902)	<i>Lysiana exocarpi</i> (Behr) Teigh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.aenone</i> (Waterhouse 1902)	<i>Diplatia furcata</i> Barlow	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.aenone</i> (Waterhouse,1902)	<i>Amyema miquelii</i> (Lehm. ex Miq.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.amaryllis</i> (Hewitson)	<i>Amyema bifurcata</i>	Australia	Orr & Kitching 2010

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Family	Scientific name	Mistletoe plant species	Place where reported	Reference
	1862)	(Benth.) Tiegh.		
Lycaenidae	<i>O. amaryllis</i> (Hewitson 1862)	<i>Amyema congener</i> (Sieber ex Schult. & Schult. f.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>O. amaryllis</i> (Hewitson 1862)	<i>Amyema fitzgeraldii</i> (Blakely) Danser	Australia	Orr & Kitching 2010
Lycaenidae	<i>O. amaryllis</i> (Hewitson 1862)	<i>Amyema linophylla</i> (Fenzl) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>O. amaryllis</i> (Hewitson 1862)	<i>Amyema lucasii</i> (Blakely) Danser	Australia	Orr & Kitching 2010
Lycaenidae	<i>O. amaryllis</i> (Hewitson 1862)	<i>Amyema mackayense</i> Danser (Blakely)	Australia	Orr & Kitching 2010
Lycaenidae	<i>O. amaryllis</i> (Hewitson 1862)	<i>Amyema maidenii</i> (Blakely) Barlow	Australia	Orr & Kitching 2010
Lycaenidae	<i>O. amaryllis</i> (Hewitson 1862)	<i>Amyema melaleuca</i> (Lehm. ex Miq.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>O. amaryllis</i> (Hewitson 1862)	<i>Amyema miquelii</i> (Lehm. ex Miq.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>O. amaryllis</i> (Hewitson 1862)	<i>Amyema miraculosa</i> (Lehm. ex Miq.) Tiegh	Australia	Orr & Kitching 2010
Lycaenidae	<i>O. amaryllis</i> (Hewitson 1862)	<i>Amyema pendula</i> (Sieber. ex Spreng.) Tiegh	Australia	Orr & Kitching 2010
Lycaenidae	<i>O. amaryllis</i> (Hewitson 1862)	<i>Amyema preissii</i> (Miq.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>O. amaryllis</i> (Hewitson 1862)	<i>Amyema quandang</i> (Lindl.) Tiegh	Australia	Orr & Kitching 2010
Lycaenidae	<i>O. amaryllis</i> (Hewitson 1862)	<i>Amyema sanguine</i> (F. Muell.) Danser	Australia	Orr & Kitching 2010



Family	Scientific name	Mistletoe plant species	Place where reported	Reference
Lycaenidae	<i>O. amaryllis</i> (Hewitson 1862)	<i>Amyema thalassium</i> Barlow	Australia	Orr & Kitching 2010
Lycaenidae	<i>O. amaryllis</i> (Hewitson 1862)	<i>Amyema cambagei</i> (Blakely) Danser	Australia	Orr & Kitching 2010
Lycaenidae	<i>O. amaryllis</i> (Hewitson 1862)	<i>Diplatia furcata</i> Barlow	Australia	Orr & Kitching 2010
Lycaenidae	<i>O. barnardi</i> (Miskin 1890)	<i>Amyema maidenii</i> (Blakely) Barlow	Australia	Orr & Kitching 2010
Lycaenidae	<i>O. barnardi</i> (Miskin 1890)	<i>Amyema miraculosa</i> (Lehm. ex Miq.) Tiegh	Australia	Orr & Kitching 2010
Lycaenidae	<i>O. barnardi</i> (Miskin 1890)	<i>Amyema quandang</i> (Lindl.) Tiegh	Australia	Orr & Kitching 2010
Lycaenidae	<i>O. genoveva</i> (Hewitson 1853)	<i>Amyema cambagei</i> (Blakely) Danser	Australia	Orr & Kitching 2010
Lycaenidae	<i>O. genoveva</i> (Hewitson 1853)	<i>Amyema bifurcata</i> (Benth.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>O. genoveva</i> (Hewitson 1853)	<i>Amyema congener</i> (Sieber ex Schult. & Schult.f.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>O. genoveva</i> (Hewitson 1853)	<i>Amyema conspicua</i> (F.M. Bailey) Danser	Australia	Orr & Kitching 2010
Lycaenidae	<i>O. genoveva</i> (Hewitson 1853)	<i>Amyema miquelii</i> (Lehm. ex Miq.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>O. genoveva</i> (Hewitson 1853)	<i>Amyema pendula</i> (Sieber. ex Spreng.) Tiegh	Australia	Orr & Kitching 2010
Lycaenidae	<i>O. genoveva</i> (Hewitson 1853)	<i>Dendrophthoe vitellina</i> (F. Muell.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>O. genoveva</i> (Hewitson 1853)	<i>Muellerina eucalyptoides</i> (DC.) Barlow	Australia	Orr & Kitching 2010

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Family	Scientific name	Mistletoe plant species	Place where reported	Reference
Lycaenidae	<i>O.genoveva</i> (Hewitson1853)	<i>Amyema quandang</i> (Lindl.) Tiegh	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.ianthis</i> (Waterhouse 1900)	<i>Amyema linophylla</i> (Fenzl) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.ianthis</i> (Waterhouse 1900)	<i>Amyema miquelii</i> (Lehm. ex Miq.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.ianthis</i> (Waterhouse 1900)	<i>Amyema quandang</i> (Lindl.) Tiegh	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.ianthis</i> (Waterhouse 1900)	<i>Dendrophthoe vitellina</i> (F.Muell.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.ianthis</i> (Waterhouse 1900)	<i>Muellerina eucalyptoides</i> (DC.) Barlow	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.iphis</i> (Waterhouse & Lyell 1914)	<i>Dendrophthoe vitellina</i> (F.Muell.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.iphis</i> (Waterhouse & Lyell 1914)	<i>Amyema bifurcata</i> (Benth.) Tiegh.	Australia	Braby 1997
Lycaenidae	<i>O.iphis</i> (Waterhouse & Lyell 1914)	<i>Amyema miquelii</i> (Lehm. ex Miq.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.iphis</i> (Waterhouse & Lyell 1914)	<i>Dendrophthoe glabrescens</i> (Blakely) Barlow	Australia	Braby 1997
Lycaenidae	<i>O.iphis</i> (Waterhouse & Lyell 1914)	<i>Amyema quandang</i> (Lindl.) Tiegh	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.olane</i> (Hewitson 1862)	<i>Amyema pendula</i> (Sieber. ex Spreng.) Tiegh	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.olane</i> (Hewitson1862)	<i>Amyema miquelii</i> (Lehm. ex Miq.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.oroetes</i> (Hewitson 1862)	<i>Amyema bifurcata</i> (Benth.) Tiegh.	Australia	Orr & Kitching 2010

