

# Abundance of Rose-ringed Parakeet (*Psittacula krameri*) and House Sparrow (*Passer domesticus*) on Guava and Sunflower Farmlands in an Agro-ecosystem in Faisalabad–Pakistan

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## ABSTRACT

Studies on abundance of rose-ringed parakeet (*Psittacula krameri*) on guava and sunflower in agro-ecosystem resulted in depredations on guava in the morning and afternoon hours in March,  $180 \pm 2.47$ ;  $180 \pm 3.47$ ; in June,  $180 \pm 2.72$ ;  $180 \pm 3.55$ ,  $180 \pm 3.20$ ;  $180 \pm 3.75$ ; and in July,  $180 \pm 2.14$ ;  $180 \pm 3.85$ . Similarly, observations on parakeet abundance on sunflower during January was  $180 \pm 2.35$ ;  $180 \pm 2.52$ ;  $180 \pm 3.14$ ;  $180 \pm 4.18$ ; in February,  $180 \pm 2.01$ ;  $180 \pm 3.68$ ;  $180 \pm 2.48$ ;  $180 \pm 3.96$  and in March,  $180 \pm 2.68$ ; and  $180 \pm 4.08$ . For the house sparrow, on sunflower in January it was  $180 \pm 2.05$ ;  $180 \pm 2.00$ ,  $180 \pm 2.55$  and  $3.14$ , for February,  $180 \pm 1.55$ ;  $180 \pm 2.88$ ;  $180 \pm 2.00$ ,  $180 \pm 3.05$ . For March, it was  $180 \pm 1.95$ ;  $180 \pm 3.14$ . For the guava, depredations recorded in for March  $180 \pm 2.00$ ;  $180 \pm 2.98$ ; in June,  $180 \pm 1.85$ ;  $180 \pm 3.05$ ,  $180 \pm 2.75$ ;  $180 \pm 2.70$ , whereas in July  $180 \pm 1.48$ ;  $180 \pm 2.85$ ; and  $180 \pm 1.75$  and  $180 \pm 3.28$ . It was concluded that of both the sampled food items, both food items were comparable in terms of parakeet and sparrow abundance and it was necessary to employ sustainable control measures on population of both birds, least hazardous to the agro-ecosystems.

**Key Words:** Rose-ringed parakeet; House sparrow; Sunflower; Maize; Depredations

## INTRODUCTION

Occurrence of sufficient quantity of food ensures an overall well being of living organisms. Endeavors of man have always been focused on obtaining the best food crops to meet the increasing food requirements of the growing population size (Anonymous, 1960). Occurrence of a variety of bird pests among the cash crops, are responsible for a substantial loss of crop yield and rendering economic losses annually. The rose-ringed parakeet, *Psittacula krameri*, is present in fairly good proportions throughout the cultivations and stored houses throughout the country (Beg, 1978; Bashir, 1978; Roberts, 1991; Khan, 2002). Severity of bird damage can be attributed from the fact that, only in the province of Central Punjab, losses due to rose-ringed parakeet depredations, amount to millions of rupees every year. Large parakeet flocks can annihilate the standing crops as well as the fallen stalks and grains of the harvested crops in the absence of any surveillance within a period of two to three days or in a few hours of the same day (Khan & Hussain, 1990; Iqbal, 1998; Malhi, 2000).

In Central Punjab, the main cause of the bird problem has been attributed to the introduction of the canal irrigation system, introduced during the British regime in the 19<sup>th</sup> century to promote agriculture. For this purpose, three main canals viz. Jhang branch, Gogera branch and Rakh branch were drawn out from the adjoining rivers. Accordingly, the small water tributaries were also extracted through these canals to enhance watering facilities to the croplands. Along

side the canal irrigation, trees viz. *Dalbergia sissoo*, *Salmalia malabarica*, *Cedrella toona*, *Terminalia arjuna*, *Ficus bengalensis* and a few others were also planted. Certain food crops like wheat, maize, sugarcane, citrus, guava, zizyphus, mulberry and mangoes were also grown to foster the food requirements of local population. As the planted vegetations grew older and taller, they provided a thick cover to many of the animal fauna including reptiles, birds and mammals (Parker, 1924). The rose-ringed parakeet, by virtue of its utter astuteness and opportunism, appears to have benefited greatly, possessing a wide feeding niche, and consuming cereals, orchards, oil-seeds and stored products (Sekhon, 1966; Gupta *et al.*, 1998). The list of cultivated cereals and other food crops consumed by the parakeet is wide (Hussain & Bhalla, 1937; Ali & Ripley, 1982; Paton *et al.*, 1982; Chakarvorty *et al.*, 1998; Khan, 2002).

