



Research Paper

Relationship between wheat cultivars and damage caused by house sparrow, *Passer domesticus niloticus* (L.), under field conditions at Assiut Governorate

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ABSTRACT

The present study was carried out at the Experimental Farm of the Faculty of Agriculture, Al-Azhar University at Assiut Governorate during the successive seasons of 2015/2016 and 2016/2017. Seven bread wheat cultivars of *Triticum aestivum* L. (Giza 168, Masr1, Masr 2, Sakha 93, Shandaweel 1, Sids1 and Sids12 cultivars) and two durum wheat cultivars of *Triticum durum* L. (Banisuef 1 and Sohag3 cultivars) were used to assess the damage caused by house sparrow (*Passer domesticus niloticus* L.). The results revealed that wheat Sids1 had the highest significant mean of damage, followed by Giza168 and Masr1 cultivars during 2015/2016 and 2016/2017 seasons, respectively. While, wheat cultivars of Masr2, Sakha93, Shandaweel1, Sids12, Banisuef1 and Sohag3 had the lowest significant mean of damage. The bread wheat cultivars were observed to exhibit the highest significant damage percentages during 2015/2016 and 2016/2017 seasons. But the durum wheat cultivars exhibited low levels of damage.

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Key words: Wheat cultivars, bread wheat, durum wheat, damage, house sparrow.

INTRODUCTION

Wheat (*Triticum* spp.) is served as a source of staple food for mankind since times immemorial (Satish et al., 2010). It is considered as a major agricultural commodity and dietary component across the world and as one of the most important cereals in regards to nutritional value (Abd El-Baky 2009). In Egypt, wheat is considered a first place strategic food crop (Ouda 2006). Because of its importance in the Egyptian diet, wheat is a strategic commodity in the country. It provides more than one-third of the daily caloric intake of Egyptian consumers and 45% of the total daily protein consumption by Egyptians (Ali and Adams, 1996). Durum wheat (*Triticum durum* Desf) is known for its high yield potential and adaptation to relatively dry environments (Varughese et al., 1997). The importance of durum wheat can be attributed to its multiple usages for human consumption is bread making, macaroni industry and its high protein and gluten contents (Rachon et al., 2002; Makowska, 2008). Damage by birds is one of the greatest problems facing growers of wide variety of arable

crops in Egypt. However, the amount of crop lost and the economic damage sustained is largely unquantified. The house sparrow (*Passer domesticus niloticus* L.) is considered as one of the important vertebrate pests during cultivations, storage of grains, human habitations and native wildlife. Since the house sparrow has great predilection for maturing seeds, it inflicts great damage on the maturing crops of wheat, broad bean, sorghum and sunflower. In fact, sparrow damage to cereal crops represents a serious problem as the losses reach up to 10% of the yield (Khattab et al., 2001; Omar 2005; Mostafa et al., 2008; Omar, 2010). The sparrow damage is thought to be one of the factors that severely constrain the efforts for achieving self-sufficiency in food production. The sparrows problem in Egypt 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. In this study, the relationship among Egyptian cultivars was

Table 1: Average percentages of wheat spike damage caused by the house sparrow during grain ripe stages of different wheat cultivars during 2015/2016 and 2016/2017 season at Assiut region.

Wheat types	Wheat cultivars	Seasons studies							
		First season				Second season			
		R1	R2	R3	Mean*	R1	R2	R3	Mean*
Bread wheat	Giza 168	16	12	10	12.67b	15	11	10	12.00b
	Masr1	12	10	12	11.33b	12	11	8	10.33b
	Masr2	3	4	6	4.33cd	4	4	2	3.33c
	Sakha 93	8	8	4	6.67c	5	3	4	4.00c
	Shandaweel1	6	6	4	5.33cd	6	4	2	4.00c
	Sids1	28	36	32	32.00a	26	34	30	30.00a
	Sids12	4	8	4	5.33c	6	6	4	5.33c
Durum wheat	Banisuef1	4	3	3	3.33cd	4	2	2	2.67c
	Sohag3	3	1	2	2.00d	2	0	2	1.33c

*Means with the same letter are highly significantly differed by using Duncan's analysis.

investigated using a sample of 9 winter cultivars released from 2016 to 2017. Our objective was to calculate the percentage of damage caused by house sparrow birds in wheat cultivars.

