



Population dynamics of southern birdwing (*Troides minos* Cramer, 1779) in Sirumalai Reserve Forest, Eastern Ghats, India

B. Archana¹, E. Joy Sharmila^{1*}, K. Rangesh², V. Pandi³, S. Susaritha¹ and
S. Kalaiselvi¹

¹Department of Zoology, The American College, Madurai 625 002, Tamil Nadu, India

²Department of Marine and Coastal Studies, School of Energy, Environment and Natural Resources,
Madurai Kamaraj University, Madurai 625 021, Tamil Nadu, India

³P.G Assistant in Zoology, Seventh day Matriculation Higher Secondary School, Melur. Madurai
6250 106, Tamil Nadu, India

Email: archanaabalan18@gmail.com; *kirubai_2007@yahoo.co.in

ABSTRACT: Southern birdwing *Troides minos* (Cramer, [1779]), a large swallow tail butterfly, state butterfly of Karnataka, is endemic to south India. *T. minos* was listed in CITES (Convention on International Trade in Endangered species of wild fauna and flora) and is of high conservation priority. IUCN also recommends close monitoring of *T. minos*. The population trend of *T. minos*, in Sirumalai Reserve Forest, Eastern Ghats was monitored for the period of twenty six months using the line transect method. Higher prevalence of *T. minos* butterflies were observed and recorded over the study. This study highlights the abundance of *T. minos* in certain months of the study period and peak abundance during the post monsoon period.
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KEY WORDS: Papilionidae, swallow tail, abundance, IUCN, CITES, conservation

Papilionidae, the smallest butterfly family constitutes 550 species and is distributed worldwide (Kunte, 2020). India harbors 107 species of Papilionidae; amongst that, peninsular India has only 19 species. India occupies the 6th rank in a list of countries suitable for swallowtail conservation (Kehimkar, 2016). *Troides minos* (Cramer, [1779]), a striking swallowtail butterfly is the second largest butterfly in India with a wing span of 140-190mm. Members of Papilionidae are conspicuously large in size with similar body forms with long and slender legs, round and narrow head with black eyes and coiled

proboscis. They also have a large thorax and even larger abdomen with contrasting longitudinal lines. Both wing surfaces have similar markings with subtle differences (Powell, 2009).

Most of the papilionidae species are forest dwelling species, except a few known to be associated with open habitats. *Troides* species are also one of the forest dependent species (Rajeswari and Jeyabalan, 2017). In previous studies, *T. minos* was declared as endemic to Western Ghats (Goankar, 1996). But in later studies it was confirmed that Southern

* Author for correspondence

birdwing is also present in few regions of Eastern Ghats (Sharmila and Thatheyus, 2014; Ponraman *et al.*, 2015; Sundar rajan *et al.*, 2016). IUCN (1990) recommends close monitoring of this species. In the present study, prevalence of *T.minos* was examined for twenty six months in Sirumalai Reserve Forest, Tamil Nadu, India.

Sirumalai is a dense forest region of about 60,000 acres, situated between 10°07' - 10°18' N latitude and 77°55' - 78°12' E longitude; Much of the Sirumalai is covered by deciduous forest and the lower slopes are covered by dry deciduous. In the present study Sirumalai Reserve Forest area was divided into eight transects, site 1 (Konganuthu), site 2 (Puli sathuodai), site 3 (Ulkombai saragam), site 4 (Kannimarkovil), site 5 (Vellode), site 6 (Kuranguthopu), site 7 (Ambathur beat), site 8 (Kadaman solai), based on different altitudes. Line transect sampling method (Pollard and Yates, 1993) was followed in the eight sites for monitoring the prevalence of *T.minos* within the forest reserve. Identification of *T. minos* was done by using standard keys from literature (Wynter-Blyth, 1957; Haribal, 1992). The influence of microclimatic factors like temperature, relative humidity, light intensity and wind speed were noted time to time during the observation period (Kunte, 1997).

Prevalence of *T. minos* was observed for a period of twenty six months from September 2020 to October 2022 and four hundred and fifty numbers of *T. minos* butterflies were observed. *T. minos* was more prevalent during the post monsoon months (October, November and December) of 2020, and

T. minos population was absent during the months of summer (April, May and June) in 2021 (Fig.1). Relative abundance of *T.minos* was distributed irregularly throughout the year, but the greatest number of individuals were observed and recorded in post monsoon season. The uncertain species abundance may be due to the environmental stochasticity.

Climatic constancy is important for perseverance of butterfly population (Roy *et al.*, 2001). The underlying correlation between microclimatic factors and abundance of *T. minos* in Sirumalai Reserve Forest was analyzed by using Pearson correlation coefficient in PAST statistical software. The environmental factors humidity ($r^2= 0.1598$) and wind speed ($r^2=0.25389$) are positively correlated with *T. minos* abundance in Sirumalai Reserve Forest, whereas, temperature ($r^2= -0.426$) and light intensity ($r^2= -0.3360$) are negatively correlated (Table.1).