In the plains of Punjab, the rose-ringed parakeet inhabits the light timbered locations, particularly the groves of larger and older trees situated near farmlands and urban plantations. It can be reckon to be a serious avian pest in the un-guarded croplands, causing substantial economic losses worth millions of rupees. Sailaja *et al.* (1988) studied the role of environmental, dietary and hormonal factors in the regulation of seasonal breeding of the free living female rose-ringed parakeets. According to them the concentration of plasma LH (Leuteinizing hormone) at the end of the breeding season declined in late May. Pair bond, which took place in October through December, was closely associated

with the increasing levels of plasma LH, following no change in plasma estradiol levels. Malhi *et al.* (2000) laid the emphasis on the altering of sowing of sunflower crop as he found that maturing sunflower crops sown in January received lesser damage as compared to the ones sown in other months of the year.

The present investigations were aimed to investigate the following aspects of the life history of the rose-ringed parakeet,

- i. To record abundance of parakeets twice a month on both sunflower and guava and
- ii. To ascertain the damage on both crops on three corners of the fields, twice a month and to assess any potential sustainable control measures in future.

## MATERIALS AND METHODS

Investigations on the abundance of rose-ringed parakeet with respect to sunflower and guava were extended from January till July, except in April and May, where no sunflower and guava occur, 2004 in an agro-ecosystem in Faisalabad, Pakistan. Direct field observations on the sampled crops were made for two successive days both in the morning and afternoon time intervals. All observations lasted for a period of three hours in the morning and afternoon sessions, with a 20 min interval hours. Observations lasted for three hours in both time intervals and each interval being 20 min duration. Before recording the data, preliminary inspection including the earlier visit to the field to assess the field conditions was also carried out. A particular point was also selected in the field from, where the entire view was clear. Numbers of parakeets flying within and away from the sampled field crops were consecutively recorded for three hours time intervals in both morning and afternoon intervals.

The sunflower and guava fields were located at the University Farms, Department of Agronomy with an area each of 1.5 acres. This field was arbitrarily divided into three corners viz. left corner (LC), middle (M) and right corner (RC). Number of parakeets entering and leaving the sunflower and guava were recorded for 20 min durations per time interval for the observations on three corners of the field. An approximate 100 m was earmarked to record the parakeet flights directed towards and away from the sampled crops. To get a better image of parakeet movements, use of binoculars (7 x 50 mm) was also used, wherever necessary throughout the observations.

## RESULTS AND DISCUSSION

Observations on the infestations of rose-ringed parakeet on guava and sunflower orchards were carried out from January through July, 2004 in the farmlands of University of Agriculture, Faisalabad. In the present agro-ecosystem, apart from guava and sunflower, some orchards and agricultural crops are also located.

Table I presents information on the total length of foraging durations for the rose-ringed parakeet for 20 min per time interval for three hours in the morning and afternoon durations. Sunflower was sampled twice in January, February and March and again in June and July, whereas no sampling took place in April and May on account of its non-availability in the study area. Observations on guava were recorded two times in June and July (mature stages), whereas observations were only made once in March (un-ripe stage). The foraging data suggests that more bird infestation occurred in the afternoon, might be due to the fact that the parakeets were left without food throughout the night, augmenting more concentrated depredations in the late afternoon hours. Of the two sampled crops in terms of bird preference, sunflower appeared slightly more preferred by the parakeets. Although the parakeet possesses a wide feeding niche, yet it more explicitly attacks the oil seed crops viz. sunflower, brassica and canola, apart from a variety of orchards. The data suggests that in all the present investigations in the un-guarded fields, the depredatory attacks continued almost throughout the time intervals, thereby elucidating the predominant pest like nature of the bird on the agricultural and horticultural practices.

In the daylight hours, virtually at no point, the detrimental activities seemed to cease. Parakeets obtained a fair degree of thrust in the early morning hours, at about sunrise and once again, in the late afternoon hours at about sunset. This also appears to be true for many other birds. In the present studies, the location of the parakeet roost was about one kilometer away from the majority of the farm crops therefore the energy budget spent during each visit to the studied croplands was not significantly higher to cause any exhaustion in the parakeet energy budget. Foraging periodicities of the parakeets became possibly more rewarding in the absence of any surveillance in the croplands, depicting an early morning and late afternoon planned bursts on both the crops. Moreover, the intensity of infestation became lowered with the progression of the daylight and could probably be regarded as negligible during the mid-day. Such a similarity also occurred during the observations in the late afternoon, near the sunset. Movement patterns and calls emitted by the parakeets and other allied birds became non-significant. Another plausible ecological factor cited for the early morning parakeet feast was to focus on different diurnal activities viz. finding food, suitable nesting sites for the fledglings, allo-preening and territorial defence against the invading birds.

