



Indian Treepie *Dendrocitta vagabunda parvula* (Latham, 1790) (Passeriformes: Corvidae) as a natural enemy of the pests of coconut and areca palm plantations

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ABSTRACT

Indian Treepie *Dendrocitta vagabunda parvula* (Latham, 1790) (Passeriformes: Corvidae), is a widespread resident bird commonly found in coconut and areca palm plantation belts. Food and feeding habits of Indian Treepie were studied by direct focal observation method gut content analysis and faecal matter analysis in an agricultural belt in south Malabar, North Kerala. Indian Treepie prefers coconut and areca palm plantations for foraging activities, and is an omnivore feeding on animal and plant items ranging from invertebrate to vertebrate species, with insects forming the main group. Its unique prey catching methods namely, hang feeding and shake and wait catch methods enable the bird to consume the hiding insects from the lengthy fronds of coconut and areca palms, which are inaccessible to other insectivorous birds. Capacity of Indian Treepie to feed on the lower side of the fronds is the reason for its higher incidence in coconut and areca palm plantations. This feature makes it as a natural enemy of the insects living on the fronds of palm trees. As it feeds up on many pests of agricultural crops like grasshopper, red palm weevil, banana stem weevil, cockroaches, nestlings of house rat and squirrel, Indian Treepie is an important biocontrol agent in the agro ecosystem of the region. Areca nut harvesting practices and predation by Jungle Crow are the major causes of egg loss and nestling loss of Indian Treepie in the region.

Key words: *Dendrocitta vagabunda*, palm fronds, hang feeding, natural enemy

INTRODUCTION

Indian Treepie, *Dendrocitta vagabunda parvula* (Latham, 1790) (Passeriformes: Corvidae), is a wide spread arboreal noisy bird seen in coconut and areca palm plantation belts in south India. People in the region treat Indian Treepie as a bad omen and drive away, kill and destroy the nestlings and nest (Basheer, 2010). There is no record about it as a pest of crops and predator on domestic animals. Other than the brief notes on its feeding preference on flowers of red silk cotton (*Bombax ceiba*), Indian coral tree (*Erythrina indica*) and fruits of jackal jujube (Zacharias and Gaston, 1983) and cashew apple (Thirumurthy and Balashanmugam, 1987), predation of red palm weevil *Rhychophorus ferrugineus* (Krishnakumar and Sudha, 2002), cannibalism (Chhangani, 2004) and role in pollinating *Bombax ceiba* (Raju *et al.*, 2005) nothing is known about its feeding habits. Studies on the biology and ecology of the Indian Treepie in coconut and areca plantations in the south Malabar region in North Kerala (Basheer, 2010) revealed that it feeds upon a variety of prey items which includes a number of pests. In the present effort, information about the pest items fed by the Indian Treepie,

its lesser known and mostly ignorant role as a natural predator of a number of pests is detailed out.

MATERIALS AND METHODS

The study was conducted in the coconut and areca palm plantations at Kizhakkoth panchayat (11°24' N; 075°53' E), a rural agricultural village (19.85 sq. km) in Kozhikode district which falls under Malabar coast moist deciduous forest eco region. Food items of Indian Treepie were determined by direct focal observation method (Altman, 1974), gut content analysis (Ahulu *et al.*, 2006) and faecal matter analysis (Corlett, 1998; Girish, 2006). Birds were monitored from a distance of 10 - 15 m by hiding behind trees with a binocular and a telescope (20 x); at the rate of 1 hr/day for 10 days/month, during 2005 period. Altogether 120 visits were made. Gut contents of four dead birds spotted from the study site were analysed. Ten fresh faecal matter samples collected from the ground was rinsed in water and the materials were sorted using a brush and magnifying glass. Collected items were identified up to order/family/genus/species level. Food items were quantified according to their frequency of occurrence (F.O). The presence

of an item, despite the number of individuals containing in the sample was taken as frequency of occurrence (F.O) (Rocha *et al.*, 2008). Percentage of occurrence (P.O) was quantified by counting all occurrences of an item to estimate the minimal number of preyed individuals. Since the faecal matter analysis solely emphasised the undigested hard tissues of the consumed items, the P.O was not considered.