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Family	Scientific name	Mistletoe plant species	Place where reported	Reference
Lycaenidae	<i>O.oroetes</i> (Hewitson 1862)	<i>Amyema miquelii</i> (Lehm. ex Miq.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.oroetes</i> (Hewitson 1862)	<i>Amyema pendula</i> (Sieber. ex Spreng.) Tiegh	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.zosine</i> (Hewitson 1853)	<i>Amyema cambagei</i> (Blakely) Danser	Australia	Braby 1997
Lycaenidae	<i>O.zosine</i> (Hewitson 1853)	<i>Amyema bifurcata</i> (Benth.) Tiegh.	Australia	Braby 1997
Lycaenidae	<i>O.zosine</i> (Hewitson 1853)	<i>Amyema congener</i> (Sieber ex Schult. & Schult. f.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.zosine</i> (Hewitson 1853)	<i>Amyema conspicua</i> (F.M. Bailey) Danser	Australia	Braby 1997
Lycaenidae	<i>O.zosine</i> (Hewitson 1853)	<i>Amyema maidenii</i> (Blakely) Barlow	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.zosine</i> (Hewitson 1853)	<i>Amyema miquelii</i> (Lehm. ex Miq.) Tiegh.	Australia	Orr & Kitching 2010 Braby 1997
Lycaenidae	<i>O.zosine</i> (Hewitson 1853)	<i>Amyema pendula</i> (Sieber. ex Spreng.) Tiegh	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.zosine</i> (Hewitson 1853)	<i>Amyema quandang</i> (Lindl.) Tiegh	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.zosine</i> (Hewitson 1853)	<i>Amyema sanguine</i> (F. Muell.) Danser	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.zosine</i> (Hewitson 1853)	<i>Decaisnina signata</i> (F. Muell. ex Benth.)	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.zosine</i> (Hewitson 1853)	<i>Dendrophthoe curvata</i> (Blume) Miq.	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.zosine</i> (Hewitson 1853)	<i>Dendrophthoe glabrescens</i> (Blakely) Barlow	Australia	Braby 1997

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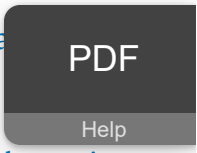
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Family	Scientific name	Mistletoe plant species	Place where reported	Reference
Lycaenidae	<i>O.zosine</i> (Hewitson 1853)	<i>Dendrophthoe vitellina</i> (F.Muell.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>O.zosine</i> (Hewitson 1853)	<i>Muellerina celastroides</i> (Sieber ex Scult. & Scult. f.) Tiegh.	Australia	Orr & Kitching 2010
Lycaenidae	<i>Pratapa deva</i> (Moore 1858)	<i>Scurrula parasitica</i> L.	India	Kasambe 2016
Lycaenidae	<i>P.deva</i> (Moore 1858)	<i>Taxillus parasiticus</i> (L.) S.T. Chiu	West Malaysia	Robinson et al. 2023
Lycaenidae	<i>P.deva</i> (Moore 1858)	<i>Dendrophthoe falcata</i> (L.f.) Ettingsh.	India	Kasambe 2016
Lycaenidae	<i>P.deva</i> (Moore 1858)	<i>Loranthus tomentosus</i> Wight	India	Robinson et al. 2023
Lycaenidae	<i>P.deva deva</i> (Moore 1858)	<i>Loranthus longiflorus</i> Desr.	India	Mackinnon & de Nicéville 1898 , Wynter-Blyth 1957
Lycaenidae	<i>P.deva deva</i> (Moore 1858)	<i>Scurrula parasitica</i> L.	India Sri Lanka	Wynter-Blyth 1957 , Jayasinghe et al. 2021
Lycaenidae	<i>P.deva deva</i> (Moore 1858)	<i>Taxillus. incanus</i> (Trimen) Wiens	Sri Lanka	Jayasinghe et al. 2021
Lycaenidae	<i>P.deva deva</i> (Moore 1858)	<i>Dendrophthoe falcata</i> (L.f.) Ettingsh.	India	Wynter-Blyth 1957 , Kasambe 2016 , Nitin et al. 2018

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Family	Scientific name	Mistletoe plant species	Place where reported	Reference
				, Jayasinghe et al. 2021
Lycaenidae	<i>P.deva deva</i> (Moore 1858)	<i>Dendrophthoe neelgherrensis</i> (Wight & Arn.) Tiegh.	Sri Lanka	Jayasinghe et al. 2021
Lycaenidae	<i>P.deva deva</i> (Moore 1858)	<i>Loranthus</i> spp.	India	Davidson et al. 1896
				, Bell 1919, Sevastopulo 1938
				, Pant & Chaterjee 1950
				, Robinson et al. 2010
Lycaenidae	<i>P.deva deva</i> (Moore 1858)	<i>Loranthus tomentosus</i> Wight	India	Wynter-Blyth 1957
				, Robinson et al. 2010
				, Nitin et al. 2018
Lycaenidae	<i>P.deva devula</i> (Corbet 1941)	<i>Loranthus parasiticus</i> (L.) Merr.	Hongkong	Robinson et al. 2023
Lycaenidae	<i>P.deva lila</i> (Moore 1884)	<i>Scurrula ferruginea</i> (Jack) Danser	India	Karma 2018
Lycaenidae	<i>P.deva lila</i> (Moore 1884)	<i>Dendrophthoe falcata</i> (L.f.) Ettingsh.	India	Veenakumari et al. 1997



Family	Scientific name	Mistletoe plant species	Place where reported	Reference
Lycaenidae	<i>P.deva relata</i> (Distant 1884)	<i>Loranthus tomentosus</i> Wight	West Malaysia	Robinson et al. 2023
Lycaenidae	<i>Rachana jalindra macanita</i> (Fruhstorfer 1912)	<i>Dendrophthoe falcata</i> (L.f.) Ettingsh.	India	Nitin et al. 2018
Lycaenidae	<i>R.jalindra macanita</i> (Fruhstorfer 1912)	<i>Helicanthes elasticus</i> (Desv.) Danser	India	Davidson et al. 1896 , Bell 1919 , Wynter-Blyth 1957 , Robinson et al. 2010 , Nitin et al. 2018
Lycaenidae	<i>Spindasis ictis</i> (Hewitson 1865)	<i>Dendrophthoe</i> spp.	India	Kasambe 2016
Lycaenidae	<i>Tajuria cippus</i> (Fabricius 1798)	<i>Dendrophthoe falcata</i> (L.f.) Ettingsh.	India	Kasambe 2016
Lycaenidae	<i>T.cippus</i> (Fabricius 1798)	<i>Macrosolen cochinchinensis</i> (Lour.) Tiegh.	West Malaysia	Robinson et al. 2023
Lycaenidae	<i>T.cippus</i> (Fabricius 1798)	<i>Taxillus parasiticus</i> (L.) S.T. Chiu	West Malaysia	Robinson et al. 2023
Lycaenidae	<i>T.cippus</i> (Fabricius 1798)	<i>Dendrophthoe glabrescens</i> (Blakely) Barlow	India	Robinson et al. 2023
Lycaenidae	<i>T.cippus</i> (Fabricius 1798)	<i>Loranthus</i> spp.	India	Robinson et al. 2023
Lycaenidae	<i>T.cippus cippus</i> (Fabricius 1798)	<i>Dendrophthoe falcata</i> (L.f.) Ettingsh.	India	Wynter-Blyth 1957

