

Losses Due to House Sparrow to Wheat Crop in Central Punjab

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ABSTRACT

A motor vehicle survey of wheat fields located along the major highways running out of Faisalabad city was carried out to assess the House Sparrow losses to the preharvest wheat crop. In these fields, a total of 360 quadrats were employed. Of these, 20.0% showed sparrow damage. In all, 20683 wheat ears were visually examined, of which 2562 belonged to category I, 16633 to category II, and 1488 to category III. Of these, 1.33% of category I, 1.28% of category II, and 4.30% of category III had been damaged to varying extents by the sparrows. On the whole, 1.50% of the wheat ears were found to be damaged. Category-wise variation in the proportion of damaged ears was statistically significant.

Key Words: Wheat crop; House sparrow; Wheat ears; Quadrats; Damage

INTRODUCTION

The House Sparrow (*Passer domesticus*) enjoys a world-wide distribution and affects a variety of habitat types under a wide range of climatic conditions. Summers-smith (1963) predicted that the House Sparrow would eventually reach every inhabitable place, despite efforts to prevent it in many areas, such as has occurred in Australia.

The House Sparrow is thought to be one of the serious pests of cereal crops in Pakistan. During certain seasons of the year it forages in the cropland in large numbers. Such foraging flocks damage the standing crops to a great extent. As the House Sparrow has great predilection for maturing seeds, it inflicts great damage on the maturing crops of wheat, rice, sorghum, and millet (Rashid, 1972; Bashir, 1978; Mirza, 1978; Beg *et al.*, 1982). As such the House Sparrow has come into a potential or direct competition with man. The sparrow damage is thought to be one of the factors that severely constrain the efforts for achieving self-sufficiency in food production. The sparrow problem in Pakistan is complex and wide-spread, varying in size and magnitude from area to area depending on the variety of cereals grown, the date of ripening of the crops, and geographic location of a given area. Generally, the early-grown crops are more vulnerable to the house sparrows, especially in those areas which fall on the routes of the migratory forms of sparrows (Bashir, 1978). Two other spring migrants viz., *Passer domesticus parkini* and *P. domesticus bactrianus* also visit Pakistan and reportedly cause serious damage to wheat and millet in the "barani" areas during the ripening stage.

A number of factors help the local House Sparrow in maintaining a high population level in the Punjab. Extensive areas under cereal crops, availability of trees for roosting, and ever increasing number of huts and houses, where most of the sparrows nest, create an ideal ecological situation for the sparrow to breed and multiply

to pest proportions. This study was, therefore, aimed at assessing the losses the House Sparrow inflict on the standing wheat and rice crops in central Punjab around the Faisalabad and Kamalia cities.

MATERIALS AND METHODS

A motor vehicle survey of wheat fields located along the major highways running out from Faisalabad city. The survey of the following roads was started when the crop had ripened and was almost ready for harvesting: Faisalabad-Jhang Road, Faisalabad-Aminpur Road, Faisalabad-Samundari Road, Faisalabad-Lahore Road, Faisalabad-Jaranwala Road and Faisalabad-Chak Jhumra Road. The procedure for sampling the crop was a modification of the method used by the Otis (1984) for estimating losses inflicted by qulea on sorghum in Africa. The survey was started beyond 15th km from the centre of the city. A total of 15 points (stations), having a space interval of 1 km was chosen on each of the roads. Of these, 5 were randomly selected for sampling. At each point sampling was done by using a 50 cm x 50 cm quadrat. Twelve quadrats, six negatively each side of the road, were laid 25 m apart from each other. In this way, a total of 60 quadrats were sampled along each of the roads. From each of the quadrats, information regarding the number of intact tillers and number of ears showing sparrow damage was recorded. While recording sparrow damage from the ears, information about the quality of the ears was also recorded. A sample of 15 ears from each of the three categories was brought to the laboratory. Grins from each of the ears were separated and counted and dried overnight at 55°C before being weighed. From each of the sparrow damaged ears the proportion of grains removed by the sparrows was visually assessed on a 5% incremented scale.

RESULTS AND DISCUSSION

Table I shows the proportion of quadrats which had damaged ears in them. The proportion of such quadrats ranged from 6.7 to 51.4%. Generally, the roads having heavier vehicular traffic such as Faisalabad-Lahore Road (damage 6.7%), Faisalabad-Jhang Road (damage 10.0%) and Faisalabad-Samundari Road (damage 15.0%) showed lower sparrow damage than those which had lighter traffic such as Faisalabad-Jaranwala Road (damage 51.4%) and Faisalabad-Chak Jhumra Road (damage 22.9%). Of a total of 360 quadrats from all the samples, 20% evidenced sparrow damage to their ears. Road-wise variation in the frequency of quadrats showing sparrow damage was statistically significant.

