



DIET PREFERENCES OF MIGRATORY BIRD ROSY STARLING (STURNUS ROSEUS) DURING STOPOVER AT NAGPUR, MAHARASHTRA (INDIA) AND POSSIBLE ROLE OF PHYTOCHEMICALS

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Abstract

The Rosy pastor or Rosy starling (*Sturnus roseus*) is a passerine bird belonging to family Sturnidae. It is a passage migrant in Pakistan and north India. It is autumn and spring visitor in the Deccan peninsula. Rosy starling arrives in Nagpur city in the Deccan peninsula (state of Maharashtra, India) at the end of autumn and stays during the spring. During the stopover in Nagpur large population of Rosy starling have been observed feeding mainly on the nectar of Palash flower (*Butea monosperma*), occasionally on Semal (*Bombax ceiba*) and few other trees. *S.roseus* are popularly called as "Palash maina" in Nagpur. The aim of the present study is to understand the preferences of *Butea monosperma* flowers in the diet of *S.roseus* during a stopover at Nagpur. The present study includes qualitative phytochemicals analysis of *Butea monosperma* flowers. The results suggest that these flowers contain phytochemicals like carbohydrate, protein, phenol, anthocyanin and flavonoids that help to refuel and give immunological benefits to *S.roseus* during long distance flight.

Keywords: *Sturnus roseus*, Migration, Nagpur, *Butea monosperma*, phytochemicals.

Introduction

Migration is widespread in birds living in the seasonal environment with fluctuating food resources. Birds show intermittent resting and refueling phases (stopovers) during long distance migration (1). Rosy Starling (*Sturnus*

roseus) is an exceptional species of birds which shows its ability and adaptability to a remarkable east-west distant migration route as against normal north-south route taken by waterfowl species in India. Food consumption depends on the birds' energy demands but also is modified by the composition, food preferences and availability of various food types. During breeding season *S. roseus* has been observed feeding on grasshoppers hence valued as a biological control in China (2). It is a late spring and post-monsoon migrant in Pakistan (3). Even banyan, peepal figs and other berries are eaten by *S. roseus*. (4). In Nagpur city (21° 09' N, 79° 09' E), flocks of *S. roseus* were commonly observed sucking nectar of Palash (*Butea monosperma*) occasionally semal (*Bombax ceiba*) flowers. Similar observations were also noted from Pohara-Malkhed Reserve Forest, Amravati district in the Deccan peninsula (5). It has been mentioned that during migration birds such as song birds undergo oxidative stress which influences dietary antioxidant preference (6).

Sturnus roseus (Rosy Starling)

Taxonomy

Kingdom	-	Animalia
Family	-	Sturnidae
Genus	-	<i>Sturnus</i>
Species	-	<i>roseus</i>
Other names	-	'Palash maina'

Description: Passerine bird Rosy Starling is a rose-pink myna-like bird measuring about 21 cm in length with a glistening black head, neck,

wings and tail and rose-colored chest. In the breeding season, males show elongated head, feathers which form a wispy crest that is fluffed and more prominent when the bird gets excited (7). The rosy starling is a highly social bird, feeding and migrating in flocks and roosting communally. The number of *S.roseus* in small flocks or 'clouds' are up to 500 or more. Even in dense colonies, it will rarely show aggression toward other individuals.

***Butea monosperma* (Palash)**

Taxonomy

Kingdom - Plantae
 Family - Fabaceae
 Genus - *Butea*
 Species - *monosperma*
 Other names - Palash, Palas, Flame of Forest

Description: This tree is found throughout India, growing up to 15 m tall. Flowers are 2.5 cm long, bright red, and produced in racemes up to 15 cm long. The fruit is a pod 15-20 cm long and 4-6 cm broad (8). Palash tree loses its leaves as the flowers develop. Flowers start appearing in February and the flowering season lasts up to the end of April. The flowers form a gorgeous canopy on the upper part of the tree, giving an appearance of a flame from a distance. The flowers show characteristics of bird pollination being large and bright orange-red in colour with copious amounts of nectar and exhibiting diurnal anthesis (9). It was observed that tree sheds leaves during spring when flowering occurs. During this period birds were commonly seen on this tree at any time of the day, between sunrise and sunset, at least a few birds were occupying the tree. Interspecific competition seems to be absent probably because there are abundant flowers present for foraging or sucking nectar. *Butea monosperma* flowers are found to have antihyperglycemic activity, anticonvulsive activity, anthelmintic activity, antioxidative, and hepatoprotective potential (10-14).

