

# Behavioral activities of the Rose-ringed Parakeet *Psittacula krameri* in the wild

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## Introduction

The Rose-ringed parakeet *Psittacula krameri* is the most widely distributed species of parrot in the Order Psittaciformes (Forshaw, 1981). It is also the most successful coloniser of new habitats among the parrots (Long, 1981), which it appears to have done by exploiting almost all known crops, and even nesting in man-made structures such as buildings (Forshaw, 1981). Nevertheless, there is very little information on its ecology and behaviour in the wild. The little information of it in the wild is in studies done mostly in India, regarding nidification and damage caused to crops (Lamba 1966, Simwat & Sidhu 1973a, 1973b, 1974, Simwat 1975, Toor and Ramazan 1974a, 1974b, 1972, and Sekhon 1966).

There is little information of the species in Sri Lanka, except for that available in general references. Hence a study into the behaviour and feeding ecology of the wild population at Polonnaruwa was undertaken.

## Site Area

The studies were done in the Archaeological Sanctuary situated at Polonnaruwa. Polonnaruwa lies in the North-East dry zone, with a mean annual rainfall of around 1,671mm and an average temperature of 25-28 C.

## Vegetation of Study Area

The vegetation here of the secondary evergreen type. It has been described by many authors and these accounts have been summarized by Peeris (1975). A semi-evergreen forest is best summarised by Walters (1971) "as one in which the upper layer is defoliated for

some time of the year while the lower tree layer retains its foliage". The Polonnaruwa study area was investigated by Dittus (1977) who concluded that "the number of tree species and their relative proportions occurring in the Polonnaruwa study area are normal for dry-zone forests".

The species of trees in the forest at Polonnaruwa differs somewhat from other dry zone forests, in the prevalence *Grewia polygama*, *Cassia fistula* and *Ixora arborea*. *Drypetes sepiaria* with a relative density of 21.3%, remains the most abundant species as in all other dry zone forests. The average height of the forest canopy is about 20-28 metres. The tallest trees are *Adina cordifolia* (38-40), *Schleichera oleosa* (38-40) and *Stereospermum personatum* (38-40). There are natural local differences in the distribution and abundance of the tree species, producing patchiness in the canopy. This is specially true of *Holoptelea integrifolia*, *Stereospermum personatum* and *Adina cordifolia* (Dittus, 1977). The present study was carried out in an area dominated by *Adina* spp. to ensure observation of reasonable numbers of parakeets feeding and nesting in the same area.



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**Fig. 1**

## Method

Observations were made by a version of the strip-transect method, described by Driscoll (1977). I (SWK) followed a pre-determined path through the study area, stopping for 5 minutes every 100m. The path was so designed that the entire 9 hectares of the study area was covered during the observations. During each of the stops the area

around was scanned very intensively through 360° using 10x50 or 7x50 binoculars. Precautions were taken to ensure uniformity during observations: observations within approximately 50m only were included; the starting point and direction of movement was the same throughout the study, and every attempt was taken to avoid repeating the same observation (or same parakeet) from different points. No special searching was done to seek parakeets, which were either calling or at known nest holes. Every time a parakeet was sighted the following information was obtained and recorded:

- (1) The activity of the parakeet at the time it was first seen.
- (2) The sex/age of the parakeet, viz. whether male, female or juvenile.

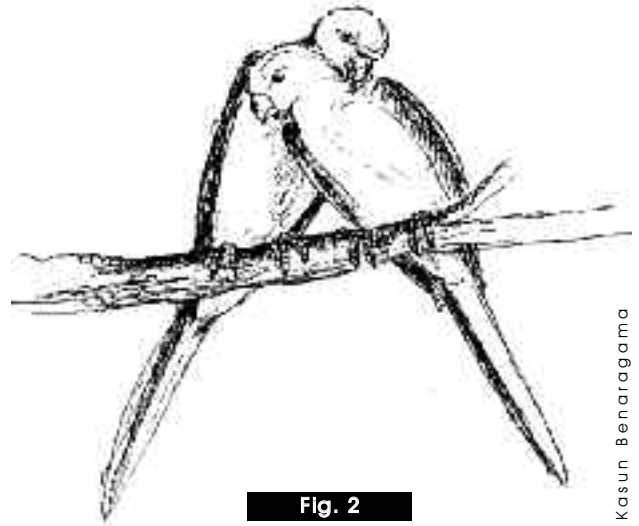
These observations were recorded on to tape in the field, and transcribed later.