To assess the weight of wheat grains per ear, the latter was segregated into three categories, namely, category I (below average), category II (average) and category III (above average). Out of a total of 20683 ears, 2562 belonged to category I, 16633 to category II, and 1488 to category III (Table II). Of these, 1.33% ears of category I, 1.28% of category II, and 4.30% of category III showed sparrow damage. Thus, the category III ears evidenced more intensive damage than those of the other two categories. The ratio method of chi-square test revealed that the category-wise damage to ears was statistically significant ($X^2 = 84.77$; d. f. = 2; $p < 0.01$) (Table II).

As 360 sampling quadrats, each of 0.25 m² in area, were used, a total of 90 m² of the standing wheat crop was sampled. In 90 m² of the sampled wheat fields, 20683 ears were present. Of the 20683 ears, 1.50% ears were found to be damaged by the sparrows. Thus, in each m² of the wheat fields, 3.46% of the wheat ears had been damaged, to varying extents, by the sparrows.

Visual estimate of sparrow damage to wheat ears of the three different categories in Faisalabad area is shown

Table I. Proportion of quadrats showing sparrow damage in wheat fields

| Sampling Area | Sampling points | No. quadrats Sampled | Quadrats showing damage | % quadrats showing damage |
|-----------------------------|-----------------|----------------------|-------------------------|---------------------------|
| Faisalabad-Jhang Road | 5 | 60 | 6 | 10 |
| Faisalabad-Aminpur Road | 5 | 60 | 5 | 8.3 |
| Faisalabad-Samundari Road | 5 | 60 | 9 | 15.0 |
| Faisalabad-Lahore Road | 5 | 60 | 4 | 6.7 |
| Faisalabad-Jaranwala Road | 6 | 72 | 37 | 51.4 |
| Faisalabad-Chak Jhumra Road | 4 | 48 | 11 | 22.9 |
| Total | 30 | 360 | 72 | 20.0 |

Table II. Proportion of wheat ears showing sparrow damage in the three categories of the ears

| | Size class of Ears | | | Total |
|---------------------------|--------------------|--------------|---------------------|--------|
| | I (Below Average) | II (Average) | III (Above Average) | |
| i) Numbers of Ears | 2562 | 16633 | 1488 | 20683 |
| ii) Number showing damage | 34 | 213 | 64 | 311 |
| iii) % showing damage | 1.33 % | 1.28 % | 4.30 % | 1.50 % |

$X^2 = 84.77$; Degree of freedom = (r-1) (c-1) = (2-1) (3-1) = 2; p (from table) < 0.01

in Table IV. Of the 20683 ears examined, 2562 ears belonged to category I, 16633 to category II, and 1488 to category III. In ears of category I, 1.33% (N = 34) had been damaged by the sparrows. In 33 of these 34 ears up to 25% of the grains had been removed; only one ear showed a damage of 45%. It was estimated that an average ear of category I had lost 0.14 ± 3.50 grains to the sparrows (Table IV). Of 16633 ears belonging to category II, 1.28% were found to be damaged by the sparrows. About 1.11% of these 16633 ears had lost up to 25% of the grains, 0.11% showed a loss ranging from 26 to 50%, 0.01% evidenced 51 to 75% grain loss, and 0.05% of the ears had been completely damaged. It was estimated that an average ear in this category had lost 0.19 ± 9.23 grains to sparrows. In contrast to the first two categories, category III ears showed greater sparrow loss. Of a total of 1488 ears of this category, 4.30% were recorded to be damaged by the sparrows. In 4.10% of these ears the damage ranged from 1 to 25%, in 0.13% from 26 to 50%, and only 0.07% of the ears had lost 80% of the grains. An average ear of this category had lost 0.48 ± 7.76 grains to the sparrows. On lumping the damage from the three ear categories, 1.50% of all the 20683 ear examined were found to be damaged by the sparrows. The proportion of the grains removed by the sparrows from each of the three categories of the wheat ears was not significantly different in a statistical sense (Table IV).