MATERIALS AND METHODS

This study was conducted at the Experimental Farm of the Faculty of Agriculture, Al-Azhar University at Assiut Governorate during the successive seasons of 2015/2016 and 2016/2017. Seven bread wheat cultivars of *T. aestivum* L. (Giza 168, Masr 1, Masr2, Sakha93, Shandaweel1, Sids1 and Sids12 cultivars) and two durum wheat cultivars of *T. durum* L. (Banisuef1 and Sohag3 cultivars) were used to assess the damage caused by house sparrow (*Passer domesticus niloticus* L.) on wheat cultivars. Grain samples of bread and durum wheat cultivars were kindly provided by the Shandaweel station in Sohage of Ministry of Agriculture, Egypt. The experimental design was split plot design with three replicates. Wheat cultivars were allocated in the main plots and one was allocated in sub-plots. The size of each plot was 10.5 m² (1/400 feddan) 3.5 m long and 3.0 m wide.

Sowing dates were 28th and 30th November in the winter seasons of 2015/2016 and 2016/2017, respectively. All the agriculture practices were applied as commonly used for growing wheat and carried out according to the recommendations set by the Egyptian Ministry of Agriculture. The wheat cultivars were applied to estimate the damage caused by house sparrow (*Passer domesticus niloticus* L.). A total of fifteen plants samples were taken randomly from the field of each replicate and damage crops were measured. The attacked plants and ears were estimated as a percentage from the total examined plants

or ears.

The percentages of damaged and undamaged were calculated using the following equation:

$$\text{Damage (\%)} = \frac{\text{No. of damaged ears}}{\text{Total No. investigated ears}} \times 100$$

The obtained data were subjected to the analysis of variance and mean comparisons were made using L.S.D. at 0.05 as described by Steele and Torrie (1984).

RESULTS AND DISCUSSION

The resistance of plants to pest attack depends on their inherited qualities, which determine the extent of pest damage. It should be recognized that host-plant resistance is not a cure-all, but an important (IPM) component, which must be fitted carefully for the control of specific pests and into crop improvement programmes. It important to note that the tested wheat cultivars are commonly cultivated in Upper Egypt during November, using broadcasting or drilling as planting method.

The differences among nine wheat cultivars, submitted to planting method at one sowing dates, and their ability to be damaged by house sparrow birds attack, during the ripening stage, through two successive growing seasons, are presented in Table 1 and Figure 1. The entire ripe stage, as well as each cultivar was individually investigated, during the two growing seasons (2015/2016, and 2016/2017), seeking for more obvious results about wheat cultivar /bird damage relationship.