Preliminary observations on the parakeets indicated that they were most active during the morning and evenings, while during midday they were inactive and retired to the shade of the canopy.

Each transect took between two and two and a half hours to complete. Six transects, at two per ten days, spread over each month were conducted. The six transects consisted of three in the mornings between 0600-0900 hours, and three in the evenings between 1600-1900 hours. The transects commenced in May 1979 and continued for twelve months continuously.

## Quantification of Observations

To study the seasonal patterns of the various activities recorded, the observations were initially standardized to the number of occurrences of each activity per 100 birds seen in each transect. These transect data were then combined to provide a mean value per transect for each month. As the main objective was to detect seasonal changes in frequency of different activities, the mean values were plotted after a log conversion against each



month. The log conversion gives a better representation of rates of change from month to month than absolute values.

The data were then subjected to an analysis of variance to determine whether the observed patterns were significantly different from random, i.e. were truly seasonal in character. They were tested at the 95% confidence level.

## Description of behaviours

After preliminary observations of the Rose-ringed Parakeet, the following 14 activities were considered as recordable. Any activity not included in these were recorded under the 15th category of 'Inactive'.

- 1) **Bill Cleaning:** The parakeet rubs its bill on the perch, similar to the action of a bird cleaning remnants of food from the outside surface of the bill.
- 2) **Confrontations:** Instances where one parakeet of either sex threatened or chased away another parakeet of the same or opposite sex, or even engaged in fights. These involvements were often accompanied with a harsh 'krr.... Call, but the call was not an essential feature of this activity.
- 3) **Calling:** Parakeets actively engaged in the normal repertoire of calls (other than the call used as a threat). Calls by young were distinguishable from those of adults. (The threatening call is a deep 'krr....', the call associated with the aggregation behaviour was a very soft 'purr', while the call of the young bird is a 'yak, yak,

yak..... Three of these calls, the general call, threat call and the call of the young - were recorded, and sonogrammes made to show the differences.

- 4) **Chasing Predators:** Parakeet (s) chasing predators, such as birds of prey, Varanid lizards or other reptiles (snakes). During this activity too, the threatening 'kr..... call may or may not be used.
- 5) **Aggregations:** An assembly or group of parakeets of both sexes, often clinging on to the vertical surface of a limb or bole of a tree. They make a soft 'krr...' call among themselves. The parakeets appeared to show immense interest in one another.
- 6) **Debarking:** Parakeets biting off pieces of the bark around nest cavities.
- 7) **Self Preening:** Parakeets preening their own feathers.
- 8) **Male preening female:** The male parakeet bending over the female and preening her feathers especially on the head.
- 9) **Bill Locking:** Male parakeet stretching out towards the female and, with open bill, locking on to the open bill of the female. At the same time, the birds pull at each other.
- 10) **Leg Salute:** Performed by male parakeets only. The male parakeet moves back from the female and raises up the leg on the side of the female while tilting slightly backwards. This action of raising the leg may be performed a number of times and on each occasion the toes open and close.
- 11) **Peeping into the Nest Hole:** At the entrance of a hole on a tree, either the male or female parakeet, with neck stretched out, peered into the hole and then withdrew its head back out of the hole. Smith (1972) observed that in captivity the "hens first examine the entrance holes by craning the neck forward and peering inside and then pulling the head back just like a courting male feeding a hen the usual ring-neck behaviour when investigating any potentially hostile object". This was the behaviour, which I termed 'peeping into the nest' in this study, and it was also performed by the male. The functional significance of this activity, apart from Smith's comment above, is not known.
- 12) **At Nest:** Parakeets (male and/or female) seen inside, or by the side, or not less than 30cm away from a nest hole on the tree. In order to maintain exclusiveness of the different activity types, the following activities, if performed by the parakeet within 30cm confine, were not considered: bill cleaning, calling, self-preening.
- 13) **Feeding:** Any parakeet observed feeding.