Table IV. Visual estimate of sparrow damage to ears of different categories

| % Damage | Frequency of Ears (% ears) | | | Total |
|----------------|----------------------------|-----------------|---------------------|-----------------|
| | I (Below Average) | II (Average) | III (Above Average) | |
| 0 | 2528 (98.7 %) | 16420 (98.71 %) | 1424 (95.69 %) | 20372 (98.49 %) |
| 5 | 18 (0.7 %) | 130 (0.78 %) | 39 (2.26 %) | 187 (0.90 %) |
| 10 | 4 (0.1 %) | 19 (0.11 %) | 5 (0.34 %) | 28 (0.13 %) |
| 15 | 9 (0.3 %) | 26 (0.15 %) | 11 (0.74 %) | 46 (0.22 %) |
| 20 | 1 (0.04 %) | 3 (0.02 %) | 2 (0.13 %) | 6 (0.03 %) |
| 25 | 1 (0.04 %) | 7 (0.04 %) | 4 (0.27 %) | 12 (0.06 %) |
| 30 | --- | 3 (0.02 %) | --- | 3 (0.01 %) |
| 35 | --- | 3 (0.02 %) | --- | 3 (0.01 %) |
| 40 | --- | 6 (0.03 %) | 1 (0.07 %) | 7 (0.03 %) |
| 45 | 1 (0.04 %) | 2 (0.01 %) | --- | 2 (0.009 %) |
| 50 | --- | 4 (0.02 %) | 1 (0.07 %) | 6 (0.03 %) |
| 55 | --- | --- | --- | --- |
| 60 | --- | 1 (0.006 %) | --- | 1 (0.004 %) |
| 65 | --- | --- | --- | --- |
| 70 | --- | --- | --- | --- |
| 75 | --- | 1 (0.006 %) | --- | 1 (0.004 %) |
| 80 | --- | --- | 1 (0.07 %) | 1 (0.004 %) |
| 85 | --- | --- | --- | --- |
| 90 | --- | --- | --- | --- |
| 95 | --- | --- | --- | --- |
| 100 | --- | 8 (0.05 %) | --- | 8 (0.04 %) |
| Total | 2562 (12.39 %) | 16633 (80.40 %) | 1488 (7.19 %) | 20683 (100.0 %) |
| Damaged | 34 (1.33 %) | 213 (1.28 %) | 64 (4.30 %) | 311 (1.50 %) |
| X' | 0.14 | 0.19 | 0.48 | 0.20 |
| S ² | 12.26 | 85.28 | 60.19 | 115.25 |
| S. D. | 3.50 | 9.23 | 7.78 | 10.74 |

House Sparrow is undoubtedly a pest of grain crops. Estimates of crop losses to bird pests vary widely because in most of cases such estimates are not statistically sound. The

first ever study on sparrow losses in Pakistan was conducted by Rashid (1972). According to him the losses by the bird in standing crop varied from 1.14 to 3.22% of the total potential production. Roberts (1978) estimated 1 – 3% damage to irrigated wheat (Punjab and Baluchistan) by House Sparrow while it ranged from 10 – 15% in the barani areas of Baluchistan and NWFP. The present data, however, shows that the House Sparrow losses are much smaller as compared to the losses described by the above mentioned workers.

The sparrow damage to the wheat crop varied from road to road. These site-related variations were generally significant. This variability might have been related to the varying traffic condition of these roads. Roads having a heavier traffic might have been less favourable sites for the foraging of the sparrows. It was observed that sparrows feeding in large flocks tended to be very responsive to disturbance. In fields near a busy road, repeated disturbance would make the feeding a costly business in terms of energetics. So it may be inferred that the traffic condition was the cause of different level of damage in fields along different roads. The data of present study seem to support his hypothesis.

REFERENCES

- Summers-Smith, J.D., 1963. *The House Sparrow*. London: Collins.
- Basher, E.A., 1978. The problem of house sparrow damage to grain crops in Pakistan and suggested methods of control. pp: 3–15. In Proceedings of the *Seminar on Bird Pest Problems in Agriculture*, 5–6 July, 1978. Vertebrate Pest Control Centre, Karachi, Pakistan
- Beg, M.A., S.A. Rana and S. Akhtar, 1982. Food of House Sparrow in the cultivations of Faisalabad. *Pakistan J. Agric. Sci.*, 19: 122–9
- Mirza, Z.B., 1978. The ecology of House Sparrow (*Passer domesticus*) in the Punjab and experience with Spanish sparrow (*P. hispaniolensis*) control in Libya. pp: 16–21. In Proceedings of the *Seminar on Bird Pest Problems in Agriculture*, 5–6 July, 1978. Vertebrate Pest Control Centre, Karachi, Pakistan
- Otis, D.L., 1984. *A Method for Estimating Sorghum Loss to Birds Over Large Areas of Eastern Africa*. Mimeograph
- Rashid, A., 1972. *Produce losses by birds in standing wheat crop in Punjab province*. p: 28. Department of Agricultural Marketing, West Pakistan Agricultural University, Lyallpur
- Roberts, T.J., 1978. Information collected by the Vertebrate Pest Control Centre on regional bird pest problems and species responsible – Estimates of crop losses attributable to birds. p: 33–9. In: *Proc. Seminar on Bird Pest Problems in Agriculture*, 5–6 July, 1978. Vertebrate Pest Control Centre, Karachi, Pakistan

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