

A comparative Study on Some Maize Cultivars and Their Relationship to Damage Caused by Hooded Crow, *Corvus corone sardonius* at Qena Governorate, EGYPT

Omar, M.M. Abdel-Aaal



Agric. Zoology and Nematology Dept., Fac. of Agric., Al-Azhar Univ. Assiut Branch, Egypt.

E-mail: m_mobarak75@yahoo.com

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Abstract

Seven field experiments were carried out at Dahsa village, Farshout district, Qena governorate, Egypt, 2019 season to evaluate the damage caused by hooded crow, *Corvus corone sardonius* on seven cultivars of maize (*Zea mays* L.). The cultivars were Watania 4, Watania 6, Watania 11, Watania 310, Hytech 2055, Hytech 2066 and Balady. The results revealed that the highest loss was recorded in Balady cultivar (7.17%), followed by single cross Hytech 2055 and S. C. Hytech 2066 (2.50 and 2.17%) as yellow seeds of maize. Moderate loss was recorded in three way cross Watania 11 and T. W. Watania 310 (1.83 and 1.33%) as white seeds of maize. While the lowest loss was recorded in S. C. Watania 6 and S.C. Watania 4 (0.17 and 0.67%) as white seeds of maize. Generally, the highest loss was recorded in maize cultivars of yellow seeds. While, the lowest loss was recorded in maize cultivars of white seeds. So, the yellow cultivars may be preferable for cultivation than white cultivars maize, besides the high oil in yellow cultivars of maize.

Keywords: Hooded crow, damage, white, yellow, seeds, maize, cultivar.

Introduction

Maize (*Zea mays* L.) is the third most cereal crop in the world, providing nutrient of humans and animals. The behavior of crows can vary widely from place to place. However, in many places, crows will gather in autumn and winter to spend the night in large communal roosts containing several hundred to many thousand birds. Roosts as large as 200,000 or more birds have been reported. Communal roosts may remain in one location for a number of years or may shift from place in response to changing conditions (Jakimaki and Suhonen, 1998).

The hooded crow, *Corvus corone sardonius* has described as

Nile valley bird, the head, the throat and neck are generally black, the wings and tail are black. Also, the chest and flanks are gray in color. The bill and legs are black. On the other hand, it the most intelligent species of crow, wary, resourceful and usually stay in pairs (El-Huseiny, 1940). The hooded crow, *C. corone sardonius* is one of the most important bird residents in Egypt. It is one of the most important agricultural pests in the cultivated areas, such as maize, peanuts, sunflower, (Metwally *et al.*, 1995; Khat tab *et al.*, 2002; Bonna h, 2007 and Issa and El-Bakhshawngi, 2018). *C. corone sardonius*, also, has a wide variety of food including maggots and beetles,

small mammals, frogs, young or wounded birds, some Mollusca, and other invertebrates. Sometimes feeds on vegetable foods and grains (El-Huseiny, 1940).

The present work was done at the Dahsa village, Farshout district, Qena Governorate to estimate the damage caused by hooded crow, *Corvus corone sardonius* in pre-harvest of some maize cultivars during 2019 season.

Materials and Methods

The experiments were conducted in old areas at Dahsa village, Farshout district, Qena governorate, Egypt, during the growing season 2019, to deter the damage caused by the hooded crow, *Corvus corone sardonius* to some cultivars of maize (*Zea mays* L.). Seven cultivated fields with maize crop were selected to the damage caused by crows on maize cultivars. The studied genotypes of maize were four white seeds color, two single cross (Watania 4 and Watania 6) and two three way cross (Watania 11 and Watania 310), three Yellow seeds color, two single cross (Hytech 2055 and Hytech 2066) in addition to Balady cultivar.

