

Effect of Broad Bean Sowing Distances on Damage Caused by House Sparrow, *Passer Domesticus Niloticus* (L.)

Khalifa, H. Abdel-Gawad¹; Abd-Elsattar, M. Metwally¹,
Nashaat, A. Mahmoud³ and Mahmoud, M. A. Omar³

¹Plant Protection Dept., Fac. of Agric., Assiut Univ., ²Agric. Zoology and Nematology Dept., Fac. of Agric., Al-Azhar Univ. Cairo, Agric. Zoology and ³Nematology Dept., Fac. of Agric., Al-Azhar Univ. Assiut

Key words: House sparrow, Broad bean, Bird damage.

Abstract:

The house sparrow, *Passer domesticus niloticus* (L.), caused a damage of the field crops in all growth stages. The present work is an attempt to study. The relationship between the damage and the distances of the cultivated broad bean plants. The obtained results revealed that insignificant differences were found between the three cultivars of broad bean in both seasons. On the other side, significant differences were observed between the damage caused by house sparrow in the planted distances of 10 cm. as compared with the damage at 30 cm distance. While the lowest damage was observed at 20 cm. The house sparrow preferred Misr-1 cultivar more than the other ones. This may be due to the highest content of protein in this cultivar.

Introduction:

Birds dominated the air and managed to invade a lot of different

environments, whether land or water, due to the anatomy and morphological structure of this type of animals. Most of bird species play a useful role in agriculture by having a potent check on insect and rodent pests. However, some granivorous bird species have been adapted to the agricultural habitats by the increasing in numbers, conflicting with our goals of agricultural production by inflicting economic losses to crops, fruits and stored grains. Bird management involves both the conservation of useful species and control of the pest ones. The birds damage to crops, particularly cereal grains, is a serious problem all over the world. In African countries, bird damage to cereal crops represents economic losses reached to 5 - 10 % of the production (Bruggers and Rulle 1981). In Egypt, The house sparrow, *Passer domesticus niloticus* (L.) is one of the most important agricultural pest in the cultivated areas. These birds consume many crops

*A portion of thesis presented in partial fulfillment of the Ph.D degree

Received on: 30/3/2010

Accepted for publication on: 27/4/2010

Referees: Prof. Dr.: E. M. El-Erake

Prof. Dr.: Zenhom R. Soliman

especially cereal grains such as wheat and sorghum in addition to broad bean, sunflowers and grapes (Khattab 1993, Metwally, 1995, Omar, 2005, Tolba, 2006 and Bonnah, 2007). Incident of damage are caused by house sparrow *Passer domesticus niloticus*, hooded crow, *Corvus corone cornix* and palm dove, *Streptopelia senegalensis egyptica* and other bird species. The broad bean (*Vicia faba* L.) is one of the most important winter legume crops for obtains seeds in Egypt. Its importance lies chiefly due to its high protein content (about 28% proteins). This crop contains also Potassium and Calcium in addition to it's easily and unexpensive crop production.

The current research aims to impact of broad bean cultivars and plant density in reducing the damage caused by house sparrow.

Materials and Methods

Two field experiments were carried at the Experimental Farm of Faculty of Agriculture AL – Azhar University in Assiut Governorate during 2006-2008 years, in order to study the effect of the three plant distances (10, 20 or 30 cm between hills, with two plants per hill) for three broad bean cultivars (Misr-1, Giza-429 and Giza-40) in reducing the house sparrows damage. The percent summer crop was maize in both seasons.

The assessment of house sparrow damage on different stages of the broad bean studies

was carried out according to the following methods:

a) The experimental area and design:

An area of about half feddan was chosen and divided into plots, each of 3.5 m. long by 3.0 m. wide. (1/400 feddan). Tested cultivars were distributed in a randomized complete block design, and each treatment was replicated 5 times. Seeds were sown on 15th. Oct. 2006 and 2007 seasons. The plant density per meter square was 64 plants in 10 cm. distances, 32 plant in 20 cm. and 21 plants in 30 cm. distances. The densities were obtained by planting on two sides of ridges 60 cm. apart, with hills 10, 20, and 30cm. apart, respectively. Plants were thinned to two plants per hill after full germination.

b) Sampling and counting:

Monitoring of bird damage in the field, based on the frequency encounter of damage horns of broad bean plants until the harvest time. Samples were taken weakly according to the appearance of the horns. Direct count method was used in order to determine the bird damage. Samples of thirty plants were taken at random from the field of each replicate were selected at random and damage horns were measured. The attacked plants were estimated as a percentage from the total examined plants in the studied crops.

c) Statistical analysis:

Data obtained of the damage (%) were statistically analyzed

using a randomized complete block design. Means were compared according to Duncan's Multiple Range test, at 0.05 level of probability.

Results and Discussion:

Data presented in Table (1) and the corresponding figure (1) show the percentage of house sparrow damage in three broad bean breeding lines (viz., Misr-1, Giza-40 and Giza-429), with three plant densities (10, 20 & 30 cm.) during 2007 & 2008 seasons. The house sparrow, *Passer domesticus niloticus* (L.) attacked both breeding lines of the broad bean plants from the beginning of appearance of plant horns till the harvest.