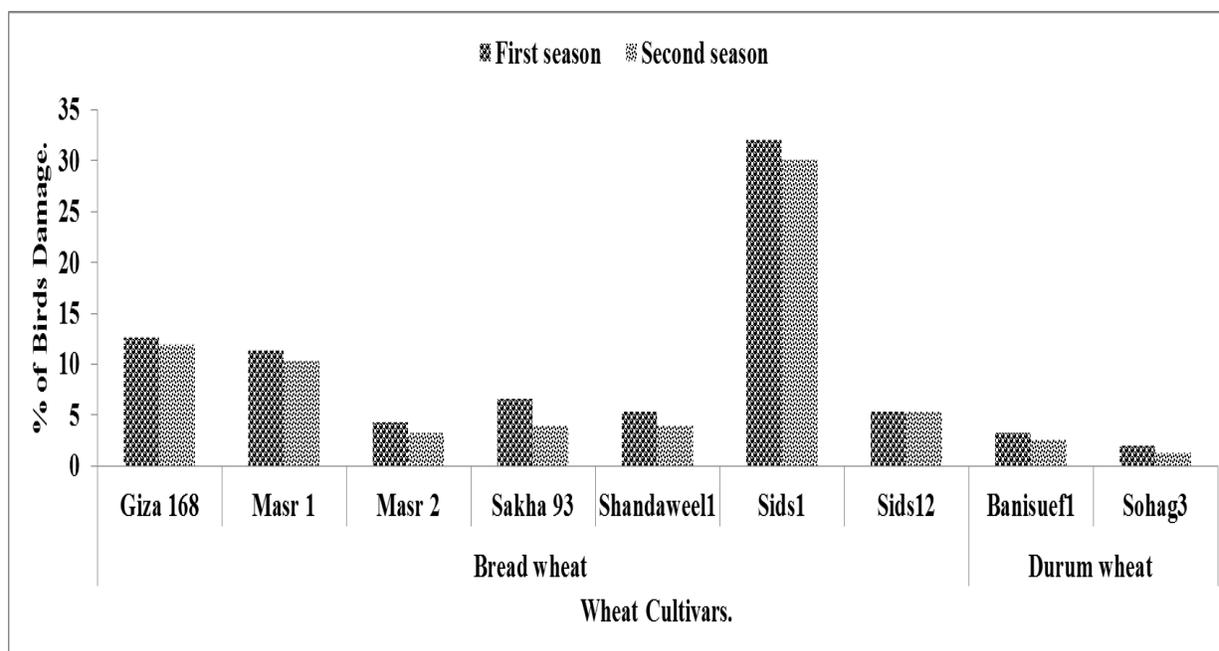


Figure 1: Average percentages of wheat spike damage caused by the house sparrow during grain ripe stages of different wheat cultivars during 2015/2016 and 2016/2017 season at Assiut region.

Table 2: Average percentages of wheat spike damage caused by the house sparrow during grain ripe stages in genotypes of wheat cultivars (bread wheat and durum wheat), during 2015/2016 and 2016/2017 season at Assiut region.

Wheat types	Seasons studies							
	2015/2016				2016/2017			
	R1	R2	R3	Mean	R1	R2	R3	Mean
Bread wheat	11.00	12.00	10.29	11.09a	10.57	10.42	8.57	9.95a
Durum wheat	3.50	2.00	2.50	2.67b	3.00	1.00	2.00	2.00b
Mean*	7.25	7.00	6.40	6.88a	6.79	5.71	5.29	5.98a

*Means with the same letter are highly significantly differed by using Duncan's analysis.

General wheat cultivars

Data on average percentages of damage caused by the house sparrow attack, during the whole ripe stage of the wheat, for the two growing seasons, are presented in Table 1 and Figure 1.

The data of the resistance/susceptibility potential of wheat cultivars to bird damage showed that the differences among the nine wheat cultivars, regarding mean percentages of damage, were generally significant. Whereas, the highest significant mean of damage (32.00 and 30.00%) were observed in wheat Sids1, followed Giza168 and Masr1 cultivars (12.67 and 12.00% and 11.33 and 10.33%, respectively) with insignificant difference between them, during 2015/2016 and 2016/2017 seasons, respectively. While, the lowest significant mean of loss [(4.33 and 3.33%), (6.67 and 4.00%), (5.33 and 4.00%), (5.33 and 5.33%), (3.33 and 2.67%) and (2.00 and 1.33%)] were observed in the wheat cultivars of Masr2,

Sakha 93, Shandaweel 1, Sids 2, Banisuef 1 and Sohag 3, with significant difference between them, during 2015/2016 and 2016/2017 seasons, respectively (Table 1 and Figure 1).

Genotypes of (Bread and Durum)wheat cultivars:

Data on the average percentages of damage caused by the house sparrow attack, during the whole ripe stage of nine genotypes wheat cultivars, for the two growing seasons, are presented in Table 2 and Figure 2).