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Family	Scientific name	Mistletoe plant species	Place where reported	Reference
				Veenakumari et al. 1997
				, Kunte 2000, Nitin et al. 2018
Lycaenidae	<i>T.cippus cippus</i> (Fabricius 1798)	<i>Loranthus longiflorus</i> Desr.	India	Wynter-Blyth 1957 Nitin et al. 2018
Lycaenidae	<i>T.cippus cippus</i> (Fabricius 1798)	<i>Dendrophthoe glabrescens</i> (Blakely) Barlow	India	Nitin et al. 2018
Lycaenidae	<i>T.cippus cippus</i> (Fabricius 1798)	<i>Macrosolen andamanensis</i> L.J.Singh	Andaman Islands	Present study
Lycaenidae	<i>T.cippus cippus</i> (Fabricius 1798)	<i>Helicanthes elasticus</i> (Desv.) Danser	India	Davidson et al. 1896 , Bell 1919, Wynter-Blyth 1957 , Kunte 2000, Kasambe 2016, Nitin et al. 2018
Lycaenidae	<i>T.cippus cippus</i> (Fabricius 1798)	<i>Helixanthera coccinea</i> (Jack) Danser	India	Veenakumari et al. 1997
Lycaenidae	<i>T.cippus cippus</i> (Fabricius 1798)	<i>H.wallichiana</i> Danser	India	Davidson et al. 1896 , Bell 1919, Wynter-Blyth 1957 , Kunte 2000, Nitin et al. 2018

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Family	Scientific name	Mistletoe plant species	Place where reported	Reference
Lycaenidae	<i>T.cippus malcolmi</i> (Riley & Godfrey 1925)	<i>Loranthus parasiticus</i> (L.) Merr.	Hongkong	Robinson et al. 2023
Lycaenidae	<i>T.cippus maxentius</i> (Fruhstorfer 1912)	<i>Dendrophthoe pentandra</i> (L.) Miq.	West Malaysia	Wee & Ng 2008
Lycaenidae	<i>T.cippus maxentius</i> (Fruhstorfer 1912)	<i>Loranthus</i> spp.	West Malaysia	Robinson et al. 2023
Lycaenidae	<i>T.cippus maxentius</i> (Fruhstorfer 1912)	<i>Dendrophthoe</i> spp.	West Malaysia	Robinson et al. 2023
Lycaenidae	<i>T.deudorix</i> (Hewitson 1869)	<i>Taxillus parasiticus</i> (L.) S.T. Chiu	West Malaysia	Robinson et al. 2023
Lycaenidae	<i>T.diaeus</i> (Hewitson 1865)	<i>Loranthus bicolor</i> Engl.	India	Robinson et al. 2023
Lycaenidae	<i>T.diaeus</i> (Hewitson 1865)	<i>Taxillus liquidambaricola</i> (Hayata) Hosok.	Taiwan	Robinson et al. 2023
Lycaenidae	<i>T.diaeus</i> (Hewitson 1865)	<i>Dendrophthoe glabrescens</i> (Blakely) Barlow	India	Robinson et al. 2023
Lycaenidae	<i>T.diaeus karenkonis</i> (Matsumura 1929)	<i>Loranthus kaoi</i> (J.M. Chao) H.S. Kiu	Taiwan	Robinson et al. 2023
Lycaenidae	<i>T.diaeus karenkonis</i> (Matsumura 1929)	<i>Taxillus caloreas</i> (Diels) Danser	Taiwan	Robinson et al. 2023
Lycaenidae	<i>T.illurgis</i> (Hewitson 1869)	<i>Taxillus nigrans</i> (Hance) Danser	Taiwan	Robinson et al. 2023
Lycaenidae	<i>T.illurgis tattaka</i> (Araki 1949)	<i>Taxillus nigrans</i> (Hance) Danser	Taiwan	Robinson et al. 2023
Lycaenidae	<i>T.jehana jehana</i> (Moore 1884)	<i>Dendrophthoe</i> spp.	India	Nitin et al. 2023
Lycaenidae	<i>T.jehana jehana</i> (Moore 1884)	<i>Loranthus</i> spp.	India	Sengupta et al. 2018

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Family	Scientific name	Mistletoe plant species	Place where reported	Reference
Lycaenidae	<i>T. maculata</i> (Hewitson 1865)	<i>Dendrophthoe</i> spp.	India	Kasambe 2016
Lycaenidae	<i>T. maculatus</i> (Hewitson 1865)	<i>Dendrophthoe</i> spp.	India	Nitin et al. 2018
Lycaenidae	<i>T. melastigma</i> (de Nicéville 1887)	<i>Dendrophthoe</i> spp.	India	Kasambe 2016
Lycaenidae	<i>T. melastigma</i> (de Nicéville 1887)	<i>Loranthus</i> spp.	India	Wynter-Blyth 1957 ; Robinson et al. 2023
Lycaenidae	<i>T. melastigma</i> (de Nicéville 1887)	<i>Loranthus tomentosus</i> Wight	India	Davidson et al. 1896 , Nitin et al. 2018
Lycaenidae	<i>Tarucus an&a</i> (de Nicéville 1884)	<i>Dendrophthoe falcata</i> (L.f.) Ettingsh.	India	Wynter-Blyth 1957 , Kunte 2000 , Nitin et al. 2018
Lycaenidae	<i>T. ananda</i> (de Nicéville 1884)	<i>Dendrophthoe falcata</i> (L.f.) Ettingsh.	India	Wynter-Blyth 1957 , Kunte 2000 , Nitin et al. 2018
Nymphalidae	<i>Euthalia aconthea</i> (Cramer 1777)	<i>Loranthus pentandrus</i> L.	Thailand	Robinson et al. 2023
Nymphalidae	<i>E. aconthea</i> (Cramer 1777)	<i>Loranthus scurrula</i> L.	India, West Malaysia	Robinson et al. 2023
Nymphalidae	<i>E. aconthea meridionalis</i> (Fruhstorfer 1913)	<i>Scurrula parasitica</i> L.	India	Wynter-Blyth 1957 ,

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Family	Scientific name	Mistletoe plant species	Place where reported	Reference
				Kunte 2000
Nymphalidae	<i>E. adonia</i> (Cramer 1780)	<i>Taxillus parasiticus</i> (L.) S.T. Chiu	West Malaysia	Robinson et al. 2023
Nymphalidae	<i>E. amanda</i> (Hewitson 1862)	<i>Taxillus. nigrans</i> (Hance) Danser	Indonesia	Robinson et al. 2023
Nymphalidae	<i>E. irrubescens</i> (Grose-Smith 1893)	<i>Taxillus limprichtii</i> (Grüning) H.S. Kiu	Taiwan	Robinson et al. 2023
Nymphalidae	<i>E. irrubescens</i> (Grose-Smith 1893)	<i>Taxillus limprichtii</i> var. <i>liquidambaricola</i> (Hayata) H.X. Qiu	Taiwan	Robinson et al. 2023
Nymphalidae	<i>E. irrubescens</i> (Grose-Smith 1893)	<i>Taxillus nigrans</i> (Hance) Danser	West Malaysia	Robinson et al. 2023
Nymphalidae	<i>E. irrubescens</i> (Grose-Smith 1893)	<i>Taxillus nigrans</i> (Hance) Danser	West Malaysia Taiwan	Robinson et al. 2023
Nymphalidae	<i>E. irrubescens fulguralis</i> (Matsumura 1909)	<i>Taxillus limprichtii</i> var. <i>liquidambaricola</i> (Hayata) H.X. Qiu	Taiwan	Robinson et al. 2023
Nymphalidae	<i>E. irrubescens fulguralis</i> (Matsumura 1909)	<i>Taxillus nigrans</i> (Hance) Danser	Taiwan	Robinson et al. 2023
Nymphalidae	<i>E. irrubescens fulguralis</i> (Matsumura 1909)	<i>Taxillus parasiticus</i> (L.) S.T. Chiu	Taiwan	Robinson et al. 2023
Nymphalidae	<i>E. lubentina</i> (Cramer 1777)	<i>Taxillus parasiticus</i> (L.) S.T. Chiu	Hongkong	Robinson et al. 2023
Nymphalidae	<i>E. lubentina</i> (Cramer 1777)	<i>Dendrophthoe glabrescens</i> (Blakely) Barlow	India	Robinson et al. 2023
Nymphalidae	<i>E. lubentina</i> (Cramer 1777)	<i>Loranthus parasiticus</i> (L.) Merr.	Hong Kong	Robinson et al. 2023
Nymphalidae	<i>E. lubentina</i> (Cramer 1777)	<i>Loranthus scurrula</i> L.	India	Robinson et al. 2023