Fig. 3

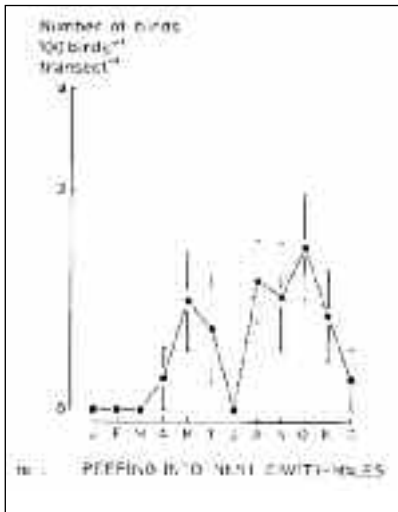
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- 14) **Feeding Young:** When either sex is actively feeding young parakeets, either in the nest cavity or outside.
- 15) **Inactive:** In the event a parakeet was spotted not indulging in any of the above described activities, the parakeet was considered as inactive. This does not mean that the parakeet was actually doing nothing, but that the 'activity' could not be detected or classified.
- 16) **Pairs:** When a male and female bird were associated close together, or indulging in activities together.

The above behavioural activities, were recorded with respect to sex (male, female, Juvenile), direction, (e.g. to male), type of predator etc. Information on the population such as number of males, females, pairs, juveniles etc., were also recorded. This resulted in a total of 46 different activities.

## Results

Of the 46 recorded behavioural activities subject to an ANOVA test, 14 activities showed test for seasonality as  $p < 0.01$  or  $p < 0.05$ . Fourteen behaviours showed significant seasonality.



### Males peeping into Nest Hole (Fig. 1)

The graphs indicate two peaks of activity, during May/June and August-October. The sudden drop in frequency in July to a much lower level than in any other month, and consistent in both sexes, cannot be disregarded.

### Females peeping into Nest Hole (semi-log) (Fig. 2)

The seasonal pattern is similar to that of males.

### Bill Locking (Fig.3)

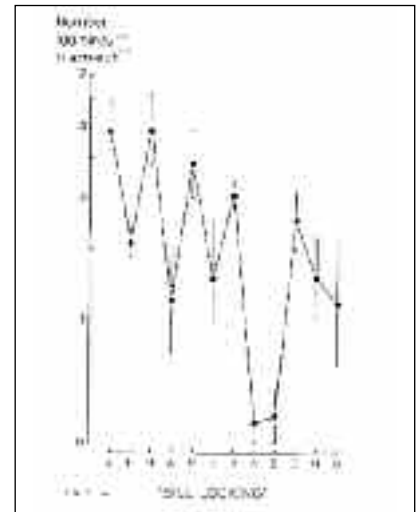
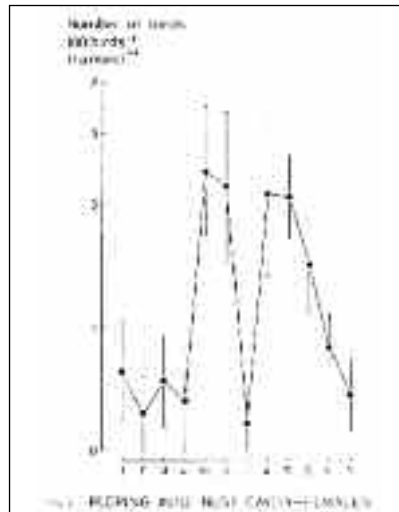
The incidence of this behaviour has considerable monthly fluctuations and also variability within months. The overall pattern was of very low frequency in August/September compared with other months, with highest frequencies, though very variable, in January and March.

### Males chasing Males (Fig. 4)

Though significantly non-random, the pattern in the graph does not appear seasonal. There were possibly two peaks of this behaviour, in July and November-December, while during March-April and August-October the incidence was generally low.

### Males preening Females (Fig. 5)

The data suggest three peaks and troughs in this activ-



ity. The peaks were in February, July and December, while the troughs were in January, May and August-October. The low value in January may be a sampling error, since the increase commencing in November may continue uninterrupted through to the February peak. The February peak was much higher than the July peak.