The effect of seasonal change is evident on the vegetation. The availability of host plants is the clear pre-requisite for the survival of the species. *Troides* species larvae are exclusive feeders of *Aristolochia* (Yao, 2015). *Aristolochia* species are one of the important plants, suitable for larval food for *Troides* sp and contain Aristolochic acids, causing both the adult and larva to be unpalatable to predators (Mebs and Scheinder, 2002). *Lantana camara*, an invasive species of Indian subcontinent, was the most prevalent nectar plant for *T.minos* in the study area. The greater availability of larval host plants and adult nectar sources at the season

Table 1. Pearson's Correlation coefficient between microclimatic factors and abundance of *Troides minos* in Sirumalai Reserve Forest

Microclimatic factors	Temp (°C)	Humidity (%)	Wind speed(m/s)	Light intensity(lux)	Density of <i>T. minos</i>
Temperature (°C)		-0.14741	-0.38006	0.46578	-0.42609
Humidity (%)	-0.14741		0.27154	-0.536	0.15989
Wind speed (m/s)	-0.38006	0.27154		-0.68414	0.25381
Light intensity (lux)	0.46578	-0.536	-0.68414		-0.33606
Density of <i>T. minos</i>	-0.42609	0.15989	0.25381	-0.33606	

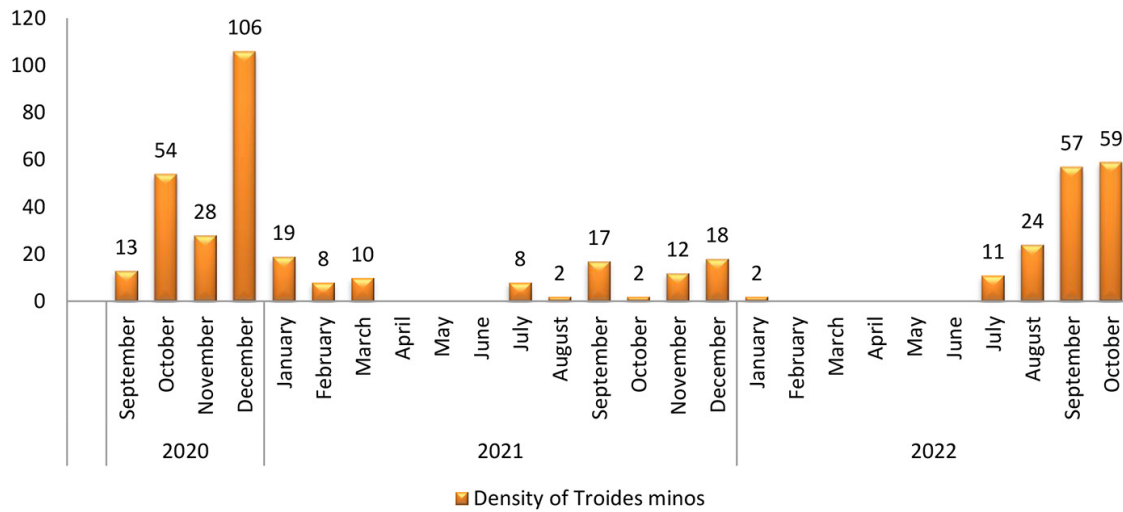


Fig.1 Prevalence of *Troides minos* during the study period in Sirumalai Reserve Forest

of wetter years may be the reason for migrants to replenish (Hu *et al.*, 2021). Different butterfly species prefer different altitudes based on the availability of food source. Based on the study, *T.minos* prefers medium or higher altitude. Thick canopy in higher altitudes protects the butterflies from extreme conditions and increases its fitness (Pellet *et al.*, 2012).

Population dynamics of Southern birdwing seems to be counter intuitive (Hu *et al.*, 2021). Dispersal of butterflies has an immense importance in setting up of population dynamics. Southern birdwing population might be prevalent in the study area due migration from some other areas. Studying other aspects of butterfly biology contributes to its conservation (Devi *et al.* 2021; Sharmila *et al.*, 2022; Archana *et al.*, 2022). Conservation measures are needed to save the species of *T. minos*. Encouraging plantations of suitable host and nectar plants within the forest reserve will help to augment the number of *T.minos* butterflies in Sirumalai Reserve Forest and in addition it will also help to improve ecotourism.

ACKNOWLEDGEMENT

The authors are grateful for the financial assistance given by TNSCST and Dr. Davamani Christober, Principal and Secretary of The American College, Madurai, for providing proper facilities.

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(Received January 02, 2023; revised ms accepted June 05, 2023; published September 30, 2023)