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STUDY OF ECONOMIC LOSSES CAUSED BY HOUSE SPARROW, *Passer domesticus niloticus* (L.) ON SUNFLOWER AND SORGHUM CROPS UNDER THE FIELD CONDITIONS

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ABSTRACT

The house sparrow, *Passer domesticus niloticus* (L.), causes damage to field crops at all growth stages. The present study was designed to find out the relationship between planting nearby and losses caused by house sparrow of sunflower and sorghum plants. The obtained results revealed that the lowest damage of sunflower and sorghum occurred at the nearby cultivations of the two crops. The house sparrow birds preferred sorghum more than sunflower crops under the field conditions. This may be mainly due to variation in morphology and phonology characteristics of plant and seeds. The lowest damage was observed at the milky stages, while the highest damage was the mature stage in both sunflower and sorghum plants under field conditions.

The economic losses caused by house sparrow in both sunflower and sorghum show significant differences between the single cultivation, and nearby cultivation. The losses were low in the nearby cultivation than the single cultivation; which could be due to the distributions of the damage in the two crops. Losses percentages were ٨.٥٢٪ and ١٧.٥٢٪ in sunflower and sorghum in

the nearby cultivation. While that of the single cultivation were ٦٧.٨٢٪ and ٥٩.٣١٪ in the two crops respectively.

INTRODUCTION

Wild birds are considered as key pests of sunflower and sorghum farms in most areas all over the world. Sunflower and sorghum seeds are very attractive to birds as food; the seed kernels contain many essential proteins and oils. In some areas, ripening of sunflower and sorghum seeds coincides with the post-reproduction period of birds, where the nutritional demands of bird populations reach their annual peak, due to sheer numbers (Besser, ١٩٧٨).

Bird damage to cereal crops represents economic losses reached about ٥ - ١٠ % of the production (Bruggers and Rulle ١٩٨١). In Egypt, the house sparrow, *Passer domesticus niloticus* (L.) is one of the most important agricultural pests in cultivated areas. These birds consume many crops especially cereal grains such as wheat and broad bean in addition to sorghum and sunflower (Bonnah, ٢٠٠٧ and Abdel-Gawad *et al*., ٢٠١٠). Sunflower (*Helianthus annuus*, L.) is one of the four important annual crops in the world used for production of edible oil. Sorghum (*Sorghums vulgare*) also is important crops that contain protein, in addition to its importance for animal feed

The present work was carried out Faculty of Agriculture farm, AL-Azhar University, Assiut Governorate during ٢٠١١season. The study was conducted because of the seriousness damage of this economically important bird pest's problem to both sunflower and sorghum fields.

MATERIALS AND METHODS

a) The experimental design:

Four areas about ¼ feddans for each were carried out at the Agriculture experimental farm of Al-Azhar University at Assuit during the summer season of ٢٠١١, to study the damage caused by house sparrow, *Passer domesticus niloticus* L., to both sunflower and sorghum. Two experimental areas were individually and other two were adjacent. The first and the second areas were cultivated with the short long stem of both sunflower and sorghum. The sorghum experiments were cultivated on ٣٠th of June, while sunflower was

cultivated on ١٥th July of ٢٠١١, so the head from both sunflower and sorghum appear in the same time. Seeds were sown in ٢٠١١ season, in hills ٢٥ cm. apart of sunflower and ٢٠ cm. apart of sorghum, on ridges ٦٠ cm. apart and ٣.٥ meter long, leaving one plant /hill at thinning time (٢١ days after sowing)in sunflower and two plants / hill in sorghum, with a plot area of ١٠.٥ $m^{٢}$ (١/٤٠٠ feddans), All field management practices for growing sunflower and sorghum had been conducted in the same way as carried out in the neighboring fields following the recommendation of the Egyptian Ministry of Agriculture.

Monitoring of bird damage in the field, based on the frequency encounter of the damaged heads of sunflower and sorghum plants until the harvest time. Samples of thirty plants were taken randomly from the field of each replicate and damage crops were measured. The attacked plants were estimated as a percentage from the total examined plants in the studied crops.

Statistical analysis:

The results were statistically analyzed according to Gomez and Gomez (١٩٨٤), using the computer MSTAT-C statistical analysis package by Freed, *et al.* (١٩٨٩). The least significant differences (LSD) test at probability level of ٠.٠٥ was manually calculated compare the differences among means, and analysis of significant variance (critical point) El –bardisy (٢٠١١).

RESULTS AND DISCUSSION

Data presented in Table ١ and the corresponding Figure ١ show the percentage of house sparrow damage in sunflower and sorghum field crops, with different treatments carried out at the Agriculture experimental farm of Al-Azhar University, Assuit during the summer season of ٢٠١١. The house sparrow, *Passer domesticus niloticus* (L.) attacked both sunflower and sorghum from the milky stages of plants till the harvest.