### Debarking by Females (Fig. 6)

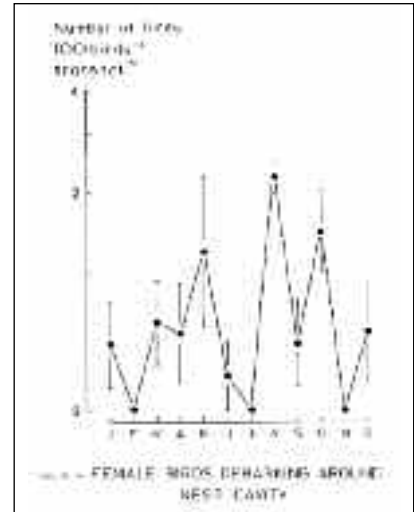
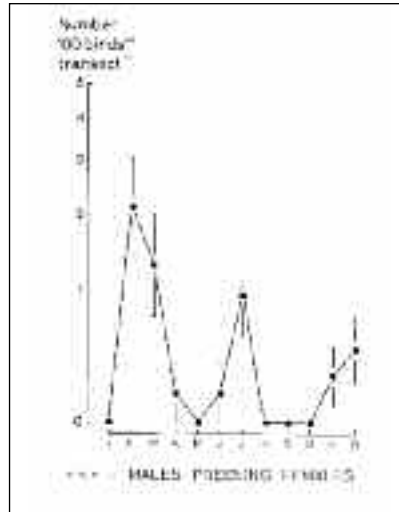
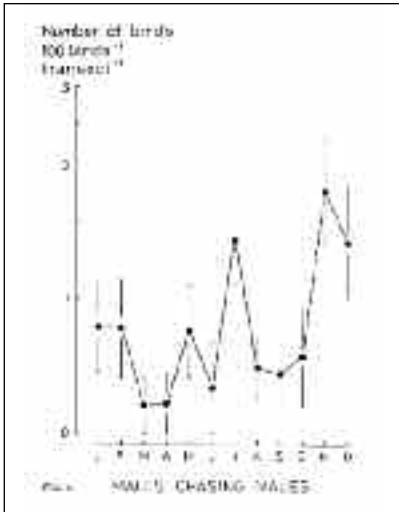
The frequencies of debarking, though significantly variable over the year, also showed considerable variation within each month, reflected by the large standard errors in most months. The low levels of this debarking in February, June-July and November, and the high levels of the activity in May and August stand out prominently. Hence it may be considered in very broad terms that there were probably two peaks of high activity in May and August separated by the low periods in June-July and November-February.

### Males Calling (Fig. 7)

Males showed a low frequency of calling during May-June, followed by an increase to September. After a relatively stable period from September to February, the frequency decreased to a low level.

### Females Calling (Fig.8)

The general pattern was the same as for the males, but with differences in the stable period (September to



February). The females showed an increase in calling frequency from January to April before decreasing. The subsequent high level was probably reached earlier in July.

**Self Preening Males (Fig. 9)**

There was a definite low in April, and possibly in May too, with a stable high level over the rest of the months. There was again considerable variation within these.

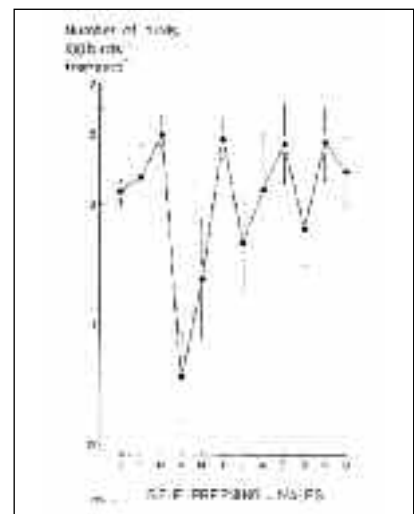
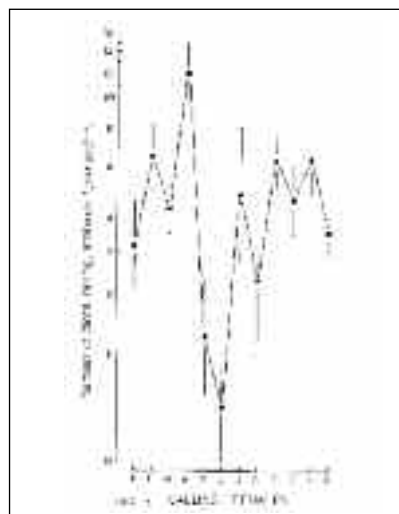
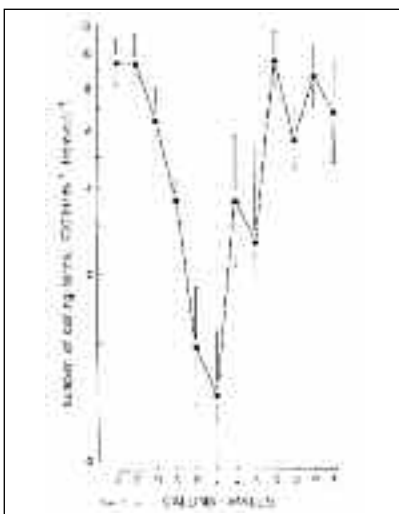
**Aggregations (Fig. 10)**