On the other side the largest percentage of attacked horns was recorded in Misr-1 cultivar during both seasons as compared with the other two cultivars (Giza-40 and Giza-429). This may be due mainly to the high percentage of the total protein, (EL-Said 2008).

Statistical analysis of data revealed that insignificant differences were noticed between the percentages of damage caused to the three broad bean cultivars. The averages of percentages damage were (18.00, 16.13 & 15.63 %) for the three cultivars, respectively.

Insignificant differences were also observed between the percentages of damage in both swing seasons. The average percentages of the house sparrow damage in the three broad bean

cultivars were (18.40, 17.20 & 16.27 %) from the total examined plants during 2007. And (17.60, 15.07 & 15.00 %) during 2008.

The average percentages of sparrow damage to the three plant densities of broad bean (10, 20 & 30 cm.) during 2007 & 2008 seasons, cleared that, the largest amount of damage was recorded in the third distance (30 cm.) for both sowing seasons. The average of total damage was (18.23%). The reverse with noticed with two swing distances (10 and 20cm.)

Statistical analysis of data revealed that there are insignificant differences between the distance of cultivation to 10 cm and 20 cm distances. The averages of total damage were (16.30 & 15.23%). On the other side, significant difference was counted between distances of 20 & 30 cm. The total damage averaged (15.23 & 18.23%). Also, insignificant differences were counted between 10 cm. and 30 cm distances. The averages of total damage were (16.30 & 18.23%). From the previous data, it is clear that, changing in plant density causes variable amount of damage, the cultivation of 20 cm. seems to minimize sparrow damage. This may be due mainly to the disappearance of plant horns under plant branches and leaves. While, the highest damage at the cultivation of 30 cm. may be due to the availability of sparrow's movement. The highest damage

caused at 10 cm distance, may be due to the overcrowding of plants were the sparrow used as slitter from its natural enemies.

Soliman (1993) reported that the average of bird damage to broad bean was 9.2 %. The damage occurred only on the milky and dough stages while mature stage did not attacked by birds. Also, Metwally *et al.*, (1995) reported that the average of bird damage to sunflower and broad bean were (3.27 & 5.25 %) while, Tolba (1999) revealed that the largest damage in broad bean pods was about 20% in Assiut

104 cultivar & 19% in Assiut 99B before harvesting time. Omar (2005) stated that there was a highly significant difference between different agriculture dates of broad bean crop during 2003 & 2004 seasons. Mostafa *et al* (2008) found that The peak of bird damage to broad bean occurred at the first week after pods emergences the damage were 18.65 & 17.51% in both old lands and newly reclaimed areas. Wholly in agreement with the data obtained in the present findings.

Table (1): Average percentages of damage caused by house sparrow in three broad bean cultivars at three sowing distances during 200 7– 2008 seasons.

Seasons of study		2007 season			2008 season			Mean
Cultivars		Misr-1	Giza40	Giza429	Giza429	Giza40	Misr-1	
sowing distances	10 cm	17.20	17.40	16.80	14.60	15.20	16.60	16.30AB
	20 cm	17.80	16.80	14.20	13.40	13.40	15.80	15.23 B
	30 cm	20.20	17.40	17.80	17.00	16.60	20.40	18.23 A
Mean of Cultivars		15.63 A						
		16.13 A						
		18.00 A						
Mean of seasons		17.29 A			15.89 A			

* Means with the same letter are insignificant at 0.05 level of probability

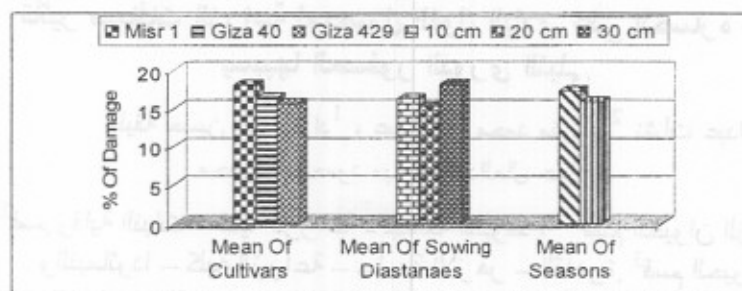


Fig. (1): Average percentages of damage caused by house sparrow in three broad bean cultivars at three sowing distances during 2007–2008 seasons.

