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FORAGING RHYTHMS OF HOUSE CROW (*Corvus splendens*) FOR 30 AND 60-MINUTE DURATIONS ON SOME CROPS IN AN AGRO-ECOSYSTEM IN FAISALABAD

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Studies on foraging rhythms of house crow (*Corvus splendens*) for 30 and 60-minute durations were studied in the Khurrianwala from December, 2004 through April, 2005 on citrus, (*Citrus reticulata*), sunflower (*Helianthus annus*), unripe zizyphus (*Zizyphus jujuba*), guava (*Psidium guajava*) and jaman (*Syzygium cumini*). For all observations, citrus and sunflower were the most intensively depredated food crops in both the morning and evening sessions, depicting the prediliction of crows and thus, largely responsible for economic losses. Highly significant correlations were obtained for the morning and evening foraging activities 0.686** for 30-minute durations, and 0.836** for 60-minute durations, depicting the severe depredations for a higher time interval, particularly in the late evening hours.
Keywords: Foraging, house crow, durations, crops,

INTRODUCTION

The house crow (*Corvus splendens*) inhabits a wide range of wild and urban habitats throughout Pakistan (Roberts, 1991). In its native population, the house crow has been reported from Pakistan, India, Sri Lanka, Nepal, all of Europe, North and South America, most of Africa and predominantly in the Australasian region (Mcleans, 1994). Primarily the crow is a primary consumer and omnivorous in nature, foraging in small flocks throughout the day on farm crops, livestock farms, and in residential areas. The crow *carte du jour* mainly comprises the kitchen refuse, fallen fruits in the gardens, and stored grains. The damage proportions recorded for the crow are of important food crops, thereby, indicating that the crow has acquired the status of a serious avian pest (Berruti, 1990).

The house crow remains active throughout the day, emerging from their roosts at about sunrise to perform various diurnal activities viz. foraging, suitable roosting sites, and the appropriate nesting sites for breeding (Gupta *et al*. 1998). According to Dhindsa *et al*. (1994), the damage recorded by crow to sprouting sunflower was 70% in an unguarded situation at Ludhiana, India It was evident that more damage occurred on the seedling stage than that at the mature stage. Losses to almonds by crows in Himachal Pradesh, India have been reported by Bhardwaj (1991). According to him, varying flocks of crows (25 to 30) through frequent visitations in the morning hours and again in the afternoon, destroyed about 55% of the almonds. In terms of severity of damage, it appeared to be more in the afternoon than in the morning. Besides crows, other avian species viz. the rose-ringed parakeet (*Psittacula krameri*) house sparrow (*Passer domesticus*), common myna (*Acridotheres tristris*) and rosy starling (*Sturnus roseus*) are also regarded as pestiferous and as such, cause substantial economic losses (Shafi *et al*. 1986). Throughout the region of Central Punjab, emergence of vertebrate pest problem occurred predominantly due to the introduction of canal irrigation system to encourage agricultural practices here more than a century ago. New plantation strips were planted alongside the three main canals connecting the whole of the region viz. the Gogera branch, Jhang branch and Rakh branch, along with allied water channels. With the progression of time, growth of old and tall trees and similar cultivations supported population of several pestiferous species. Multiple crop patterns over a small area (about 10 acres) predominantly among the vicinities of canal rest houses provided ample food, roosting and refuge to many birds pests. Besides, the unwise and non-selective application of toxicants on cropped areas by man to control pests has also developed resistance among a variety of pests (Beg, 1978; Ali *et al*. 1981; Khan and Ahmad, 1983 a,b; Chakarvorty *et al*. 1998; Malhi *et al*. 2000; Khan, 2002).

Aim of the present studies was, therefore, to know about the number of depredating crows for 30 and 60–minute time intervals on the sampled food crops in the study area, mainly with a view to ascertain their relative depredations and population abundance in terms of foraging rhythms.

MATERIALS AND METHODS

Studies on foraging rhythms of house crow for 30 and 60-minute durations on citrus, sunflower, guava, unripe zizyphus and jaman were extended for a period of five

months viz. December 2004 through April, 2005 in an agro-ecological system located in Khurrianwala, about 20 km away from Faisalabad. The enriched plantations of the study area supports a diverseity of fauna including birds, reptiles and small and large mammals (Akram, 1981; 1987).