Material and method

In the present study, twelve sites in Nagpur city have been selected. Observation sites were selected by the presence of flocks of birds which also coincided with the blooming of *Butea monosperma* (Palash) flowers. Feeding behavior of *S.roseus* was observed for six years (2012-2018) in the months from Feb to April. Regular field visits were made throughout this period from 7 a.m. to 9 a.m. in the morning. The roosting behavior was observed from 4.30 p.m. to 6.30 p.m. in the evening. Data on present bird species was collected by direct observation method with the help of Olympus Binocular 10*50 X. For photography Canon camera – EOS 550 D, Lens 100-400 was used.

Collection and identification of plant material

Since flocks of *S. roseus* were mostly observed sucking nectar and foraging on petals of Palash flowers, these flowers were collected from Satpuda botanical garden Nagpur. The herbarium was authenticated and the voucher specimen was deposited at Post Graduate Teaching Department of Botany RTM Nagpur University (Ref. No. 9814) for further reference.

Extract preparation and phytochemical screening

Freshly collected flowers were shade dried for 10-15 days and then coarsely powdered. For extraction of crude phytochemical, 5 g of powdered flower material was kept in a closed conical flask with 20 mL various solvents like methanol, ethanol and distilled water in a shaker at room temperature for 24 h. After incubation, the extracts were filtered through many layers of muslin cloth and the extracts were collected and stored in the refrigerator at 4°C [15].

All the extracts were subjected to preliminary phytochemical screening as per the methods are given by, Harborne (1973), Trease and Evans (1983), Kokate C.K. (2000), [16-18]. There is no previously isolated compound.

Table 1: Preliminary phytochemical screening of *Butea monosperma* dried flowers

Phytochemical constituents	<i>Butea monosperma</i> Flower Extract		
	Distilled Water	Methanol	Ethanol
Carbohydrate	+++	-	-
Protein	+++	+++	+++
Saponin	-	-	-
Fats	-	-	-
Phenol	+++	++	+++
Anthocyanin	+++	+++	+++
Sterol	-	-	-
Flavonoid(Shinoda)	-	+++	-

(-) absent; (+) low; (++) average; (+++) high.

Results and discussion

Results reported in table 1. According to the phytochemical screening results, it was confirmed that by foraging or sucking nectar of *B. monosperma* flowers birds obtained carbohydrate, phenol, protein, anthocyanin and flavonoids. As evident from Table 1 it was noted that absence of fats, saponin and sterol in any of the three extracts. Similar results were obtained by Gavit [19]. Observation indicated presence of flavonoid in the methanolic extract. Flavonoids act as superoxide scavengers and antioxidants [20]. The selection of stopover sites by the birds appears to be dependent on the availability of foods rich in flavonoids. It appears that during autumn migration, the birds select fruits with more flavonoids, anthocyanins and phenolic compounds to protect themselves against the potentially damaging effects of oxidative stress caused by the long-distance fasting flight. It was found that food preferences that are rich in antioxidants play a major role in long-term survival of the Rosy Starling by suppressing oxidative stress.

Conclusion

Migratory birds *S. roseus* prefer *Butea monosperma* flower nectar during their stopover at Nagpur, conservation of these plants may help in overcoming oxidative stress and refueling for their successful migration. Along with local birds, migratory birds like Rosy Starling (*Sturnus roseus*) were tremendously benefited by including *Butea monosperma* flowers in their diet.

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