



### **Migration of crimson rose butterfly (*Pachliopta hector*) from India to Sri Lanka**

Migrations of butterflies are common phenomena, yet they are one of the greatest natural events on earth. The migration of monarch butterflies, *Danaus plexippus* (L.) is a spectacular event that has received great attention in northern America. They travel 1,200–2,800 miles from the northeast United States and southeast Canada to the mountain forests of central Mexico, where they find suitable climatic conditions to hibernate from the beginning of November to mid-March (WWF 2022). This swarming occurs primarily across North American land mass, so does not cross the sea. Although migration appears to be widespread among butterflies, its prevalence, and migration behaviours, are poorly understood.

In Sri Lanka, some findings show that occurrences and the diversity of butterflies depend on seasonality. Butterfly community structure changes with the availability of resources within their habitat, which varies with the season. Some butterfly species show migratory behaviour to overcome harsh conditions in certain seasons (Weerakoon & Ranawana 2021). Huge numbers of butterflies swarming in Sri Lanka was common in the past (Fletcher 1907, Mackwood 1913, Wickwar 1906, Willey 1908, Williams 1927, 1933), but there have been no such observations in recent times. Numbers of butterflies migrating seem to have declined but there are no actual records. Occasionally, butterfly migrations can be observed during January and February in different locations and in smaller numbers (personal observations). However, migration behaviour of butterflies in Sri Lanka requires further study.

Crimson rose, *Pachliopta hector* (L.) is a common butterfly in Sri Lanka and India. It belongs to the family Papilionidae (Swallowtails) (van der Poorten & van Der

Poorten 2016). It is an eye-catching butterfly and is recognized as a migrant in Sri Lanka (Woodhouse 1950). They are big butterflies that can be easily identified by the black velvety wings and the brilliant crimson spots on the upper side of the hind wings. Usually, the abdomen and thorax are marked with red. They have been recorded over the sea between Sri Lanka and India (van der Pooten & van der Pooten 2016). Here we report observations on the migration of crimson rose butterflies from India to Sri Lanka from three locations: (1) locations in India, (2) over the sea in the Gulf of Mannar, between India and Sri Lanka and (3) on the north-eastern beaches of Sri Lanka.

**Observations in India.** Butterflies were observed at Dhanushkodi beach (9°10'47"N, 79°25'09"E) in Southern India. Dhanushkodi beach on Pamban Island is on the last island of India before Sri Lanka. Thalaimannar (9°5'03"N, 79°42'03"E) is on the nearest land mass of Sri Lanka to India. The Political boundary of Sri Lanka and India is a 24km distance across the sea (Fig. 1). There is no land mass in between except for a few tiny sand dune islands.

A huge number of crimson rose butterflies were observed gathering on the sandy Dhanushkodi beach on the 14<sup>th</sup> of February 2022. They were feeding on nectar from the flowers of giant milk weed, *Calotropis gigantea* (L.) (Asclepiadaceae; Fig. 2). These butterflies moved from India flying across the Indian Ocean in a south easterly direction towards Sri Lanka after feeding on the nectar of the giant milk weed. It is possible that the nectar was required to provide enough energy for them to swarm towards the next land across the sea without touching water (Brower *et al.* 2006). However, this needs further study before robust conclusions can be drawn.

**Observations over the Sea.** Fishermen, whale watching groups, and ourselves witnessed crimson rose butterflies above the sea between India and Sri Lanka (Gulf of Manner) flying towards Sri Lanka during January–March in 2022. These observations were from the sea

close to Kandakkuliya (8°12'29"N, 79°41'43"E), Kalpitiya, in Sri Lanka. Red and black butterflies were seen flying towards Sri Lanka and hundreds of dead butterflies were seen floating on sea. This was 60–70Km away from Dhanuskodi (Fig. 1). According to fishermen this is common during December–March every year. Kandakkuliya is around 95km away from Dhanushkodi.

Around 15km away from mainland Sri Lanka close to Kalpitiya, we observed low numbers of crimson rose butterflies flying toward Sri Lanka. In December 2019, the first author observed a few crimson rose butterflies above the sea 2–3km away from Kalpitiya beach, Sri Lanka. They were flying slowly towards Sri Lanka around 10 feet above the water. As this was close to the beach there is hope that they reached land.

**Observations in Sri Lanka.** After recording thousands of butterflies on Dhanushkodi beach in India we visited Thalaimannar, which is the closest proximity to Dhanushkodi in Sri Lanka, on the 18<sup>th</sup> 26<sup>th</sup> and 27<sup>th</sup> of February 2022. On the 18<sup>th</sup> no crimson rose butterflies were seen on the coast (8°58'42"N, 79°53'39"E) adjacent to Thalaimannar. During later visits on the 26<sup>th</sup> and 27<sup>th</sup> of February 2022 we found a few crimson rose butterflies flying towards the Thalaimannar coast. During those days the wind direction was from the north east, which means that they could have been pushed southward preventing them from reaching Sri Lankan land except for the few that we saw.

During a further visit to Kandakkuliya (8°12'29"N, 79°41'43"E), Kalpitiya area, 100km south of Thalaimannar, a few days after the visit to Thalaimannar, we found a small number of crimson rose butterflies in separate locations energetically moving to find food plants but we did not record numbers. If these butterflies were from India, they were able to fly around 113km across the sea without stopping, perhaps supported by wind. However, this needs further investigation as they could possibly be Sri Lanka dwellers rather than migrants.

Crimson rose butterflies gather on the most southerly coast of India, especially at Dhanushkodi. They must then cross the sea. This is a high energy consuming activity as they must fly 24km over the sea without any rest to reach the nearest land in Sri Lanka. They feed on nectar, especially from giant milkweed flowers, which are prominent on the beaches, presumably

to fulfil the high energy requirements before flying over the sea (Brower *et al.* 2006).

Then they cross the sea, but the wind may push them south not allowing them to reach land in Sri Lanka, except for a few strong butterflies. We believe that this wind is one reason for the low numbers of crimson rose butterflies arriving at Thalaimannar from the sea. In lighter winds many more might reach Thalaimannar. Records of 100s of dead crimson rose butterflies in the sea, especially in the southern part of the Gulf of Mannar, around 50–70Km away from Dhanushkodi suggests that many crimson rose butterflies are not strong enough to cross the sea.

Here we have concentrated on Dhanushkodi, but other coastal parts of southern India should be monitored for more information and further study. If crimson rose butterflies were found to be departing from Kodiyakarai Sanctuary in India, they would most probably land in northern Sri Lanka. Apart from this migration behaviour from India to Sri Lanka, scientists have questions to solve about whether crimson rose butterflies then migrate on to the south or east or south-east of Sri Lanka. van der Poorten & van Der Poorten (2016) reported a third-party report of crimson rose butterflies seen 22km off the east coast of Sri Lanka flying eastward. For this to be understood, further observations are required both in India and Sri Lanka.

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**Figure 1.** Map of southern India and Sri Lanka showing Dhanushkodi, Thalaimannar, Kalpitiya and Kandakkuliya beaches. Map is extracted from Google Earth



**Figure 2.** Crimson rose butterflies, *Pachliopta hector* (L.) feeding on nectar from *Calotropis gigantea* (L.) flowers on a sandy beach at Dhanushkodi, India. © Photo: Paulmathi Vinod

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