PRESENT STATUS OF SWALLOWTAIL BUTTERFLIES IN GARBHANGA RESERVE FOREST, ASSAM, INDIA

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Abstract

Garbhanga Reserve forest in Assam has a rich diversity of swallowtail butterflies with 29 species and subspecies belonging to eight genera. Habitat degradation caused by encroachment in fringe areas, illegal logging and stone quarrying is gradually posing a threat to the survival of these butterflies within the forest.

Keywords

Garbhanga, habitat, swallowtail butterflies, threat

The forests of Assam house a rich butterfly diversity. Evans (1932) described about 962 species and subspecies of butterflies belonging to the five families from the Assam region alone. Swallowtails belonging to family Papilionidae are one of the most spectacular insects that have drawn the attention of entomologists and naturalists. Globally 573 species of swallowtails have been identified so far and their distribution and status established (Collins & Morris, 1985). There is a rich diversity of this predominantly forest-dwelling species in parts of East and Southeast Asia. Infact the International Union for Conservation of Nature and Natural Resources (IUCN) has identified northeastern India as one of the 'swallowtail-rich zones' under the Swallowtail Conservation Action Plan (1984).

According to earlier reports of Evans (1932) and Talbot (1939), about 62 species of swallowtails were described from the Assam region alone. However, most of these species are no longer common and the status of some species is either very rare or extinct. From the conservation point of view, swallowtails play a very important role in plant propagation through cross-pollination. Moreover, a majority of medicinal plants are dependant on swallowtails for propagation. A wide variety of both flowering and non-flowering plants support the swallowtails as adult and larval food sources. These butterflies are very sensitive bio-indicators and have very specific habitat requirements. On account of their large size and brilliant colouration, these butterflies (live or dead) have great aesthetic and trade value.

The study was carried out to document the local swallowtail diversity in Garbhanga Reserve Forest ($25^0$55'-$25^0$05'N & $91^0$37'-$91^0$49'E). The total forest cover is about 110km^2 and it is situated in an altitude of 100-200m. The topography mostly comprises of a hilly terrain with a perennial stream. The forest type is mostly mixed deciduous with a few scattered tropical evergreen pockets. The forest has diverse habitats ranging from an upland forest with a thick rainforest canopy to open forested areas with grassy patches and dense undergrowth vegetation along the stream.

Methods

Surveys were carried out at different spots within the study area by point and line transect methods (Barhaum *et al.,* 1980, 1981). The present survey was carried out from 2000 to 2002 during the pre-monsoon, monsoon and the post-monsoon seasons.

Butterflies were collected by chasing and netting as well as by bait trapping as mentioned by the Zoological Survey of India (1990). Surveys were mostly carried out during the first half of the day. The collected specimens were preserved and identified following ZSI (1990), Evans (1932), Talbot (1939), Wynter-Blyth (1957), Mani (1986) and Haribal (1992). One specimen representing each species and subspecies was preserved for future reference. A total of 70 individuals were collected and preserved. The collection included a male and a female of each species, dry and wet season forms and the polymorphic forms. To determine the status of different species within the study area, the number of individuals encountered along the line transect were counted (Barhaum *et al.,* 1980, 1981). The available adult and larval host-plants were recorded in each transect. Host plants were identified by preparing herbarium following Dutta (1982) and Kanjilal (1936-1940).

Results and Discussion

During the survey, 29 species and subspecies of swallowtail butterflies belonging to eight genera were identified in the study area, of which 10 were found to be very rare. They belonged to the genera *Pachliopta, Lamproptera, Atrophaneura* and *Princeps*. Out of the 29 species, nine were black-bodied swallowtails (*Papilio* and *Princeps)* and 11 belonged to the red-bodied group (*Atrophaneura* and *Pachliopta)*. The black-bodied species were observed to prefer damp, shady places in the forest interior covered by canopy of tall trees and dense undergrowth near the water source. However species like the swordtails and zebras (*Pathysa* spp.) were found to particularly prefer open, grassy patches in forest fringes. The bluebottles and jays (*Graphium* spp.) as well as the swordtails (*Pathysa* spp.) and dragontails (*Lamproptera* spp.) were found to be particularly fond of mud puddling along the water stream. The natural preference of all the swallowtails for shady forest areas particularly during mid-day seemed to be controlled by the humidity of the specific area. Moreover, water sources encouraged adult butterflies to mud puddle in large congregations on the sandy patches along the stream.

The dominant larval food-plants of the black-bodied swallowtails belonged to the plant families Rutaceae, Annonaceae, Lauraceae and Magnoliaceae while the larvae of red-bodied swallowtails were found to prefer the plant family

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Table 1. List of swallowtails recorded in Garbhanga Reserve Forest, Assam.