References

- Bonnah, A. A. M. M. 2007.** The damage and control of hooded crow on some plantation in Sohag Governorate. Ph.D. Thesis, Faculty of Agriculture, Assiut University, Egypt.pp. 116.
- Bruggers, R.L. and P. Rulle 1981.** Economic impact of pest birds on repining cereal in Senegal. Prot. Ecol. 3:7-16.
- El-Said, M.A.A. 2008.** Effect of plant density and phosphorus fertilization on some faba bean cultivars. . M. Sc. Thesis Faculty of Agric., Assiut Univ.pp. 87.
- Khatab, M.M. 1993.** Biological, Ecological and Toxicological studies on harmful birds of agriculture and of Sharkia Governorate. M.Sc. Thesis Fac. Agric., Al – Azhar Univ. PP.192.
- Metwally, A.M.; H.H. El – Deeb; S. Abd El – Aal; and M.M. Khatab 1995.** Birds damage to some ripening field crops under different conditions in Sharkia Governorate Al – Azhar J. Agric. Res., 21. 413 – 424.
- Mostafa, M. A.; M. M. D. Khat-tab and M.A.I. Attia 2008.** Field trials to evaluate damage caused by wild bird species to field crops at Sharkia governorate. J. Agric. Sci. Mansoura Univ., 33 (10): pp. 7529-7542.
- Omar, M.M.A. 2005.** Ecological and biological studies on some wild birds. M.Sc.Thesis Fac. Agric., Al – Azhar Univ. PP.148-149.
- Soliman, A.M.A. 1993,** Studies on arthropods associated with the harmful birds and their nests at Kafr El - Sheikh Governorate. M. Sc. Thesis Fac. of Agric. Zagazig Univ. PP.115.
- Tolba, E.F.M. 1999.** Some ecological aspects on House sparrow attacking various crops in Assiut Governorate. M. Sc. Thesis Faculty of Agric., Assiut Univ.pp.105.
- Tolba, E.F.M. 2006.** Ecological studies on house sparrow, *Passer domesticus niloticus* (L.) and its control in Assiut Governorate. Ph. D. Thesis Faculty of Agric., Assiut Univ. pp.188-19

تأثير مسافات الزراعة لمحصول الفول البلدى على الخسارة التى يسببها العصفور الدورى النيلي

خليفة حسين عبدالجواد¹ ، عبدالستار محمد متولى² نشأت عبدالعزيز محمود³ محمود مبارك عبدالعال عمر 3

¹ قسم وقاية النبات – كلية الزراعة – جامعة أسيوط ، ² قسم الحيوان الزراعى والنيماطودا – كلية الزراعة – جامعة الأزهر – القاهرة. ³ قسم الحيوان الزراعى والنيماطودا – كلية الزراعة – جامعة الأزهر – فرع أسيوط

الملخص العربى

أجريت هذه الدراسة على أساس تقييم الأصناف والكثافة النباتية على مقدار الإصابة والضرر الناتج عن العصفور الدورى النيلي بالنسبة لمحصول الفول البلدى حيث تم تقدير نسبة الإصابة لبعض أصناف الفول البلدى (الصنف مصر 1 ، جيزة 40 ، جيزة 429) كما تم فى هذا البحث زراعة هذه الأصناف على ثلاثة مسافات زراعة مختلفة على خطوط (مسافة 10 ، 20 ، 30 سم) وذلك خلال موسمين زراعة متتالين لتوضيح أثر كل من الصنف المنزرع والمسافة النباتية فى خفض نسب الضرر .

ومن خلال هذه الدراسة فقد أظهرت النتائج ما يلى :-

1- لا توجد فروق معنوية بين نسب الإصابة للأصناف المنزرعة الثلاثة ولكن قد لوحظ أن متوسطات الخسائر المسببة عن العصفور الدورى النيلي للصنف مصر 1 كانت عالية مقارنة بالصنفين جيزة 40 ، الصنف جيزة 429 . حيث بلغ متوسطات نسب الإصابة (18 ، 16.13 ، 15.63 %) على التوالي . وربما يرجع ذلك إلى زيادة نسبة البروتين فى الصنف مصر 1 عن باقى الأصناف .

2- فيما يتعلق بمسافات الزراعة أظهرت النتائج أنه لا توجد فروق معنوية بين مسافات الزراعة المختبرة على 10 ، 20 سم حيث بلغت متوسطات نسب الإصابة (16.30 ، 15.23 %) ، وبالرغم من عدم وجود فروق معنوية بين الزراعة على 10 ، 20 سم إلا أنه فى حالة الزراعة على 10 سم تكون الإصابة عالية نظرا لأن الزيادة فى الكثافة النباتية تعرض النباتات إلى ظاهرة الرقاد المبكر مما يؤدى إلى تكشف القرون حيث يجعل الحقل بيئة صالحة لهبوط الطيور المهاجمة فبالناتالى تزيد الإصابة .

بينما توجد فروق معنوية بين مسافة الزراعة على 20 ، 30 سم ، حيث بلغت متوسطات الخسائر (15.23 ، 18.23 %) وهذا يعنى أنه كلما اتسعت مسافة الزراعة زادت نسبة الإصابة نظرا لوجود مسافات بين النباتات تعطى الفرصة للطيور من الحركة داخل الحقل المنزرع ، وكذلك الرؤية الواضحة للقرون فتزيد الإصابة . ولكن هناك فروق غير معنوية بين 10 و 30 سم . وذلك لقلة المحصول فى حالة الزراعة على 30 سم . لذلك يفضل الزراعة على مسافة 20 سم لأنها تعتبر من أفضل مسافات الزراعة من حيث قلة الإصابة بواسطة الطيور .

3- كما أظهرت النتائج أنه لا توجد فروق معنوية بين موسمي الزراعة حيث بلغت متوسطات نسب الإصابة (17.29 ، 15.89 %) على التوالي .