RESULTS

Diet analysis (direct focal observation, gut content analysis and faecal matter analysis) revealed that the prey items consist of 14 pests present on coconut and areca plantation belts which include insects, snails and vertebrates. The 64 per cent were insects. It includes the most common pests of coconut palm namely red palm weevil (*Rhynchophorus ferrugineus*), leaf-eating caterpillar (*Opisina arenosella*), larvae of various other insect groups and a major pest of banana, banana stem weevil (*Odoiporus longicollis*) (Sahayaraj and Kombiah, 2009). In addition to the lesser known pests of coconut palm namely, snails and earwigs, one chrysomelid beetle and orthoptera were found to be among the major food items.

Among the vertebrate pests, nestlings of squirrel (*Funambulus* sp.), house rat (*Rattus rattus*), black-headed munia (*Lonchura malacca*) and blue rock pigeon (*Columba livia*) and eggs of black-headed munia were found. According to direct focal observation method the most accounted invertebrate groups were grasshoppers, earwigs, insect larvae, red palm weevil and cockroach in F.O method; insect larvae, grasshopper, cockroach, earwig and beetle (Chrysomelidae) in P.O method (Table 1). The vertebrate groups were black headed munia (nestlings 3.3% /eggs 2.5%), nestlings of squirrel and house rat in F.O method and black headed munia and nestlings of house rat in P. O method.

DISCUSSION

Major finding of the present study is the recognition of the beneficial role of Indian Treepie as a natural predator of numerous major pests of the coconut and areca palm trees that remained unnoticed. Its ability to reach up to the bottom side of fronds of coconut trees which is not foraged by any other bird elevates its position as a special niche predator in palm plantations. In addition to the hang feeding, shake and wait catch method of food capturing (Basheer, 2010) enables

Table 1. Prey records of Indian Treepie

Common name	Order/Family/Genus/Species	Direct focal observation				Gut content analysis				Faecal matter analysis	
		F.O.		P.O.		F.O.		P.O.		F.O.	
		N	%	N	%	N	%	N	%	N	%
Grasshopper	Orthoptera	96	80.0	247	15.5	3	75	7	9.3	8	80
Earwig	Forficulidae	86	71.7	197	12.3	2	50	7	9.3	6	60
Insect larvae	Various groups	76	63.3	375	23.5	4	100	12	16.0	0	0
Beetle-1(Red palm weevil)	<i>Rhynchophorus ferrugineus</i> Curculionidae	74	61.7	89	5.6	2	50	3	4.0	7	70
Cockroach	<i>Periplaneta</i> sp	73	60.8	226	14.2	4	100	10	13.3	10	100
Beetle -2	Chrysomelidae	67	55.8	189	11.8	4	100	13	17.3	8	80
Snail	Pulmonata	64	53.3	103	6.4	2	50	5	6.7	4	40
Beetle -3	Unidentified Curculionidae	45	37.5	57	3.6	3	75	8	10.7	7	70
Leaf-eating caterpillar	<i>Opisina arenosella</i> Oecophoridae	43	35.8	54	3.4	2	50	5	6.7	0	0
Beetle- 4 (Banana stem weevil)	<i>Odoiporus longicollis</i> Curculionidae	33	27.5	41	2.6	3	75	4	5.3	4	40
Black-headed Munia (nestling)	<i>Lonchura malacca</i>	4	3.3	7	0.4	0	0	0	0.0	0	0
Black-headed Munia (egg)	<i>Lonchura malacca</i>	3	2.5	5	0.3	0	0	0	0.0	0	0
Squirrel (nestling)	<i>Funambulus</i> sp.	2	1.7	2	0.1	1	25	1	1.3	0	0
House rat (nestling)	<i>Rattus rattus</i>	2	1.7	3	0.2	0	0	0	0.0	0	0
Blue Rock Pigeon (nestling)	<i>Columba livia</i>	1	0.8	2	0.1	0	0	0	0.0	0	0
				Total	1597	100			75	100	