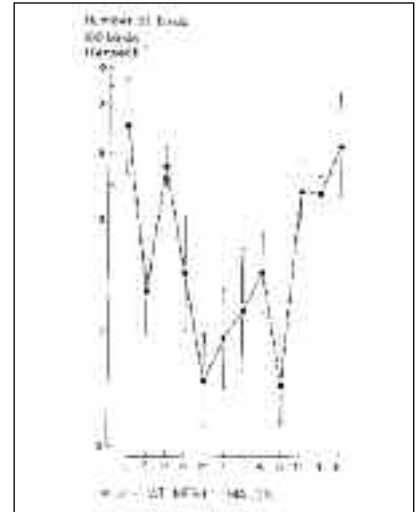
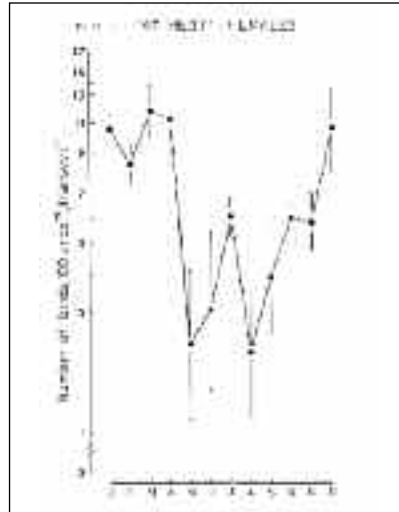
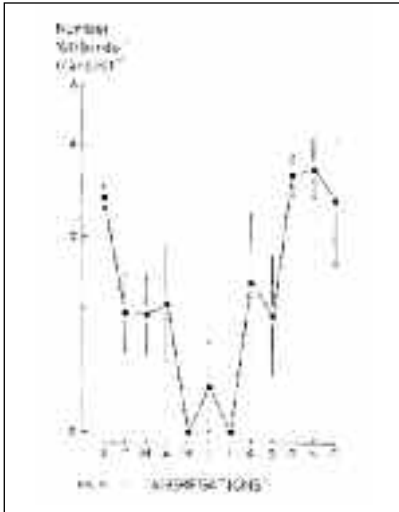
There was a very clear seasonal pattern, with few birds

seen in aggregations in May-July, followed by an increase in October - January and a subsequent decrease to May. The data in the decreasing and increasing phases of the activity showed very large variations, which were reflected by the standard errors.

**Females at Nest (Fig. 11)**

The females showed a similar pattern to the males, but the period of high incidence of being at the nest extended over a larger period of time, mainly from December to April, and was much more consistent. The incidence was much lower from May to August, but there was a conspicuous increase in July.





### Males at Nest (Fig. 12)

Though the data are variable within months, there was a clear seasonal pattern, with high levels in December-March (with a lower value in February), and low levels in May and September.

The increase in the mean from May was broken by the low value in September. It is possible that this value is not real and was due to some error in the sampling. If so, the increase from May would be continuous and unbroken to December.

### Inactive Males (Fig. 13)

There was a fluctuating high level from May to October, followed by a gradual decrease to April. As the monthly variations in the months May-October were high, they may be considered as showing no difference between months.

### Inactive Females (Fig. 14)

There were two peaks in February and May to July, separated by low levels in August to January and March - April.

The different activities that were defined and recorded were those behaviours which could be identified and quantified in the field. It is therefore, most probably that the recorded activity may be incomplete owing to the artificial constraint imposed by the observation technique. Thus, it is possible that a number of such activities may in

combination, constitute complete behavioural sequences, and also may explain significance of the activities observed.