The experiment was grown in a randomized complete blocks design (R.C.B.D.) with five replications for each cultivar. The experimental plot

comprise five ridges of 3.5 meter long with 60 cm. between ridges, sowing was in hills spaced 20 cm. apart, on one side of the ridge with one seed per hill using Afir method of planting. Rows were sown with pathways 50 cm. between blocks of plots for each entry. The recommended practices of maize production were followed throughout the growing season. Data were collected from ten plants of each plot excluding borders as mentioned above for each maize cultivars.

Assessment bird damage was carried out in maize fields during summer season of 2019 after silking stage till the pre-harvest. Thirty successive plants were inspected in each plot to estimate the degree of damage in the investigated ears. Samples were taken weekly and the degree of damage due to crows in the ears was estimated according to Hamelink (1981) by using the following equations:

$$\text{Damage (\%)} = \frac{0.0 \times S_1 + 0.25 \times S_2 + 0.50 \times S_3 + 0.75 \times S_4 + 1.0 \times S_5}{N} \times 100$$

Were:

S_1 = No of undamaged ears; S_2 = No. of 1/4 damaged ears; S_3 = No. of 1/2 damaged ears; S_4 = No. of 3/4 damaged ears; S_5 = No. of complete damaged ears; N = Total Number of investigated ears.



1) White seeds maize.

2) Yellow seeds maize.

Data obtained of the damage (%) were statistically analyzed using a randomized complete block design. Comparison between means of each factor was carried out using Duncan - range tests (Duncan, 1955).

Results and Discussion

Birds damage to maize (*Zea mays* L.):

Maize is one of the preferred food items for hooded crow, *C. corone sardonius*. The crows attacked maize during developing maize ears immediately following pollination and during the early stages of grain filling. It caused a great amount of damage to ears and this can lead to missing or damaged kernels on these ears, induced big losses and poor grain quality. Damage is usually concentrated along field edges, but also it can involve entire fields.

a) White of maize cultivars:

Data presented in Table (1) show the damage caused by hooded crow, *C. corone sardonius* in genotype single and three cross of maize. The highest loss was

recorded in the genotype T.W.C. (Watania 11) with mean of 1.83%, followed by genotype T.W.C. (Watania 310) (1.33%). While the lowest loss was recorded in the genotype S.C. (Watania 6) with mean of 0.17%, followed by genotype S.C. (Watania 4) with mean of 0.67%. The results showed that there were significant differences between T.W.C. (Watania 11) and S. C. (Watania 6 and Watania 4). The means of damage percentage were (0.80, 0.20, 0.00 and 0.00%) recorded at the different degrees of damage 25, 50, 75 and 100%, respectively. Abd el-Hafez *et al.*, (1994) indicated that the damage caused by *C. corone sardonius* to corn fields in Upper Egypt. And they found that attacked corn ears one months before harvest and the damage was clear on ear tops in circles moving downward.

Table 1. Average percentage of damage caused by hooded crow, *Corvus corone sardonius* in genotype S.C. and genotype T.W.C. of white maize.

Percent of ear. Damage	Cultivars of white maize			
	Single cross		Three way cross	
	Watania 4	Watania 6	Watania 11	Watania 310
25% damage	0.80	0.20	1.00	1.20
50% damage	0.00	0.00	0.60	0.20
75% damage	0.00	0.00	0.00	0.00
100% damage	0.00	0.00	0.00	0.00
No damage	29.20	29.80	28.40	28.60
% of damage	0.67 bc	0.17 c	1.83 a	1.33 ab

* Means have the same letters are not significantly differed by using Duncan's analysis.

b) Yellow of maize cultivars:

Data in Table (2) revealed that the highest damage was recorded in Balady cultivar with mean of 7.17%, while the lowest loss was recorded in the genotype S.C. (Hytech 2066) with mean of 2.17%, followed by genotype S.C. (Hytech 2055) with mean of 2.50%. The statistical analysis showed that there were high significant differences between the Balady cultivar and other cultivars (Hytech 2055 and Hytech 2066). The

means of damage percentage were (2.20, 0.87, 0.27 and 0.00%) recorded in the different degrees of damage 25, 50, 75 and 100%, respectively. Khattab *et al.*, (2002) revealed that hooded crow, *C. corone sardonius* attack the maturing stage of *Zea mize*, the preferred time from 35 to 42 days after silking with values 13.21 and 13.90% in ear without pruning and 19.61 and 20.89% in those with pruning.