Foraging rhythms of house crow were recorded in the main roost comprising a total of seven trees, four *Salmalia malabarica* and three *Dalbergia sissoo*, located half km away from the sampled croplands and making an easy access to the food crops. Data was recorded by direct field observations for three days per week, three hours durations each in the morning (at about sunrise) and afternoon (till at sunset), from a selected point using field binoculars (7x50 mm). Surveyed area during the present studies was 200 m only on one side of the crops, demarcated using the solid objects like the electrical polls, and bounded by small water tributaries. For three hours in the morning and afternoon, six time intervals 30-minutes each were made in the morning and afternoon observations. For 60-minutes, a total of three such time intervals, 60-minutes each, were made. Number of crows entering a particular food crop were recorded for a given time interval. The sum total for every interval was recorded for both time durations in varying flocks of crows to assess their relative abundance in cropped areas. The obtained data was subjected to statistical multivariate analysis using a micro-computer to interpret the results (Steel and Torrie, 1996).

RESULTS AND DISCUSSION

Studies on foraging rhythms of house crow for 30 and 60-minutes on sampled crops viz. citrus, sunflower guava, unripe zizyphus and jaman for 30 and 60-minutes on sampled food crops viz. citrus, sunflower, guava, unripe zizyphus and jaman were exyended from December 2004 till April, 2004 in an agro-ecosystem in Khurrianwala, Faisalabad. All observations commenced at about sunrise for three hours in the morning. Fig. 1 presents the information on the foraging rhythms for 30-minutes in morning for crows in terms of 95% confidence interval (standard error of means) for the respective months. It is evident that in December, maximum foraging values were recorded on sunflower and guava, while about comparable foraging rhythms were recorded for citrus, zizyphus and jaman. Situation in January with regard to foraging on samplec croplands in the morning was somewhat different, as both sunflower and guava showed maximum and comparable visitations, whereas unripe zizyphus and jaman, lesser in foraging magnitude, were also equivalent. For the subsequent months, in the morning time intervals, citrus, sunflower were dominant, while guava was co-dominat in terms of crow foraging.

Situation in the afternoon time intervals showed that citrus and sunflower assumed to be the predominat croplands for crow depredations. Guava was sporadically also foraged in the afternoon, but unripse zizyphus and jaman remained to be the least attacked food crop by crows.

For the 60-minutes foraging in the morning, citrus and sunflower were again dominat food crops intensively depredated by crows for all five months, while sporadically guava, was co-dominantly attacked, and amount of depredations to unripe zizyphus and jaman remained considerably non-significant (Fig. 2).

For afternoon, nearly a similar foraging trend was maintained, with citrus and sunflower depicting the maximum intensity of depredations by crows, comparable during March; followed by guava and rarely unripe zizyphus and jaman, were recorded.

Estimating a correlation between 30-minute duration in the morning and afternoon crow visitations is indicated by a regression line indicating a strong correlation ($r = 0.686$) between early morning and late afternoon hours, exhibiting an enhanced crow foraging frequency on the sampled food crops (Fig. 3).

Similarly, a highly significant correlation ($r = 0.836$) was also recorded for morning and afternoon foraging intensity of house crows (60-minute duration) as indicated by a regression line in the sampled croplands.

In the region of Central Punjab, multi-cropping practices on the farmlands along with orchards, trees, forest plantations and garden trees have has a favourable impact on the population of house crow, providing not only the food requirements throughout the year, but also suitable roosting and nesting niches. The bird problem here has long been realized, as other birds like rose-ringed parakeet, house sparrow and starling, have also been greatly benefited, mainly on account of the canal irrigation system (Karim, 1987; Sarwar *et a*l. 1989 a,b; Roberts, 1991; Jabeen, 2005). Data of the present work shows that citrus and sunflower were the intensively depredated food crops by house crows, while guava was also attacked, but its frequency was fairly low, and unripe zizyphus and jaman were hardly consumed significantly by the crows, as also reported by (Collins *et al*. 2001). It is important to point out here that in the present agro-ecosystem, all the food croplands were not protected and located hardly a kilometer away from the roost of house crow. This certainly triggered the attack by the birds (crows) on the food crops. In the outset in the