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Family	Scientific name	Mistletoe plant species	Place where reported	Reference
Nymphalidae	<i>E. lubentina</i> (Cramer 1777)	<i>Macrosolen cochinchinensis</i> (Lour.) Tiegh.	Hong Kong	Robinson et al. 2023
Nymphalidae	<i>E. lubentina</i> (Cramer 1777)	<i>Scurrula ferruginea</i> (Jack) Danser	West Malaysia	Robinson et al. 2023
Nymphalidae	<i>E. lubentina</i> (Cramer 1777)	<i>Scurrula parasitica</i> L.	India	Kasambe 2016
Nymphalidae	<i>E. lubentina arasada</i> (Fruhstorfer 1913)	<i>Dendrophthoe glabrescens</i> (Blakely) Barlow	India	Nitin et al. 2018
Nymphalidae	<i>E. lubentina lubentina</i> (Cramer 1777)	<i>Dendrophthoe falcata</i> (L.f.) Ettingsh.	India	Wynter-Blyth 1957 , Nitin et al. 2018
Nymphalidae	<i>E. lubentina lubentina</i> (Cramer 1777)	<i>Dendrophthoe glabrescens</i> (Blakely) Barlow	India (Northeast)	Wynter-Blyth 1957 , Robinson et al. 2010 , Karmakar et al. 2018 , Nitin et al. 2018
Nymphalidae	<i>E. lubentina lubentina</i> (Cramer 1777)	<i>Loranthus cordifolius</i> Wall.	India	Wynter-Blyth 1957 , Robinson et al. 2001
Nymphalidae	<i>E. lubentina lubentina</i> (Cramer 1777)	<i>Loranthus longiflorus</i> Desr.	India	Wynter-Blyth 1957 , Robinson et al. 2001

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Family	Scientific name	Mistletoe plant species	Place where reported	Reference
Nymphalidae	<i>E. lubentina lubentina</i> (Cramer 1777)	<i>Scurrula ferruginea</i> (Jack) Danser	India	Karmakar et al. 2018
Nymphalidae	<i>E. lubentina lubentina</i> (Cramer 1777)	<i>Scurrula parasitica</i> L.	India	Wynter-Blyth 1957 , Robinson et al. 2001 , Davidson & Aitken 1890 , Bell 1909a
Pieridae	<i>Delias aganippe</i> (Donovan 1805)	<i>Amyema cambagei</i> (Blakely) Danser	Australia	Orr & Kitching 2010
Pieridae	<i>D. aganippe</i> (Donovan 1805)	<i>Amyema linophylla</i> (Fenzl) Tiegh.	Australia	Orr & Kitching 2010
Pieridae	<i>D. aganippe</i> (Donovan 1805)	<i>Amyema melaleuca</i> (Lehm. ex Miq.) Tiegh.	Australia	Orr & Kitching 2010
Pieridae	<i>D. aganippe</i> (Donovan 1805)	<i>Amyema miquelii</i> (Lehm. ex Miq.) Tiegh.	Australia	Orr & Kitching 2010
Pieridae	<i>D. aganippe</i> (Donovan 1805)	<i>Amyema preissii</i> (Miq.) Tiegh.	Australia	Orr & Kitching 2010
Pieridae	<i>D. aganippe</i> (Donovan 1805)	<i>Amyema quandang</i> (Lindl.) Tiegh	Australia	Orr & Kitching 2010
Pieridae	<i>D. argenthona</i> (Fabricius 1793)	<i>Amyema cambagei</i> (Blakely) Danser	Australia	Braby 1997
Pieridae	<i>D. argenthona</i> (Fabricius 1793)	<i>Amyema bifurcata</i> (Benth.) Tiegh.	Australia	Orr & Kitching 2010
Pieridae	<i>D. argenthona</i> (Fabricius 1793)	<i>Amyema miquelii</i> (Lehm. ex Miq.) Tiegh.	Australia	Braby 1997
Pieridae	<i>D. argenthona</i> (Fabricius	<i>Amyema miquelii</i> (Lehm.	Australia	Orr & Kitching 2010

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Family	Scientific name	Mistletoe plant species	Place where reported	Reference
	1793)	ex Miq.) Tiegh.		
Pieridae	<i>D. argenthona</i> (Fabricius 1793)	<i>Amyema pendula</i> (Sieber. ex Spreng.) Tiegh.	Australia	Orr & Kitching 2010
Pieridae	<i>D. argenthona</i> (Fabricius 1793)	<i>Amyema quandang</i> (Lindl.) Tiegh	Australia	Orr & Kitching 2010
Pieridae	<i>D. argenthona</i> (Fabricius 1793)	<i>Amyema sanguine</i> (F. Muell.) Danser	Australia	Braby 1997 Orr & Kitching 2010
Pieridae	<i>D. argenthona</i> (Fabricius 1793)	<i>Decaisnina signata</i> (F. Muell. ex Benth.)	Australia	Orr & Kitching 2010
Pieridae	<i>D. argenthona</i> (Fabricius 1793)	<i>Dendrophthoe curvata</i> (Blume) Miq.	Australia	Orr & Kitching 2010
Pieridae	<i>D. argenthona</i> (Fabricius 1793)	<i>Dendrophthoe glabrescens</i> (Blakely) Barlow	Australia	Braby 1997
Pieridae	<i>D. argenthona</i> (Fabricius 1793)	<i>Dendrophthoe vitellina</i> (F. Muell.) Tiegh.	Australia	Orr & Kitching 2010
Pieridae	<i>D. argenthona</i> (Fabricius 1793)	<i>Diplatia furcata</i> Barlow	Australia	Braby 1997
Pieridae	<i>D. argenthona</i> (Fabricius 1793)	<i>Muellerina celastroides</i> (Sieber ex Scult & Scult. f.) Tiegh.	Australia	Orr & Kitching 2010
Pieridae	<i>D. belladonna</i> (Fabricius 1793)	<i>Dendrophthoe glabrescens</i> (Blakely) Barlow	India	Robinson et al. 2023
Pieridae	<i>D. belladonna</i> (Fabricius 1793)	<i>Oryctanthus florulentus</i> (Rich.) Tiegh.	India	Robinson et al. 2023
Pieridae	<i>D. descombesi</i> (Boisduval 1836)	<i>Taxillus parasiticus</i> (L.) S.T. Chiu	West Malaysia	Robinson et al. 2023
Pieridae	<i>D. descombesi descombesi</i> (Boisduval 1836)	<i>Loranthus cordifolius</i> Wall.	India	Karmakar et al. 2018