Table II presents information on the depredations of house sparrow the two sampled crops in the study area. It is evident that the damage proportions recorded with respect to house sparrow appeared to be lower than that of the rose-ringed parakeet. In terms of the severity of damage, the sparrow is considered as a potent agricultural vertebrate pest. The data is approximately comparable to both the studied crops, with slightly more infestations recorded in the

**Table I. Total length of foraging durations recorded for the rose-ringed parakeet, *Psittacula krameri*, in various observation months in morning and afternoon in an agro-ecosystem in Faisalabad. The data has been combined for the three corners of the field**

Months	Sampled crops	Length of foraging durations (for three corners) (in min)	
		Morning	Afternoon
Jan	Sunflower	180 ± 2.35	180 ± 2.52
Jan	Sunflower	180 ± 3.14	180 ± 4.18
Feb	Sunflower	180 ± 2.01	180 ± 3.68
Feb	Sunflower	180 ± 2.48	180 ± 3.96
Mar	Sunflower	180 ± 2.68	180 ± 4.08
Mar	Guava	180 ± 2.47	180 ± 3.75
Jun	Guava	180 ± 2.72	180 ± 3.55
Jun	Guava	180 ± 3.20	180 ± 3.75
Jul	Guava	180 ± 2.14	180 ± 3.85
Jul	Guava	180 ± 2.25	180 ± 4.42

**Table II. Total length of foraging durations recorded for the house sparrow, *Passer domesticus*, in various observation months in morning and afternoon in an agro-ecosystem in Faisalabad**

Months	Sampled crops	Length of foraging durations (for three corners) (in min)	
		Morning	Afternoon
Jan	Sunflower	180 ± 2.05	180 ± 2.00
Jan	Sunflower	180 ± 2.55	180 ± 3.14
Feb	Sunflower	180 ± 1.55	180 ± 2.88
Feb	Sunflower	180 ± 2.00	180 ± 3.05
Mar	Sunflower	180 ± 1.95	180 ± 3.14
Mar	Guava	180 ± 2.00	180 ± 2.98
Jun	Guava	180 ± 1.85	180 ± 3.05
Jun	Guava	180 ± 2.75	180 ± 2.70
Jul	Guava	180 ± 1.48	180 ± 2.85
Jul	Guava	180 ± 1.75	180 ± 3.28

afternoon sessions. Availability of sufficient quantity of food not only ensures a nutritious diet to the birds, but also to store a substantial food to support the emerging fledglings following the breeding months in March and April (Simwat & Sidhu, 1973; Toor & Ramzan, 1974; Malhi & Brar, 1985; Shafi *et al.*, 1986; Babu & Muthukrishnan, 1987; Khan & Beg, 1998; Khan, 2002).

The data of the present studies also suggests that in the late afternoon, the parakeet attacks built up gradually towards the right and left corners of the field and less in the middle, whereas for the house sparrows the damage was recorded evenly in the right left and middle of the fields. For the parakeets, probably, the corners provided an easy access than the middle of the field crops. In reality, both the sampled crops appeared to be comparable in terms of tenacity, although slightly, the sunflower provided more foraging due to both the birds. The feeding niche of the parakeet is wide, and undoubtedly, the introduction of canal irrigation system in the province of Punjab, more than a century ago, had a favourable impact on its feeding and nesting niches, while such a fact cannot be disintegrated

from that of the other birds, although they possess a fairly less feeding niche than that of the parakeet (Parker, 1924; Umer, 1956; Taber *et al.*, 1967). Successive plantation of trees along the canal sides, cultivated and non-cultivated crops and the orchards, in the urban gardens, cantonments and University and College campuses, serves as an additional useful base to enhance the feeding niche for many of the birds and small mammals. As majority of the crops are located in close proximity to the food and with a multi-cropping system extended throughout the Punjab province, food limitation does not become a limiting factor. Apart from this, predominant trees viz. *Salmalia malabarica*, *Dalbergia sissoo*, *Eugenia jambolina*, *Cedrella toona*, *Ficus begalensis*, *Eucalyptus* and *Terminalia arjuna*, provide the best roosting sites to the parakeets and similar birds. In the current agro-ecosystems, occurrence of small mammals and birds as of the ecological predicament to foster the crops, requires the attention of the ecologists to critically evaluate the present scenario and to suggest some viable control measures with regard to their substantial depredations and serious economic losses both to the farmers and national economy with a minimum deterrence to the non-targeted animals and sustainability of the agro-ecosystems.

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