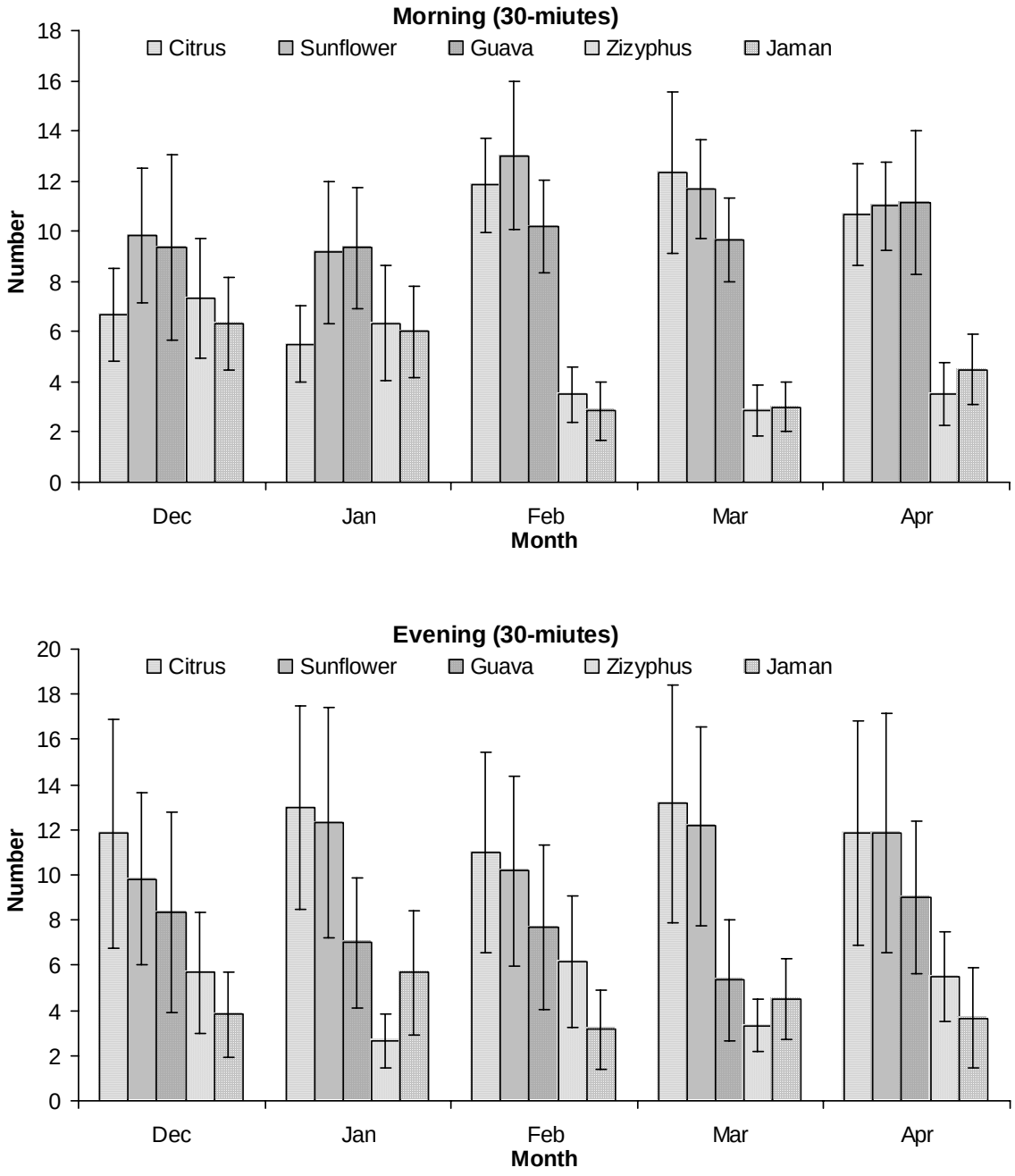

Fig. 1. Foraging rhythms (30-minute) time interval of house crow recorded in the morning and afternoon for various months in the study area.