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Family	Scientific name	Mistletoe plant species	Place where reported	Reference
Pieridae	<i>D. descombesi descombesi</i> (Boisduval 1836)	<i>Scurrula ferruginea</i> (Jack) Danser	India	Karmakar et al. 2018
Pieridae	<i>D. eucharis</i> (Drury 1773)	<i>Dendrophthoe falcata</i> (L.f.) Ettingsh.	India except Andaman & Nicobar Islands Lakshadweep	Kasambe 2016, Wynter-Blyth 1957 , Kunte 2000, Nitin et al. 2018
Pieridae	<i>D. eucharis</i> (Drury 1773)	<i>Dendrophthoe glabrescens</i> (Blakely) Barlow	India	Robinson et al. 2023 , Nitin et al. 2018
Pieridae	<i>D. eucharis</i> (Drury 1773)	<i>Dendrophthoe longensis</i> L.J. Singh	India Andaman Islands	Singh 2023
Pieridae	<i>D. eucharis</i> (Drury 1773)	<i>Helicanthes elasticus</i> (Desv.) Danser	India	Wynter-Blyth 1957 , Kunte 2000, Robinson et al. 2010 , Kasambe 2016
Pieridae	<i>D. eucharis</i> (Drury 1773)	<i>Loranthus cordifolius</i> Wall.	India	Robinson et al. 2023
Pieridae	<i>D. eucharis</i> (Drury 1773)	<i>Loranthus elasticus</i> Desv.	India	Robinson et al. 2023
Pieridae	<i>D. eucharis</i> (Drury 1773)	<i>Loranthus longiflorus</i> Desr.	India	Wynter-Blyth 1957 , Kunte 2000

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Family	Scientific name	Mistletoe plant species	Place where reported	Reference
Pieridae	<i>D.eucharis</i> (Drury 1773)	<i>Loranthus scurrula</i> L.	India	Robinson et al. 2023
Pieridae	<i>D.eucharis</i> (Drury 1773)	<i>Scurrula parasitica</i> L.	India	Wynter-Blyth 1957 , , Kunte 2000 , Kasambe 2016
Pieridae	<i>D.eucharis</i> (Drury 1773)	<i>Taxillus vestitus</i> (Wall.) Danser	India	Wynter-Blyth 1957 , , Kunte 2000 , Nitin et al. 2018
Pieridae	<i>D.harpalyce</i> (Donovan 1805)	<i>Amyema congener</i> (Sieber ex Schult. & Schult. f.) Tiegh.	Australia	Orr & Kitching 2010
Pieridae	<i>D.harpalyce</i> (Donovan 1805)	<i>Amyema miquelii</i> (Lehm. ex Miq.) Tiegh.	Australia	Orr & Kitching 2010
Pieridae	<i>D.harpalyce</i> (Donovan 1805)	<i>Amyema pendula</i> (Sieber. ex Spreng.) Tiegh	Australia	Orr & Kitching 2010
Pieridae	<i>D.harpalyce</i> (Donovan 1805)	<i>Amyema preissii</i> (Miq.) Tiegh.	Australia	Orr & Kitching 2010
Pieridae	<i>D.harpalyce</i> (Donovan 1805)	<i>Amyema quandang</i> (Lindl.) Tiegh	Australia	Orr & Kitching 2010
Pieridae	<i>D.harpalyce</i> (Donovan 1805)	<i>Muellerina eucalyptoides</i> (DC.) Barlow	Australia	Orr & Kitching 2010
Pieridae	<i>D.henningia henningia</i> (Eschscholtz 1821)	<i>Helixanthera parasitica</i> Lour.	Philippines	Robinson et al. 2023
Pieridae	<i>D.henningia henningia</i> (Eschscholtz 1821)	<i>Loranthus philippensis</i> Cham. & Schltdl.	Philippines	Robinson et al. 2023

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Family	Scientific name	Mistletoe plant species	Place where reported	Reference
Pieridae	<i>D.hyparete</i> (Linnaeus 1758)	<i>Dendrophthoe falcata</i> (L.f.) Ettingsh.	Andaman Islands	Robinson et al. 2023 Veenakumari et al. 1997
Pieridae	<i>D.hyparete</i> (Linnaeus 1758)	<i>Dendrophthoe glabrescens</i> (Blakely) Barlow	Oriental	Robinson et al. 2023
Pieridae	<i>D.hyparete</i> (Linnaeus 1758)	<i>Dendrophthoe pentandra</i> (L.) Miq.	Southeast Asia	Robinson et al. 2023
Pieridae	<i>D.hyparete</i> (Linnaeus 1758)	<i>Loranthus pentandrus</i> L.	Thailand	Robinson et al. 2023
Pieridae	<i>D.hyparete</i> (Linnaeus 1758)	<i>Macrosolen cochinchinensis</i> (Lour.) Tiegh.	Hong Kong	Robinson et al. 2023
Pieridae	<i>D.hyparete</i> (Linnaeus 1758)	<i>Scurrula ferruginea</i> (Jack) Danser	West Malaysia	Robinson et al. 2023
Pieridae	<i>D.hyparete</i> (Linnaeus 1758)	<i>Taxillus limprichtii</i> (Grüning) H.S. Kiu	Taiwan	Robinson et al. 2023
Pieridae	<i>D.hyparete heirte</i> (Hübner 1818)	<i>Loranthus parasiticus</i> (L.) Merr.	Hong Kong	Robinson et al. 2023
Pieridae	<i>D.hyparete heirte</i> (Hübner 1818)	<i>Macrosolen cochinchinensis</i> (Lour.) Tiegh.	Hong Kong	Robinson et al. 2023
Pieridae	<i>D.hyparete indica</i> (Wallace 1867)	<i>Dendrophthoe glabrescens</i> (Blakely) Barlow	India Andaman Islands	Present study
Pieridae	<i>D.hyparete indica</i> (Wallace 1867)	<i>Dendrophthoe curvata</i> (Blume) Miq.	India Andaman Islands	Present study
Pieridae	<i>D.hyparete indica</i> (Wallace 1867)	<i>Dendrophthoe longensis</i> L.J. Singh	India Andaman	Present study

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Family	Scientific name	Mistletoe plant species	Place where reported	Reference
			Islands	
Pieridae	<i>D.hyparete indica</i> (Wallace 1867)	<i>Dendrophthoe pentandra</i> (L.) Miq.	Myanmar	Oo 2020
Pieridae	<i>D.hyparete indica</i> (Wallace 1867)	<i>Loranthus pentapetalus</i> Roxb.	Myanmar	Oo 2020
Pieridae	<i>D.hyparete luzonensis</i> (C. & R. Felder 1862)	<i>Loranthus yadoriki</i> Siebold & Zucc.	Taiwan	Robinson et al. 2023
Pieridae	<i>D.hyparete luzonensis</i> (C. & R. Felder 1862)	<i>Taxillus limprichtii</i> var. <i>liquidambaricola</i> (Hayata) H.X. Qiu	Taiwan	Robinson et al. 2023
Pieridae	<i>D.hyparete metarete</i> (Butler 1879)	<i>Dendrophthoe pentandra</i> (L.) Miq.	West Malaysia	Robinson et al. 2023 , Wee & Ng 2008 , Corbet & Pendlebury 1978
Pieridae	<i>D.hyparete mindanaensis</i> (Mitis 1893)	<i>Dendrophthoe</i> spp.	Philippines	Salaga et al. 2021
Pieridae	<i>D.hyparete mindanaensis</i> (Mitis 1893)	<i>Dendrophthoe pentandra</i> (L.) Miq.	Philippines	Igarashi & Fukuda 1997 , Hardy & Lawrence 2017 , Corbet & Pendlebury 1978
Pieridae	<i>D.mysis</i> (Fabricius 1775)	<i>Dendrophthoe curvata</i>	Australia	Orr & Kitching 2010