Table ١: Average percentage of damage caused by house sparrow in sunflower and sorghum crops under field conditions during ٢٠١١ season.

Crops	Cultivation	% of damage		
Sunflower	Single	٥٦.٠٠٪ A		
	Nearby	٢٠.٦٧٪ C	٢٦.٦٧٪ B	٥٩.٠٠٪ A
Mean		٣٨.٣٣٪ B		
Sorghum	Nearby	٣٢.٠٠٪ B		
	Single	٦٠.٢٢٪A		
Mean		٤٧.٣٣٪ A		
L.S.D.٠.٠٥٪		٦.٦٦		

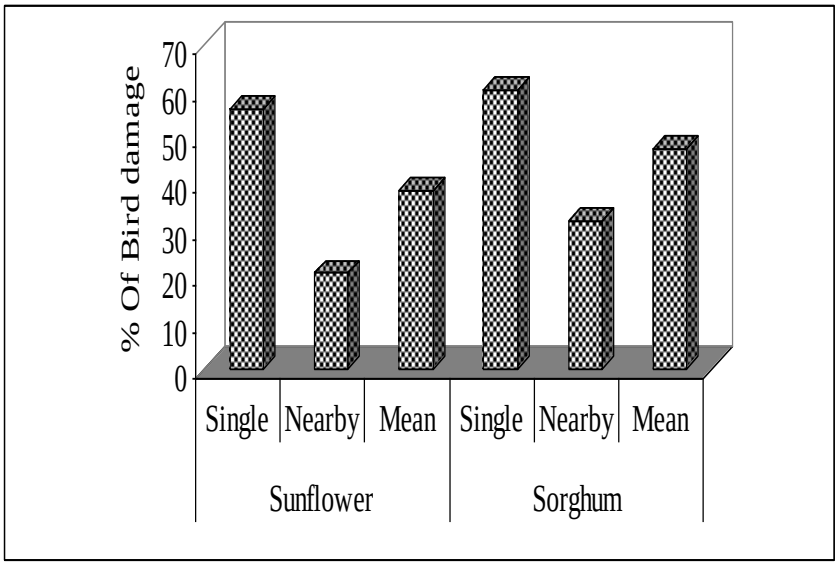

Figure ١: Average percentage of damage caused by house sparrow in sunflower and sorghum crops under field conditions during ٢٠١١ season.

Damage caused by house sparrow on some crops

The results of the effect of different planting sites and food preference of house sparrow showed that the rate of damage was lower in the adjacent methods of cultivation of sorghum. The averages of total damage were ٢٠.٦٧ and ٣٢.٠٠٪ for sunflower and sorghum crops. With the only farming methods the results showed that the highest percentage of damage caused by sparrows of both sunflower and sorghum, whereas the averages of total damage were ٥٦.٠٠ and ٦٠.٢٢٪ for sunflower and sorghum crops. This result could be due to the distribution of damage to the cultivated area of crops, sunflower and sorghum. Cultivation of sunflowers near the sorghum attained the highest level of protection with agriculture only.

Data in Table ٢ and Figure ٢ represent the average percentage of house sparrow damage on flower, milky, doughy and mature stages of sunflower and sorghum during ٢٠١١ summer season under the field conditions.

The results revealed no sparrow damage in flowering stages of sunflower and sorghum. But the sparrows starting to attacked crops in the milky stage of both sunflower and sorghum. The averages of total damage were ٧.٣٤ and ١٠.٦٧٪, followed by dough stage, ١٠.٠٠ and ٤٦.٠٠٪ for sunflower and sorghum crops, respectively. Whereas the mean highest damage values ١٤.٠٠ and ٥٥.٣٣٪ were recorded in mature stage of sunflower and sorghum, respectively.

Table ٢: Assessment of damage caused by house sparrow at ripening stages of sunflower and sorghum under field conditions during ٢٠١١ season.