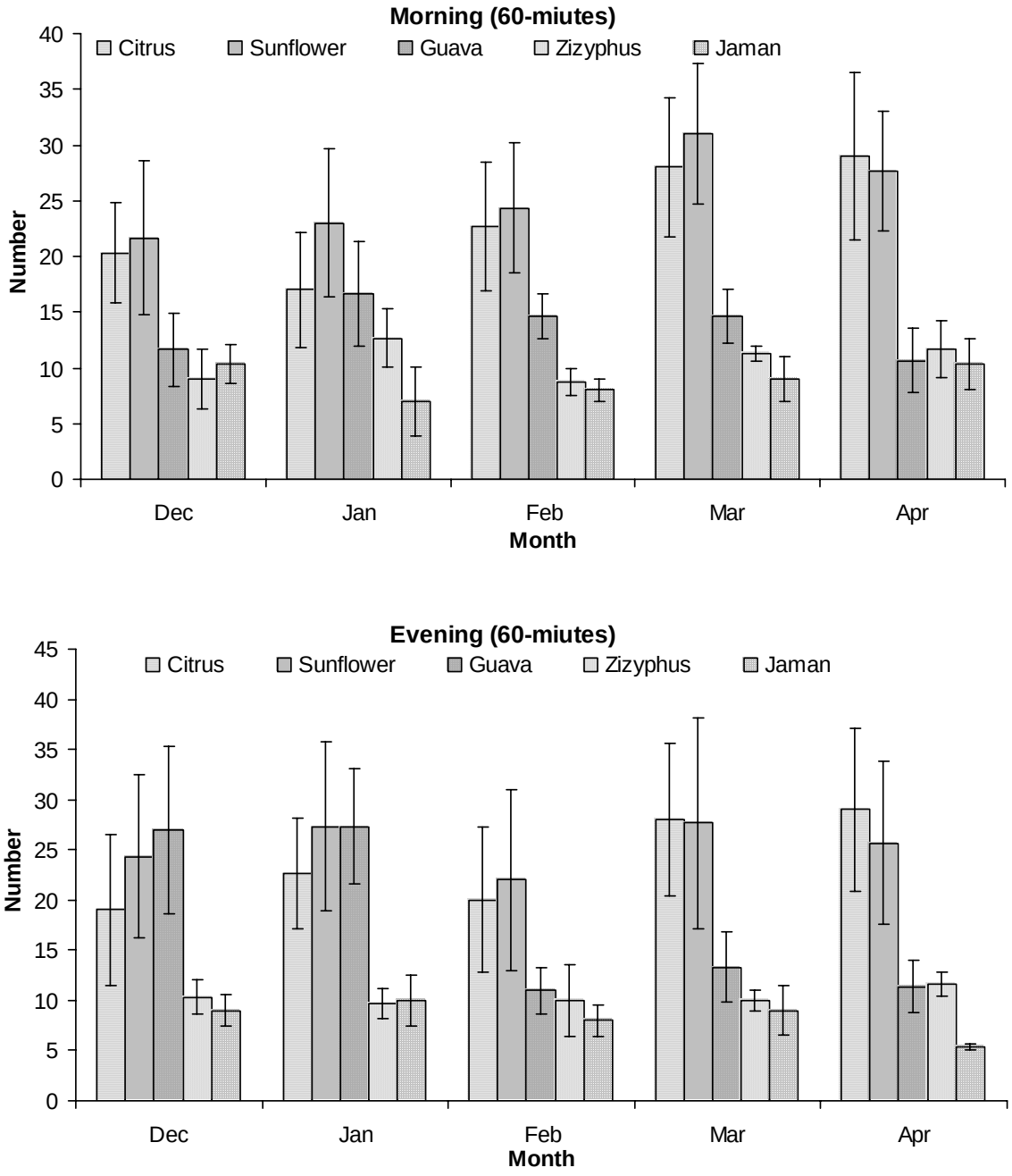

Fig. 2. Foraging rhythms (60-minute) time intervals recorded for house crow for the morning and afternoon time intervals in the study area.