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Family	Scientific name	Mistletoe plant species	Place where reported	Reference
		(Blume) Miq.		
Pieridae	<i>D.mysis</i> (Fabricius 1775)	<i>Dendrophthoe falcata</i> (L.f.) Ettingsh.	Australia	Braby 1997
Pieridae	<i>D.mysis</i> (Fabricius 1775)	<i>Dendrophthoe vitellina</i> (F.Muell.) Tiegh.	Australia	Orr & Kitching 2010
Pieridae	<i>D.nigrina</i> (Fabricius 1775)	<i>Amyema cambagei</i> (Blakely) Danser	Australia	Orr & Kitching 2010
Pieridae	<i>D.nigrina</i> (Fabricius 1775)	<i>Amyema bifurcata</i> (Benth.) Tiegh.	Australia	Orr & Kitching 2010
Pieridae	<i>D.nigrina</i> (Fabricius 1775)	<i>Amyema congener</i> (Sieber ex Schult. & Schult. f.) Tiegh.	Australia	Orr & Kitching 2010
Pieridae	<i>D.nigrina</i> (Fabricius 1775)	<i>Amyema lucasii</i> (Blakely) Danser	Australia	Orr & Kitching 2010
Pieridae	<i>D.nigrina</i> (Fabricius 1775)	<i>Amyema miquelii</i> (Lehm. ex Miq.) Tiegh.	Australia	Orr & Kitching 2010
Pieridae	<i>D.nigrina</i> (Fabricius 1775)	<i>Amyema quandang</i> (Lindl.) Tiegh	Australia	Orr & Kitching 2010
Pieridae	<i>D.nigrina</i> (Fabricius 1775)	<i>Amylothea dictyophleba</i> (F.Muell.) Tiegh.	Australia	Orr & Kitching 2010
Pieridae	<i>D.nigrina</i> (Fabricius 1775)	<i>Benthamina alyxifolia</i> (F. Muell. ex Benth.)	Australia	Orr & Kitching 2010
Pieridae	<i>D.nigrina</i> (Fabricius 1775)	<i>Dendrophthoe curvata</i> (Blume) Miq.	Australia	Orr & Kitching 2010
Pieridae	<i>D.nigrina</i> (Fabricius 1775)	<i>Dendrophthoe falcata</i> (L.f.) Ettingsh.	Australia	Braby
Pieridae	<i>D.nigrina</i> (Fabricius 1775)	<i>Dendrophthoe vitellina</i> (F.Muell.) Tiegh.	Australia	Orr & Kitching 2010

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Family	Scientific name	Mistletoe plant species	Place where reported	Reference
Pieridae	<i>D. nigrina</i> (Fabricius 1775)	<i>Lysiana subfalcata</i> (Hook.) Barlow	Australia	Orr & Kitching 2010
Pieridae	<i>D. nigrina</i> (Fabricius 1775)	<i>Muellerina celastroides</i> (Sieber ex Scult & Scult. f.) Tiegh.	Australia	Orr & Kitching 2010
Pieridae	<i>D. nigrina</i> (Fabricius 1775)	<i>Muellerina eucalyptoides</i> (DC.) Barlow	Australia	Orr & Kitching 2010
Pieridae	<i>D. pasithoe</i> (Linnaeus 1767)	<i>Loranthus pentandrus</i> L.	Java	Robinson et al. 2023
Pieridae	<i>D. pasithoe</i> (Linnaeus 1767)	<i>Taxillus chinensis</i> (DC.) Danser	Hong Kong Taiwan	Robinson et al. 2023
Pieridae	<i>D. pasithoe</i> (Linnaeus 1767)	<i>Taxillus limprichtii</i> (Grüning) H.S. Kiu	Taiwan	Robinson et al. 2023
Pieridae	<i>D. pasithoe</i> (Linnaeus 1767)	<i>Taxillus nigrans</i> (Hance) Danser	Taiwan	Robinson et al. 2023
Pieridae	<i>D. pasithoe curasena</i> (Fruhstorfer 1908)	<i>Taxillus limprichtii</i> var. <i>liquidambaricola</i> (Hayata) H.X. Qiu	Taiwan	Robinson et al. 2023
Pieridae	<i>D. pasithoe pasithoe</i> (Linnaeus 1767)	<i>Scurrula ferruginea</i> (Jack) Danser	India	Karmakar et al. 2018
Pieridae	<i>D. wilemani</i> (Jordan 1925)	<i>Taxillus nigrans</i> (Hance) Danser	Taiwan	Robinson et al. 2023

Taxonomic Notes on Loranth host plants

In the ANI the population of *Macrosolen* is more as compared with the population of *Dendrophthoe*, however population of *Dendrophthoe* is severely damaged by the butterfly larvae.

Dendrophthoe curvata (Blume) Miq. (1856)

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Distinguishing features. It is recognized by glabrous except for young parts, narrowly to broadly ovate or obovate, leaves with attenuate to cuneate base mostly obtuse or rounded sometimes acute apex and pinnate venation, long petiole, (2-) 5-10(-16) flowered racemes, uniformly upward widened 5 merous clavate flowers with shades of yellow to red at acute apex. Leaves usually darker and more lustrous on the upper surface, inflorescence and flowers tomentose when young. Fruits with widened base pale green turning reddish brown when ripe. Perianth red, deeply curved with yellow neck.

Distribution/Locality selected for in-situ Observations. Saddle Peak, Dundus Point, Swaraj Dweep, Manipur Parvat, Port Mout, Viper Island, Wandoor, Kalatang, Henry Lawrence, Rani Jhansi Marine National Park, and Nayasahar ([Figure 1](#)).

Habitat. Aerial stem parasite (shrub) on *Psidium guajava* (L.), *Eucalyptus* spp., *Callistemon viminalis* (Sol. ex Gaertn.) G. Don, *Ficus* spp., *Gmelina arborea* Roxb. (Lamiaceae), *Morinda citrifolia* L. (Rubiaceae) ([Singh and Murugan 2013](#); [Singh 2023](#)).

Conservation status. 'Endangered' based on the IUCN categories and criteria ([IUCN 2020](#)).
Dendrophthoe glabrescens (Blakely) Barlow (1962).

Distinguishing features. It is recognized by glabrous nature of plant, narrowly-lanceolate to elliptic or obovate leaves with attenuate base and rounded apex, (3-) 5-10(-20) -flowered racemes, glabrous. Leaves dull on both sides, inflorescence and flowers entirely glabrous, Perianth cylindrical or weakly clavate uniformly yellowish red often darkening with age, sometimes red especially in the upper part. Perianth straight sometimes slightly curved. Capitate stigma, elliptic oblong fruits, fruits yellow green turning reddish pink when ripe.

Distribution/Locality selected for in-situ Observations. Little Andaman, Hut Bay, Netaji Nagar ([Figure 1](#)).

Habitat. Aerial stem parasite (shrub) on *Psidium guajava* (L.) (Myrtaceae), *Murraya koengii* (L.) Spreng (Rutaceae), *Citrus reticulata* Blanco (Rutaceae) ([Singh and Murugan 2013](#); [Singh and Ranjan 2013](#); [Singh et al. 2016](#); [Sivaramakrishna et al. 2021](#); [Singh 2023](#)).

Conservation status. 'Endangered' based on the IUCN categories and criteria ([IUCN 2020](#)).
Dendrophthoe longensis L.J. [Singh \(2023\)](#).