Obviously, the tested wheat cultivars differed in their susceptibility to birds damage. This dissimilarity was significant in both genotype wheat cultivars (bread and durum wheat) in the two growing seasons. The highest significant damage percentages (11.09% and 9.95%) were occurred in the bread wheat cultivars during 2015/2016 and 2016/2017 seasons. However, durum wheat cultivars

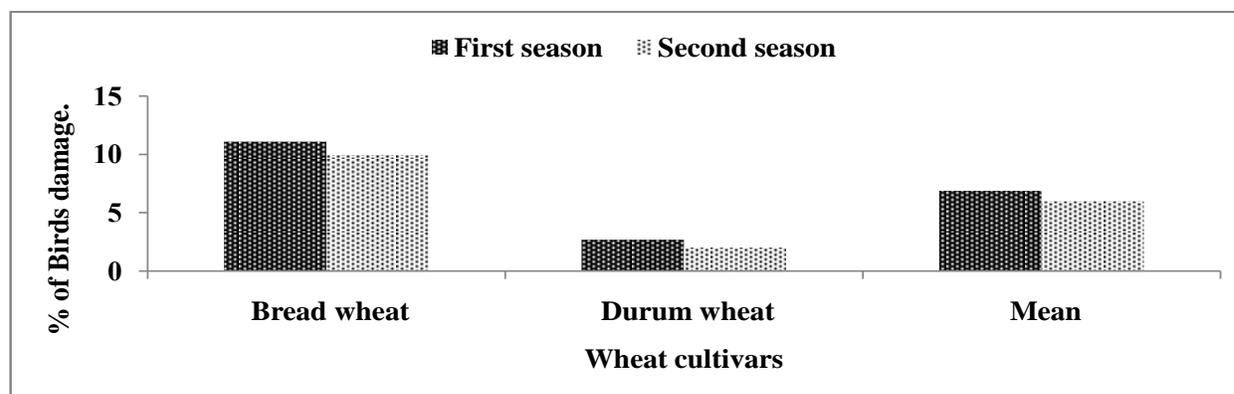


Figure 2: Average percentages of wheat spike damage caused by the house sparrow during grain ripe stages of genotypes of wheat cultivars (bread wheat and durum wheat), during 2015/2016 and 2016/2017 season at Assiut region.

were observed to exhibit low levels of damage (2.67 and 2.00%) during 2015/2016 and 2016/2017 seasons. As regard growing seasons, the data on grain ripe stage, through two successive growing seasons (2015/2016 and 2016/2017), are presented in Table 2 and Figure 2. The highest calculated damage percentage was found in the wheat cultivars (6.88%) during 2015/2016 season. But the lowest calculated damage percentage was 5.98% during 2016/2017 season, with insignificant difference between them (Table 2 and Figure 2).

Finally, the aforementioned results showed that it is preferable to cultivate the bread wheat cultivar that is susceptible to birds attack, such as the wheat cultivar Masr2, Sakha 93, Shandaweel1 and Sids12. Also, the durum wheat cultivars (Baeni Suef 1 and Sohag3) generally appeared to be less preferable for bird attack at grain ripe stage during both growing seasons (Tables 1 and 2). On the other hand, the results in the tables showed that the house sparrow birds severely attacked the wheat cultivar (Sids1) more than other wheat cultivars, plus Giza168 and Masr1 cultivars. The differential vulnerable liability among the tested wheat cultivars may be ascribed to the differential morphological and physiological plant characteristics among them (e.g., awns, grain contents and concentration of phenolic compounds). Thus, certain cultivars appeared to be less affected (resistant) to bird loss, while the others were most susceptible. These results are in accordance with the findings of Das (1988) who reported that loss of wheat grain in field by birds, at different conditions (wheat varieties, planting dates and irrigation levels) was greatest at maturity stage, with early and late planting dates and least with normal planting date. Gowayed (2003) studied the morphological characteristics of eight species of *Triticum caryopsis*. He found that there are variable 100 grain weight, shape, embryo shape and grains separable from lemma and palea during threshing. Eman-Tolba (2006) found that the genotype (1512) and two wheat cultivars (Sids 6 and Sids 7) showed high percentages of bird damage, followed by Giza 164. Therefore, it is quite obvious that the subsequent

performance significantly reduced the percentages of damage caused by birds. Omar (2010) reported that the highest damage was recorded in Giza 168 and Sids 1 cultivars (2.52 and 1.90%). But, the lowest calculated damage percentage was recorded in Baeni Suef1 cultivar (0.96%) during 2007 and 2008 seasons.

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