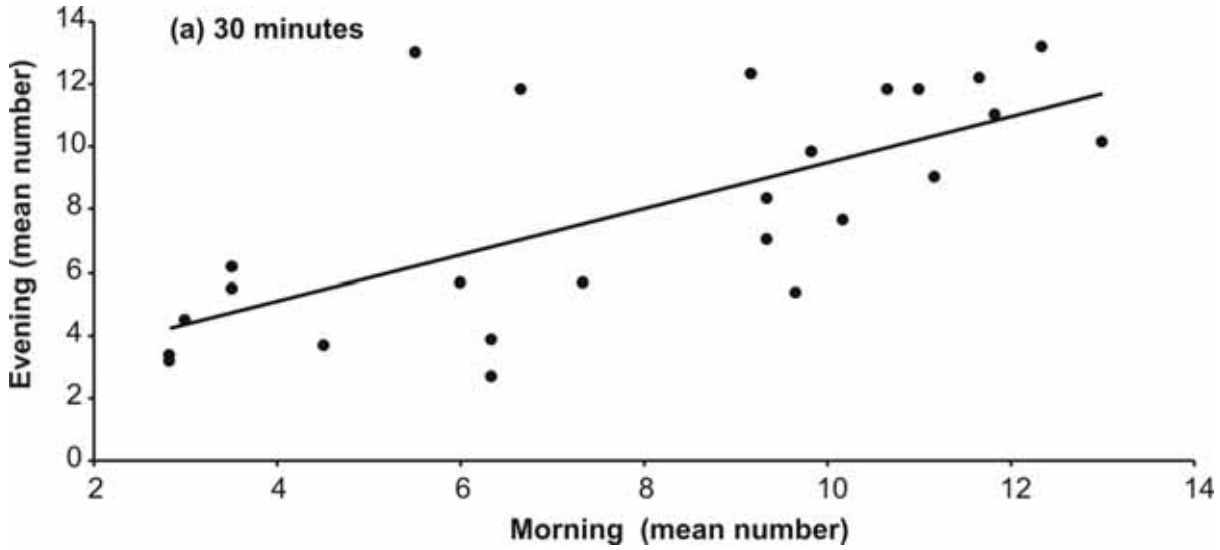

Fig. 3. A regression line showing the correlation between the morning and afternoon foraging frequency of crows (for 30-minute duration) on sampled food crops.

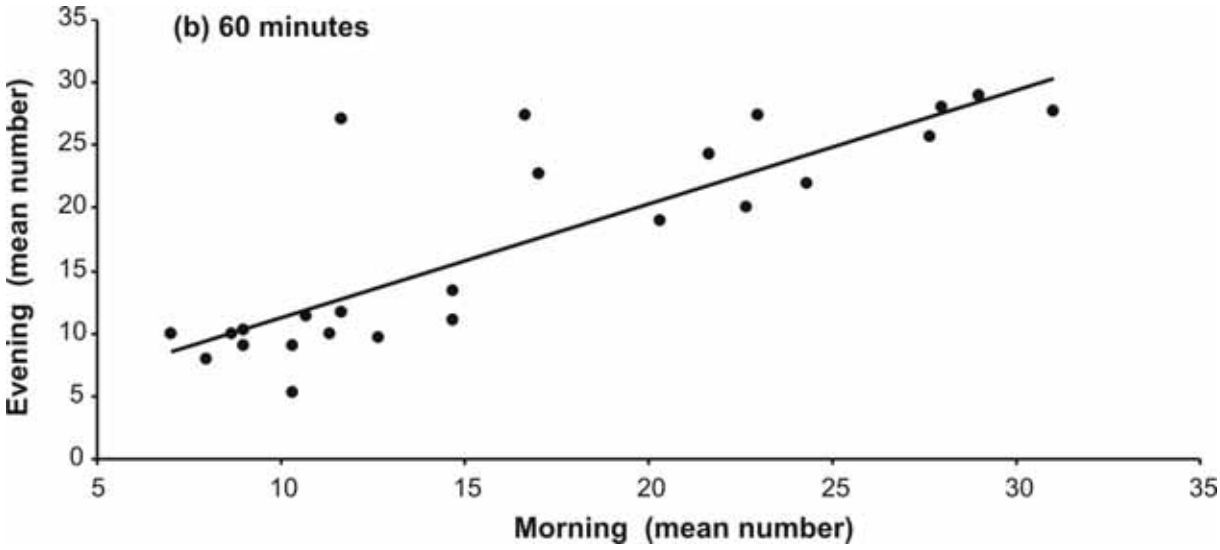

Fig. 4. A regression line showing the correlation between the morning and afternoon foraging frequency of crows (for 60-minute duration) on sampled food crops (r = 0.836).

morning hours, there was a burst of crow activity on sampled food crops, at least for the first three hours, past which the number declined and by the mid-day was nearly a hiatus, as in line with (Dhindsa *et al* 1991). The tenacity of depredation seemed more significant in the afternoon than in the morning hours, possibly due to the fact that the crows had to sustain without food throughout the following night. Possibly, the crows might not be so tenacious if the crops had been away from the main crow roost. Number of crows recorded for 30-minute duration were more or less lower on virtually all sampled croplands than 60-minutes. In the light of the present studies, it was apparent that, not only the lack of protection of crops provided an easy access to crows to the food crops, but permitting large foraging durations, also increases their mode of depredation and result in economic losses.

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