Distinguishing features. It is recognized by profuse branching habit of stem with very long internodes and plenty of lenticels, cordate to obliquely ovate lamina with oblique base, acute to slightly acuminate apex, entire sometimes with undulate margin and 2–3 pairs of prominent lateral veins, 2 to 15 flowered umbellate inflorescence, elliptic ovate bract, 3–4–

merous, lanate, alternate, weakly clavate flower, corolla with acute apex distinguishes it from all previously known species. Ellipsoid fruit with apical collar, 4-merous flowers capitate, red stigma ovate to ovate-oblong, brown seeds cordate to obliquely ovate, entire sometimes with undulate margin, 4.5–12.5×3.0–8.5 cm, oblique at the base, acute to slightly acuminate at apex; both surfaces light green to bright green, glossy, deeply veined lanate, umbellate of 2 to 15 flowered Perianth dull greenish yellow with white powdery appearance, lanate uniformly widened upwards, slightly narrowed to a neck, with dark green band and usually weakly clavate and acute at the apex.

Distribution/Locality selected for in-situ Observations. Long Island, Sigmendera, Lalaji Bay, Long Island, near Forest Guest House. ([Figure 1](#))

Habitat: Aerial stem parasite (shrub) on *Mangifera indica* L. (Anacardiaceae) ([Singh 2023](#))

Conservation status. 'Endangered' based on the IUCN categories and criteria ([IUCN 2020](#)).
Macrosolen andamanensis L.J. Singh (2013).

Distinguishing features. It is recognized by glabrous branchlets with, opposite lanceolate glossy leaves, raceme with 1 or 2 opposite pairs of flowers, six or five merous flowers, 5–6-lobed, corolla mostly red below dark brown colored neck, green above, globose, greenish yellow fruits turning reddish brown when ripe.

Distribution/Locality selected for in-situ Observations. South Andaman, Garacharma, Haddo, Manglutan, Middle Andaman, Parnashala, Yerrata, North Andaman- Laxmipur, ([Figure 1](#))

Habitat. Aerial stem parasite on *Mangifera indica* L. ([Singh, 2013a](#), [Singh, 2013b](#)).

Conservation status. 'Endangered' based on the IUCN categories and criteria ([IUCN 2020](#)).
Notes on pest of ***Dendrophthoe*** spp.

([Figure 2](#), [Figure 3](#), [Figure 4](#), [Figure 5](#))

Delias hyparete indica ([Wallace, 1867](#)) (Lepidoptera: Pieridae)

Delias hyparete indica ([Wallace, 1867](#)) (Lepidoptera: Pieridae) is distributed to Sikkim, North eastern regions of India ([Varshney and Smetacek, 2015](#)). The distributed of the butterfly has also been recorded from various geographical region; Nepal, Myanmar, Thailand, Laos, Cambodia, Vietnam, Hainan, South China by various as mentioned in [Table 1](#). In the present study we observed that this invaded butterfly is common in appearance during pre-monsoonal months in the Andaman group of Islands which has been recorded

for the first time on mistletoe species from the ANI, although, its distribution was recorded earlier only from Sikkim State of North East India ([Varshney and Smetacek 2015](#)).

Description of the butterfly D. h. indica

The wingspan of male and female is 70mm and 80mm, respectively. The upper side is cream white in color with blackened veins. The forewing subapical area is dusted with black and not reaching up to the cell without sub marginal black area. Hindwing veins clustered heavily black with sub marginal black area. UN FW as UP with prominent sub apical spots a row of 6 sub marginal red spots, the spots in area 2 and 3 larger than in area 4, 5 and 6.

Morphology and description of Delias hyparete indica: Male and female butterfly

The wingspan of male and female is 70mm and 80mm, respectively. The upper-side of the forewing and hindwing of the female is creamy white with heavily blackened veins, subapical region dusted with black. The upper-side forewing of male is creamy white with dark black venation while the upper-side hind wing shows very pale venation. The under-side of both male and female are similar in appearance with bright yellow coloration around the inner side of the hindwing. The hindwings have black margins with a row of submarginal red spots.

Egg: The female butterfly lays eggs in clusters on the upper or lower surface of the leaf. The cluster of eggs observed to be 20 to 47 in numbers. The eggs were observed to be cream white in color. Each of the egg is flask shaped with longitudinal ridges running from base to the top. The egg takes about 4–5 days to hatch. The newly hatched larvae are orange in color and with a black head capsule. The body is covered with fine setae.

1st Instar Stage: After hatching from the egg, the caterpillars consumes some part of the egg shell and later start feeding on the epidermal portion of the leaf lamina. The caterpillar grows up to 4mm within 2–3 days. The caterpillar is pale yellow in color.

2nd Instar Stage: The second instar is yellowish brown in color with black head capsule. Pale yellow setae in dorso lateral and lateral rows. At the posterior end of the caterpillar there develops anal plate which is black in color. The body reaches up to 7mm in 3–4 days.

3rd Instar Stage: The body is similar to third instar. The setae is yellow in color. The grows up to 14mm in length in 3–4 days.

4th Instar Stage: The body reaches 22–24mm in length and last up to 4–5 days.

5th Instar Stage: The fifth instar is the final instar. Its reaches about 36–40mm in 6–7 days. It has a large black anal plate. The tail and the head part look similar in appearance and

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sometimes appear larger than the head.

Pupa: After the completion of the last instar stage the caterpillar stops feeding and moves towards a safer place for pupation. The body of the caterpillar shortens and the color of the body is golden yellow in appearance. The caterpillar secures its body by spinning a silk pad at the posterior end by the use of anal claspers. Then the caterpillar body suspends at the mid-section with the help of silk girdles.

Pupal stage: On the end of fifth instar, the caterpillar turns into pupa within a day. The length of the pupa is 24–25 mm. The pupa now suspends itself through the same silk girdle. The pupa attaches its posterior end to the silk pad with the cremaster which is a hook shaped projection at the end of the chrysalis. The golden pupa has a black rostrum at its anterior end. Black spiky structures are present on the dorsal part of the body segments. It takes 28–30 days to complete its life cycle on the host plant.

Notes on pest of *Macrosolen* spp. ([Figure 6F](#))

Tajuria cippus cippus ([Fabricius, 1798](#)) is distributed in Andaman Islands and its status is rare ([Kailash and Rajan 2004](#); [Veenakumari et al. 2008](#)). The butterfly is also distributed in other parts of India except for the arid regions ([Varshney & Smetacek 2015](#)). It is also distributed in Myanmar, Thailand, Laos, Cambodia, Vietnam, Yunan, and Fujian as mentioned in [Table 1](#).

Morphology and description of butterfly T. c. cippus: Male and female butterfly

Upper side male shining metallic blue with about half the forewing up to apex black, black borders on hind wing narrower. Female pale blue but black borders less intense and narrower than in the male, in addition broken black line on hind wing. Underside gray with broken transverse lines close to outer margin on both wings ([Figure 5](#)). Male and female two tailed. The wingspan measures 27–32 mm. The butterfly is distributed in Andaman Islands and its status is rare ([Kailash and Rajan 2004](#); [Veenakumari et al. 2008](#)).

Egg: The butterfly lays egg singly on the axis of young leaf shoots. The egg is dome shaped and whitish in color with subtle green undertone. It takes 3–4 days for the egg to hatch.

1st Instar: The first instar larva after hatching out from the egg is seen skimming on upper and lower surface of the leaf. The larva is yellowish in color and long setae are present on the body. The larva feed on the upper or lower surface of the young leaves leaving many holes. It grows up to 1.8 mm in length. As the larvae grow it appear brown in coloration. The first instar lasts about 2–3 days.