F.O. – Frequency of Occurrence; P.O – Percentage of Occurrence

the bird to flush out the hiding insects from the lengthy fronds of coconut and areca palms. Height of the plant and the difficulty in reaching up to the lower side of the fronds makes chemical control of coconut palm pests often practically impossible. Spraying insecticides with dusting machines that can reach up the canopies of tall palms are costly and treatments involve the danger of drifting insecticides causing harm elsewhere. Further, most chemicals are expensive and some may be handled by trained personnel only. For all these reasons, biological control is preferable wherever possible. However, biological control is a complex matter and the controlling agent cannot always be found locally (Ohler, 1999). Capacity of Indian Treepie to feed upon adult and larvae of many insect pests on the lower surface of the palm leaflets indicates its utility as a natural predator and biological control agent.

Among the insect pests consumed, red palm weevil is a concealed tissue borer attacking palm species worldwide (Sadakathulla, 1991) and is affecting about 11.65 % of palm trees in India (Shekar, 2000). Current tactics to manage this pest in Asia are largely based on insecticide applications although there is concern about environmental pollution (Murphy and Briscoe, 1999) and no practical method of biological control is available at present. Capture by Indian Treepie indicates that the bird could catch the adult weevils hiding in the palm fronds. The leaf-eating caterpillar, *Opisina arenosella* Walker is the most important lepidopteran pest of coconut palm in South Asia (Cock and Perera, 1987). While foraging, Indian Treepie tears open the silken webs on the leaflets and consume the caterpillars hiding beneath. Phytophagous chrysomelidae includes many established and potential agricultural pests and studies on host plants and ecology of Indian chrysomelids are highly insufficient (Kalaichelvan and Verma, 2005). Chrysomelid beetles found on the tender leaflets of coconut and areca palm fronds and fed by Indian Treepie is likely to be damaging the tender leaflets of coconut and areca palm fronds.

Coconut palm plantations suffer severe damage mainly by rats (*Rattus* sp.) (Parshad, 1999). Consumption of nestlings of pests like house rat and squirrel damaging the tender nuts of coconut and oil palms (Rao and Subiah, 1982; Advani 1984, 1985; Chakravarthy, 1993) by Indian Treepie appears to be primarily due to their nesting site on the palm trees. Earwigs (Forficulidae) threaten the insect pollinators attempting to visit the female flowers of coconut palm (Free, 1993), hence their predation by Indian Treepie enhances the pollination of the coconut trees. Presence of banana stem weevil as a food item results from the intercropping of banana plants in coconut plantations and the foraging of Indian Treepie among the banana plants. Present study reveals the presence of snails

on the fronds and crowns of palm trees and its selection as a food item by Indian Treepie. However, the damage caused by snails to the coconut and areca palm crowns remain largely unrecognized. In conclusion, the presented data highlights the importance of Indian Treepie as a native predator of the major pests of coconut and areca palm trees. It is essential that farmers should be made aware of the beneficial role of these birds as a natural predator of the several major pests of the palm trees and that the Indian Treepie is not a pest of any major food items or crops in the region. Nest loss during areca nut harvesting in palm plantations is recorded as a major cause of egg loss and nestling loss of Indian Treepie (Basheer, 2010). Further, it is necessary to see that anthropogenic activities are not leading to the disappearance of this beneficial bird from the agricultural fields and it requires spreading awareness about its status as a beneficial bird among the farming community.

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Received: August 16, 2011

Revised: December 10, 2011

Accepted: January 18, 2012