From Dung to Decay: The Unusual Diets of Butterflies

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Abstract

Butterflies are often known for feeding on nectar, but it doesn't provide all the nutrients they need for growth and reproduction. During an expedition in Arunachal Pradesh, India, we observed species feeding on alternative sources like dung, carrion, and ash. These unusual diets supply essential nutrients such as amino acids and minerals, allowing butterflies to thrive in nutrient-poor environments. Species like the Paris peacock (*Papilio paris*) and Orange oakleaf (*Kallima inachus*) displayed these behaviors. By feeding on decaying matter, butterflies play a role in nutrient recycling and ecosystem health. This study highlights their adaptability and calls for further research into their ecological roles.

Keywords: Butterflies, coprophagous, saprophagous.

Introduction

Butterflies are often known for their vibrant colours and delicate beauty, captivating enthusiasts and researchers alike. While nectar provides butterflies with essential sugars and some nutrients, it does not supply all the nutrients required for their growth and reproduction. Hence, nectar seekers often engage in a behaviour known as mud-puddling, where they gather in large groups to use their proboscis to absorb fluids from sources like soil, dung or carrion. In response, some butterflies have evolved to exploit alternative food sources to meet their nutritional needs (Beck et al. 1999). Dung and decaying organic matter offer valuable nutrients, such as amino acids, salts, and minerals, which are often absent from nectar. These diets may also help them establish intestinal to microbes. Understanding these atypical feeding behaviours provides insight into the survival strategies and ecological roles of butterflies.

From July 31, 2024 to August 10, 2024, during the monsoon season, we conducted an expedition for butterflying and mothing in the Upper Siang and Dibang Valley regions of Arunachal Pradesh, India. This region, renowned for its rich biodiversity and varied topography, offered a unique opportunity to observe and document a wide range of butterfly and moth species. The expedition took place across diverse elevations, ranging from approximately 700 to 2000 meters above mean sea level. The varying altitudes provided access to different ecological zones, from subtropical to temperate, which are crucial for understanding the distribution of butterfly species in this region.

During the expedition, several notable butterfly species were encountered. Photographs were taken using a Canon 70D camera to aid in identification. Field identification was initially carried out using standard butterfly and moth field guides and an online database about butterflies in India (Kunte et al., 2024). For

Study area and observations



Figure: 1 & 2 Green Commodore butterfly exhibiting coprophagy; 3 Red Admiral butterfly exhibiting coprophagy; 4 Orange oakleaf butterfly exhibiting saprophagy on dead snake; 5 Lycaenid butterfly exhibiting mud puddling; 6 Red Helen butterfly exhibiting mud puddling; 7 Indian Nawab butterfly exhibiting ash feeding; 8 Vagrant butterfly exhibiting ash feeding.

accurate identification, we consulted experts Mr. Sanjay Sondhi, a Dehradun-based naturalist and Mr. Fahim Khan, a lepidopteran enthusiast. During the expedition, several notable butterfly species were

encountered, including Paris peacock (Papilio paris), Yellow Gorgon (Meandrusa payeni) and White Dragontails (Lamproptera curius) belonging to the family Papilionidae, Orange oakleaf (Kallima inachus), Amber jungle queen (Stichophthalma sparta), Blue duke (Bassarona durga), Vagrant Indian Nawab (Charaxes (Vagrans egista), bharata), Cruiser (Vindula erota), Sailor (Neptis hylas) and Large Yeoman (Cirrochroa aoris) belonging to the family Nymphalidae and many others. We observed them feeding on unusual diets. While most butterflies are known for their reliance on nectar, many species in this region were seen feeding on alternative sources like animal dung (Fig. 1, 2, 3), dead animals like snakes (Fig. 4), mud puddling (Fig 5, 6), and even ash (Fig. 7, 8).

Dung feeding/coprophagous butterflies: Feeding on dung is an adaptation observed in a few butterfly species (Hewavitharana et al. 2013). By consuming dung, butterflies gain nitrogen and other minerals otherwise scarce in their typical that are nectar sources. This adaptation enables them to thrive in environments where nectar is not readily available or is of poor quality (Molleman et al. 2005; Ravenscraft & Boggs 2016). Species like Hermeuptychia hermes and Colobura dirce have been documented feeding on dung and decomposing organic matter. These butterflies are typically found in tropical and subtropical regions, where dung is more accessible and decomposition processes are more prevalent (Krenn et al. 2010). The ability to utilize dung as a food source allows these butterflies to supplement their diet and enhance their survival and reproductive success.

Feeding on dead animals/ saprophagous butterflies: Butterflies feeding on dead animals, including reptiles such as snakes, is an even more unusual behaviour. While there are few documented cases of butterflies consuming dead snakes, species like the Nymphalis xanthomelas, Kaniska canace and Vanessa indica, are known to visit carrion and decaying matter for nutrient supplementation (Ômura, 2001; Ômura & Honda, 2003). Butterflies feeding on dead reptiles may be more common in environments with scarce nectar sources. In such cases, alternative food sources, including dead become crucial for meeting animals, their nutritional requirements such as amino acids, salts, and minerals, which are not readily available from their usual nectar sources (Laxmisha & Ramesh, 2023). This behaviour is particularly prevalent in tropical and subtropical regions, where the decomposition of large animals is more common, providing an accessible source of essential nutrients.

Conclusions

The study of butterfly feeding behaviours, particularly those involving dung and decaying organic matter, reveals a remarkable adaptability and their resilience in the face of environmental challenges. While nectar remains the primary food source for most butterflies, the ability to utilize alternative food sources such as dung and dead animals highlights their ecological flexibility and survival strategies. By breaking down and recycling organic waste, these butterflies contribute to the health and functioning of their habitats. Their feeding behaviour aids in the decomposition process, returning essential nutrients to the soil and supporting plant growth.

Further research is needed to explore the full extent of these unconventional feeding behaviours and their implications for butterfly ecology. Investigating the nutritional benefits of feeding on dung and dead animals, as well as the specific environmental conditions that drive such behaviours, will enhance our understanding of butterfly adaptations and their roles in ecosystem processes.

In summary, the diverse feeding behaviours of butterflies, from nectar to unusual diet, underscore the complexity and adaptability of these fascinating creatures. Their ability to utilize a range of food sources highlights their critical role in maintaining ecological balance and provides valuable insights into their survival strategies.

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