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2nd Instar: The second instar last for 4 days and grows up to 5mm in length. The setae as seen in first instar are absent in this stage. Pale brown patches are seen on the sides.

3rd Instar: The third instar is dark reddish brown in appearance. The dorsal nectary organ and the tentacular organs can be observed. The dorsal tubercles are golden yellow and reddish in coloration. The instar last up to 5–6 days and grows upto 11 mm.

4th Instar: The fourth instar is dark brown in color with prominent whitish posterior patch and the lateral triangular patch. The larvae at this stage look like bird dropping. This is camouflaging behavior of the larvae protect it from the predator. This stage last for 5–6 days. The larva measures 12mm in length.

Pupa: Pupation takes place after 1 day. The pupa turns black after 8–9 days and then adult butterfly emerges out.

The butterfly takes about 28–30 days to complete its life cycle on the host plant.

Impact of herbivory on Loranth host plants

In the present study have observed that two genera of Loranth, *Dendrophthoe* Mart. and *Macrosolen* (Blume) Rchb. appear to be susceptible to damage by butterfly larvae which feed on the plant and affects their growth. The genus *Dendrophthoe* appear to be most susceptible than *Macrosolen*.

Impact of *Delias hyparete indica* on *Dendrophthoe* host plants

Three species of *Dendrophthoe* viz. *D. curvata*, *D. glabrescens*, and *D. longensis* appear to be most susceptible to damage by the larvae of *Delias hypareta indica*, feeding on the plant and affecting their growth. The caterpillar after emergence from the egg feeds on the leaves of the host plant. The larvae initially feed on the epidermal portion of the leaf and at later stages of its development it fully consumes the leaves. Since there are more eggs in clusters, there is competition among the caterpillar for food, so in the later stages the plant is devoid of leaves. It was also observed that the butterfly mostly laid eggs in the pre monsoon season. The host plant leaves are severely damaged by the developing larvae. The larvae lined together in groups and feeds on the leaves. However, when the larvae are about to reach the pre pupa stage, each of the larvae separates them from the group and migrate to a secluded place for formation of pupa till the emergence of butterfly. It was observed that when there is heavy infestation, the host plant gets devoid of leaves as a result of which the branches are exposed and it hardly could recover itself which in turn results in drying of

branches and in later stages this dry branches become dead and detach from its host plant body.

It was also observed that when the host plant on which host the hemi parasitic plant dies off, in later stages the hemi parasitic also die. Since, the host plant tissue dries up, the hemi parasitic plant is unable to draw nutrition from its host plant, dies off and in turn suffers the butterfly larvae which in later stages also fails to survive. The host of hemi parasitic plant and the host plant of butterfly are dependent on each other for their survival. When due to any cause any of the interdependency gets disturbed the whole life cycle of the butterfly gets affected.

During the field study it was observed that *Dendrophthoe curvata* was growing on its host plant *Psidium guajava* L. (1753) of Myrtaceae. The *D. curvata* was host plant to butterfly *D. h. indica*. The *P. guajava* was standing in inclined slope and was old and matured. Due to land slide the guava tree fell off, as a result after some days the hemi parasitic plant surviving on it also died which in turn affected the life cycle of the butterfly. So, all are interdependent on each other for their survival. Similarly, the plants are lost due to natural disasters, natural calamities, landslides and many anthropogenic activities.

The host plants recorded for the *D. glabrescens* are *Mangifera indica*, *Citrus* spp., *Psidium guajava*, *Bergera koenigii* L. (1767) of Rutaceae in the Little Andaman Island. Butterfly, *D. h. indica* lays egg sin cluster on the *D. glabrescens* leaf. The larvae after hatching start consuming upper epidermal tissue of the leaves. During the developmental stage of the larvae, they consume the whole leaf leaving behind the branches which results suppressed plant growth. The plant could not recover itself due to heavy infestation. Finally, the branches dry up and lead to death of the host plant.

It was also observed that the butterfly prefers those host plants (species of *Dendrophthoe*) which are readily available in the concerned locality and heavily damaged.

Impact of *Tajuria cippus cippus* (Fabricius, 1798) on *Macrosolen* host plants

The herbivory of *Tajuria cippus cippus* presents a significant threat to the population of the endemic *Macrosolen* spp., particularly *M. andamanensis*, impacting its growth by targeting young leaves and floral parts. The butterfly lays its eggs singularly on the axis of young shoots and host plant leaves. Despite the butterfly's low population, its damage to the host plant remains minor. Additionally, observations reveal *T. c. cippus* larvae also infesting *Dendrophthoe glabrescens*. These larvae consume soft portions of epidermal tissues, leaving distinctive scratch-like scars and eventually consuming the leaves entirely. This feeding

behavior leads to affected leaves losing their photosynthetic ability, turning brown, and serving as perfect camouflage for the larvae, which feed on the greener parts. Before pupation, larvae migrate to locations on the host plant, such as bark or twigs, for optimal camouflage, potentially aiding in predator evasion.

Discussions

The present study recorded two butterflies *D.eucharis* (Drury 1773) and *D.h. indica* in the ANI which have severely damaged the Loranth host plants. *D.eucharis* (Drury 1773) Common Jezabel is distributed throughout India except Andaman and Nicobar Islands, Lakshadweep (Varshney and Smetacek 2015). However, its presence in the islands has been reported by various authors (Devy et al. 1998; Mohanraj and Veenakumari 2011) and more recently its occurrence in island ecosystem has been recorded by Singh, 2013a, Singh, 2013b.

Account by Veenakumari (2011) mentioned the occurrence of two others species of *Delias* (*D.hyparete*, *D.h. metarete*) apart from *D.h. indica* in the ANI, however during the field study authors never spotted any population of these butterflies. In the present field study good population of *D.h. indica* were observed in flight during the pre-monsoonal season. The host plants of the butterfly are available. Mostly the host plants of this butterfly were mostly recorded on old trees of *Mangifera indica*, *Psidium guajava*, *Manilkara zapota*, *Ficus* spp., *Citrus* spp., which are easily found in the gardens and roadside. Due to increase in human population and various developments works, the old trees hosting these hemi parasitic plants are being cut off which in turn cause a great loss to the surviving butterfly.

Conclusions

Three species of *Dendrophthoe* viz. *D. curvata*, *D. glabrescens*, *D. longensis* and an endemic species of *Macrosolen*, *M. andamanensis* are recorded here for the first time in great detail as new host plants for butterfly larvae from ANI. In the ANI the larvae of butterflies have preferred choice with *Dendrophthoe* species as host plant. The genus *Dendrophthoe* seems has more threat by butterfly larvae than the other Loranth in these islands. Because arthropod herbivores comprise one of the greatest threats and challenge to conservation of hemi-parasitic Loranth *in-situ*, the findings of the present study are relevant for the management, and conservation of Loranth host plants as well as butterflies in India. The present study revealed that among the Loranthaceae the genus *Dendrophthoe* is the most preferred host for the butterflies' larvae as mentioned in Table 1.

Uncited reference

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CRedit authorship contribution statement

Neelam Purti: Data curation, Formal analysis, Investigation, Methodology, Resources, Visualization, Writing – original draft. **Lal Ji Singh:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Resources, Supervision, Validation, Visualization, Writing – review & editing. **Arun K. Pandey:** Conceptualization, Data curation, Formal analysis, Methodology, Resources, Supervision, Validation, Visualization, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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