Stages	Crops		Mean
	Sunflower	Sorghum	
Flower stage	٠.٠٠E	٠.٠٠E	**٠.٠٠D**
Milky stage	٧.٣٤ %D	١٠.٦٧٪	**٩.٠١٪C**
Dough stage	١٠.٠٠٪CD	٤٦.٠٠٪	**٢٨.٠٠٪B**
Mature stage	١٤.٠٠٪C	٥٥.٣٣٪	**٣٤.٦٧٪A**
L.S.D.٠.٠٥٪	٦.٤٢		**٤.٥٤**
Mean	**٧.٨٣٪B**	**٢٨.٠٠٪A**	

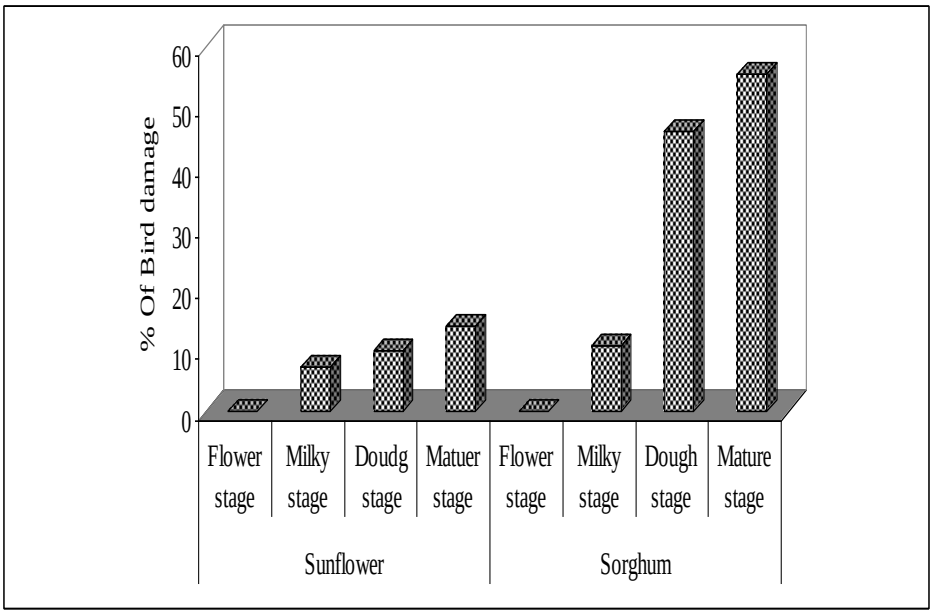

Figure ٢: Assessment of damage caused by house sparrow at ripening stages of sunflower and sorghum under field conditions during ٢٠١١ season.

Statistical analysis of data in Table ٢ showed a high significant difference between sorghum and sunflower crops. The averages of total damage were ٢٨.٠٠٪ and ٧.٨٣٪ for sorghum and sunflower crops during planting season. Generally, the results showed high damage caused by house sparrow birds in sorghum than sunflower crops. This variation may be mainly due to the variation in morphology and phonology characteristics of plant and seeds.Tolba (١٩٩٩) reported that the damage started during the milkly and dough stages, then increased gradually till the harvest time. Abd El-Gawad *et al.*, (٢٠١٠) observed that the house sparrow, *Passer domesticus niloticus* (L.) caused damage to the field crops in all growth stages.

Damage caused by house sparrow on some crops

The economic loss for crops (sunflower and sorghum) caused by house sparrow

Data presented in Table ٣, showed that, the value of loss (quantitative) in production of sorghum was about ٧٧٠.٥٦ kg/ feddan worth about ١٣٨٧ pounds, representing about ٥٩.٣١٪ of the total production as a result of birds attack in the case of cultivation alone, and about ٢٢٧.٥٧ kg/ feddan approximately ٤٠٩.٦٣ pounds, representing about ١٧.٥٢٪ in the case of cultivation nearby for the sunflower.

Table ٣: Economic losses in sunflower and sorghum crops caused by house sparrow under field conditions during ٢٠١١ season.

Crops	Treatment	Loss % /feddan	Amount of Loss/feddan	Price	Value of Loss/feddan
Sunflower	Single	٦٧.٨٢٪	١١٧٩.٢٣ kg.	٢.٠	٢٣٥٨.٤٧ Pounds
	Nearby	٨.٥٢٪	١٤٨.١٨ kg.	٢.٠	٢٩٦.٣٥Pounds
Sorghum	Single	٥٩.٣١٪	٧٧٠.٥٦ kg	١.٨	١٣٨٧Pounds
	Nearby	١٧.٥٢٪	٢٢٧.٥٧ kg.	١.٨	٤٠٩.٦٣Pounds

The loss amounted to about ١١٧٩.٢٣ kg/ feddan worth about ٢٣٥٨.٤٧ pounds, representing about ٦٧.٨٢٪ of the total production of the crop of sunflowers in the case of alone, and about ١٤٨.١٨ kg/feddan worth about ٢٩٦.٣٥ pounds, representing about ٨.٥٢٪ in the case of cultivation nearby. The study showed significant differences between single cultivation and nearby cultivation for both crops (sunflower, and sorghum). It is recommend the importance of the crop rotation, and on the other hand the need to include sorghum crop, mainly in the crop rotation and focus on the cultivation nearby Sunflower and not individually for each of the other (figure ٣).