Common name	Scientific name	Wingspan(mm)	Distribution	Preferred larval food plants	Status
Chain Swordtail	*Pathysa aristeus anticrates* Doubleday, 1846	85-90	Indo-Australian		R
Fivebar Swordtail	*Pathysa antipathies pompilius* Fabricius, 1787	80-95	Indo- Australian	*Michelia doltospa, Annona* spp., *Uvaria* spp.	R
Common Mormon	*Papilio polytes romulus* Cramer, 1775 Female polymorphic form: *P. polytes stichius*	90-100	Indo-Australian	*Aegle marmelos, Murraya koengi, Glycosmis pentaphylla,cultured lime and oranges*	C
Great Mormon	*Papilio memnon agenor* Linnaeus, 1758	120-150		Cultivated citrus like orange *(C.sinensis),* Lime *(C.aurantifolia), Murraya* spp., *Triplasia* spp.	C
Great Zebra	*Pathysa xenocles phrontis* De Niceville, 1897	85-120			LC
Lesser Zebra	*Pathysa macareus indicus* Rothschild, 1895	80-100			LC
Common Jay	*Graphiumdoson axion* C. & R. Felder, 1864	70-80		*Cinnamomum* spp., *Polyalthia longifolia, Magnolia grandiflora, M. pumila, Huntheria zeylanica, Trachopermum asiaticum*	LC
Tailed Jay	*Graphium agammemnon agammemnon* Linnaeus, 1758	85-100		*Anona squamosa, Polyalthia longifolia, Michelia champaca, Miliusa tomentosa*	LC
Common Blue Bottle	*Graphium sarpedon sarpedon* Linnaeus, 1758	80-90	Indo-Australian	*Cinnamomum* spp., *Polyalthia longifolia, Michelia doltospa, Millusa tomentosum*	
Common Rose	*Pachliopta aristolochiae aristolochiae* Fabricius, 1775	80-110	Indo-Australian	*Aristolochia indica, A. elegans, A. saccata, A. indica, A. tagala*	R
Crimson Rose	*Pachliopta hector* Linnaeus, 1758	90-100		*Aristolochia* spp.	VR
Common Raven	*Princeps castor polas* Jordan, 1909	100-130		Wild citrus plants	R
Red Helen	*Princeps helenus helenus* Linnaeus, 1758	100-120		All types of wild and cultivated citrus plants	LC
Yellow Helen	*Princeps nephelus chaon* Westwood, 1845	115-130		All types of wild and cultivated citrus plants	LC LC
Common Mime	*Chilasa clytia clytia* Linnaeus, 1758 Dimorphic form: *C. dissimilis*			*Cinnamomum zeylanicum, Litsea chinensis, L.sebifera, Alseodaphne semicarpifolia*	LC
Lime Butterfly	*Princeps demoleus* Linnaeus, 1758	80-100	Indo-Australian	Cultivated lime and oranges, *Glycosmis pentaphylla, Aegle marmelos, Murraya koengi*	C
Green Dragontail	*Lamproptera meges* Tytler	40-50	Indo-Australian Northeastern India	*Illigera cordata*	VR
White Dragontail	*Lamproptera curius* Fabricius	40-50	Indo-Australian Northeastern India	*Illigera cordata* (foliage)	VR
Great Windmill	*Atrophaneura dasarada dasarada* Moore, 1857	100-140		*Aristolochia griffithi, A.saccata, A.tagala, A.indica*	R
Common Windmill	*Atrophaneura polyeuctus* Doubleday, 1842	100-120		*Aristolochia griffithi, Aristolochia shimada, A.saccata, A.indica, A.tagala*	VR
Common Batwing	*Atrophaneura varuna astorion* Westwood, 1842	88-136	Northeastern India	*Aristolochia kaempferi* and other *Aristolochia* spp.	R
Lesser Batwing	*Atrophaneura aidoneus* Doubleday, 1845	100-120	Indo-Australian Northeastern India	*Aristolochia* spp.	VR
White-head Batwing	*Atrophaneura sycorax* GroseSmith	110-130	Northeastern India	*Aristolochia spp.*	VR
Golden Birdwing	*Troides aeacus* C.& R. Felder, 1860	120-190	Indo-Australian	*Aristolochia griffith, A.saccata, A.indica, A.tagala*	R

Common name	Scientific name	Wingspan(mm)	Distribution	Preferred larval food plants	Status
Common Birdwing	*Troides helena cerebrus* C.& R. Felder, 1865	140-190	Indo-Australian	*Aristolochia indica,A.tagala, A.saccata, A.griffithi, Thottea wallichi*	R
Common Peacock	*Princeps polycter ganesa* Doubleday, 1842	120-150	Indo-Australian.	All types of wild and cultivated citrus plants	VR
Paris Peacock	*Princeps paris paris* Linnaeus, 1758	90-120	Indo-Australian Northeastern India	All types of wild and cultivated citrus plants	VR
Common Bianor	*Princeps bianor* Linnaeus	85-130	Northeastern India	All types of wild and cultivated citrus plants	VR
Krishna Peacock	*Princeps krishna* Moore, 1857	120-130	Northeastern India	All types of wild and cultivated citrus plants	VR

C - Common, LC - Less Common, R - Rare, VR - Very Rare; NR - Not Rare.

Aristolochiaceae that included *Aristolochia tagala, A. indica and A. saccata.* However, the present findings have revealed that the distribution of the *Aristolochia* species in the study area was very restricted. It was observed that the swallowtails visited the flowers of *Lantana camara, Hibiscus rosasinensis, Ixora coccinea, Solanum nigrum, Tectona grandis, Saraca indica* which are abundantly available within the study area.

The geographic location of any study area initiates the formation of a good habitat that can support rich butterfly diversity. As the study area harboured 29 species and subspecies of swallowtail butterflies, it can be presumed to have a good diversity of swallowtails, which may be attributed to Garbhanga being an ecotone transitional zone between the Meghalaya Plateau and Assam Valley. Although habitat conditions in Garbhanga are suitable for the propagation of swallowtail butterflies, increasing anthropogenic activities like stone quarrying, illegal tree-felling for fuel and timber and expanding human settlements in the fringe forest areas are slowly destroying the natural habitat of these butterflies leading to gradual decline in their population. To conserve all swallowtails, immediate measures to investigate the causes of habitat degradation both within the forest and adjoining areas must be taken to formulate suitable action plans to save the already dwindling population. Butterfly conservation awareness needs to be created amongst the masses particularly about swallowtail butterflies as they are habitat sensitive and they migrate away from a deteriorating habitat.

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