Therefore, it is necessary to look for correlation between the recorded activities so that it may be possible to make more meaningful interpretations of the seasonal patterns the parakeets show.

The Spearman-rank test for correlation was used for this purpose, taking significance at the 95% level. The results are indicated in Fig. 15.

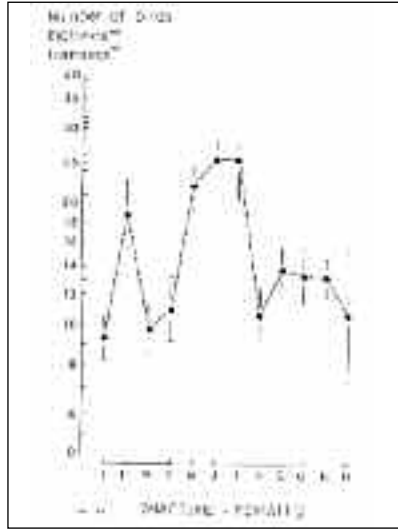
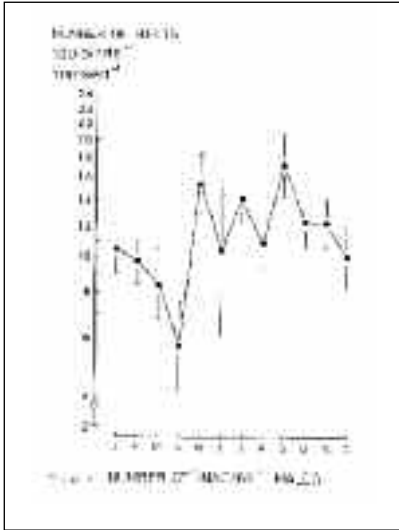
### Discussion

Many of the activities of the parakeets showed significant seasonal patterns that appear to be related to the breeding season.

The breeding season is defined as the period of the year during which, in a particular area, birds of a given species mate, build their nests, lay their eggs, and rear their young—more particularly the period of laying (Lack, 1968).

The number of young fledged and the postulated egg-laying period based on known information on incubation etc. (Lamba, 1966; Salim Ali, 1968) shows definitely that the breeding season, in its narrowest sense from January to early August.

But considering the breeding season in its broadest sense, it is possible to show from the various activities, especially 'bill locking', 'males chasing males', 'at nest' and 'calling' that the breeding season probably begins as early as November.



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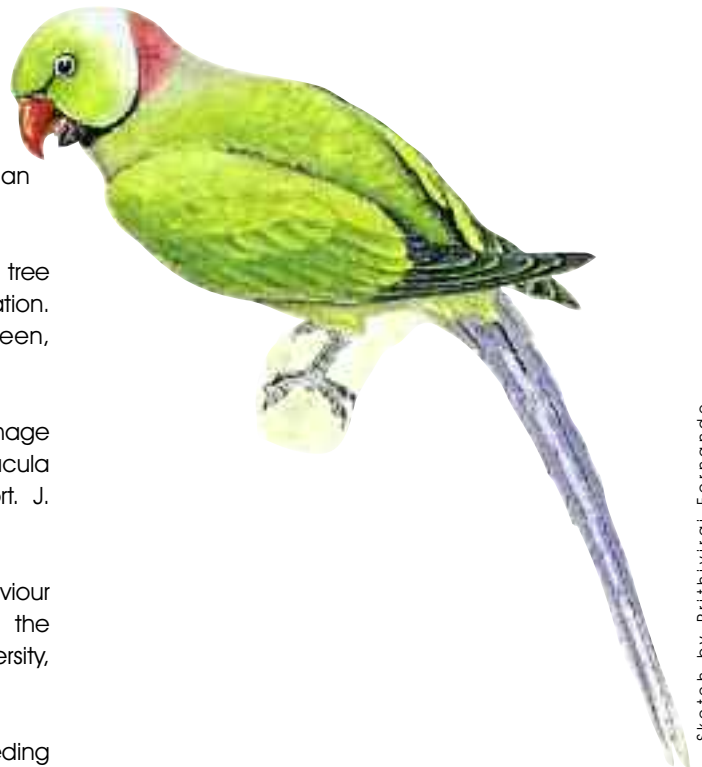
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Sketch by Prithiviraj Fernando