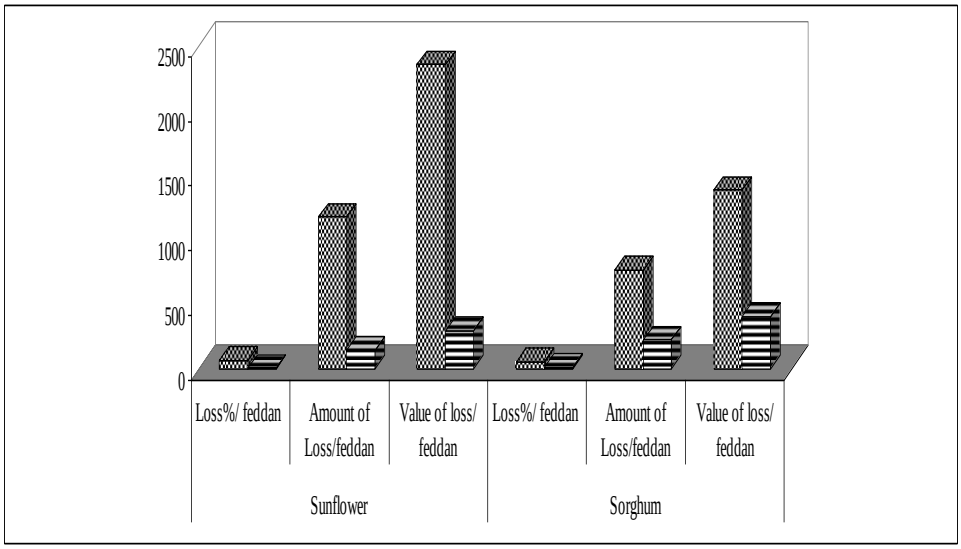

Figure ٣: Economic losses in sunflower and sorghum crops caused by house sparrow under field conditions during ٢٠١١ season.

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دراسة الخسائر الاقتصادية المسببة بواسطة عصفور النيل الدوري في محصولي دوار الشمس والذرة الرفيعة تحت الظروف الحقلية

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أجري هذا البحث في مزرعة كلية الزراعة بجامعة الأزهر بأسيوط بهدف معرفة الخسارة الاقتصادية الناتجة عن الزراعات المتجاورة لكل من محصولي دوار الشمس والذرة الرفيعة مقارنة بالزراعات المفردة لهذين المحصولين تحت الظروف الحقلية وأعطت التجربة النتائج الآتية:

١- في الزراعات المتجاورة لكل من دوار الشمس والذرة الرفيعة كانت الخسارة الاقتصادية أقل من الزراعات المتباعدة لهذين المحصولين بفروق معنوية حيث كان متوسط نسبة الإصابة(٢٠.٦٧% و ٣٢.٠٠%) للمحصولين على الترتيب ، في حين أن نسبة الإصابة كانت في الزراعات المتباعدة كانت ٥٦.٠٠% لمحصول دوار الشمس ، ٦٠.٢٢% لمحصول الذرة الرفيعة.

٢- من دراسة العلاقة بين طور النضج والإصابة وجد أن المحصول يصاب بالطيور من الطور اللبني وحتى طور النضج الكامل ، وتشتد الإصابة في طور النضج الكامل حيث تصل إلى١٤.٠٠% في دوار الشمس وتكون ٥٥.٣٣% في الذرة الرفيعة.

٣- من دراسة التفضيل الغذائي للعصفور الدوري النيلي وجد أنه يفضل الذرة الرفيعة عن دوار الشمس حيث كان متوسط الخسارة ٢٨.٠٠% في الذرة الرفيعة وكانت٧.٨٣% في دوار الشمس ، وهذا ربما يرجع إلى أن نورات الذرة تكون أكثر سهولة للالتقاط بواسطة الطيور من دوار الشمس هذا إلى جانب كبر حجم حبة دوار الشمس .

٤- من دراسة تقدير الخسارة ونسبة الفاقد الناتجة عن اصابة عفور النيل الدوري لهذين المحصولين تبين أن أقل كمية مفقودة لكلا المحصولين في الزراعات المتجاورة مقارنةً بالزراعات الفردية.

٥- يوصي البحث بتنظيم الزراعة مع زراعة المحاصيل المعرضة للإصابة بالطيور في تجمعات متجاورة وبذلك توزع الإصابة عن كل الحقول ، كذلك يجب الزراعة في مواعيد متقاربة حتى يكون طرد الثمار في موعد واحد ويتم الحصاد عند تمام النضج مع عدم الانتظار ، وبذلك تحقق أقل خسارة نتيجة إصابة الطيور.