Table 2. Average percentage of damage caused by hooded crow, *Corvus corone sardonius* in genotype S. C. of yellow maize.

Percent of ear damage	Cultivars of yellow maize		
	Single cross		Balady
	Hytech 2055	Hytech 2066	
25% damage	1.80	1.80	3.00
50% damage	0.60	0.40	1.60
75% damage	0.00	0.00	0.80
100% damage	0.00	0.00	0.00
No damage	27.60	27.80	24.60
% of damage	2.50 b	2.17 b	7.17 a

* Means have the same letters are not significantly differed by using Duncan's analysis.

Generally, from data in Tables (1 and 2) it revealed that the Balady cultivar exhibited the high loss caused by hooded crow, *C. corone sardonius* as compared with the other cultivars of maize. This may be due to maturing early (80: 90 days) than

the other cultivars of maize (110:120 days). The genotypes S.C. (Watania 6 and Watania 4 cultivars) gave low loss of maize (0.17 and 0.67%), respectively. Eman – Abdelrazek (2013) reported that the percentage of maize ear damage by, *C. corone*

sardoni at maturity stage may reach 3.01% up to 3.06%.

Data in Table (3) showed the percentage of damage in the genotype S.C. and genotype T.W.C. of white maize. The highest crows loss was recorded in genotype T.W.C. with mean of 1.58% as compared with the genotype S.C. (0.83%) for white maize. This difference of birds damage may be due mainly to the variation in morphology and phonology characteristics of maize

seeds. Abdel-Haleem *et al.*, (2006) reported that the plant height and ear height of the cross T.W.C. 324 gave high average with high degree of stability. For ear diameter all the tested genotypes except T.W.C. 321 and T.W.C. 322 gave high average of ear diameter with high degree of stability. All the crosses except S.C.123 gave high average of ear length with high degree of stability and genotype T.W.C. 324 was top of those genotypes.

Table 3. Average percentage of damage caused by hooded crow, *Corvus corone sardoni* in genotype S.C. and genotype T.W.C. of white maize.

Percent of ear damage	Cultivars of White Maize	
	Single cross	Three way cross
25% damage	0.60	1.10
50% damage	0.20	0.40
75% damage	0.00	0.00
100% damage	0.00	0.00
No damage	29.20	28.50
% of damage	0.83 b	1.58 a

* Means have the same letters are not significantly differed by using Duncan's analysis.

In addition, data in Table (4) showed that the genotype S.C. of white and yellow maize. The highest loss was recorded in genotype S.C. of yellow maize (2.33%), while, the lowest loss was recorded in genotype S.C. of white maize with mean of

0.83%. This may be to the high percent of oil in seeds of yellow maize cultivars than that of the white maize cultivars. Bonnah (2007) found that the percent of damage caused by hooded crow, *C. corone sardoni* on corn ears was (6.16%).

Table 4. Average percentage of damage caused by hooded crow, *Corvus corone sardoni* in single cross of white and yellow maize under field conditions.

Percent of ear damage	Maize cultivars	
	White maize	Yellow maize
	Single cross	Single cross
25% damage	0.60	1.80
50% damage	0.20	0.50
75% damage	0.00	0.00
100% damage	0.00	0.00
No damage	29.20	27.70
% of damage	0.83 b	2.33 a

* Means have the same letters are not significantly differed by using Duncan's analysis.



3) 25 % damage.



4) 50% damage.



5) 75 % damage.



6) Normally and healthy ears.



7) Hooded crow, *C. corone sardonius*

Fig. (3, 4 and 5). Show crows all grains after lifting husks in milky stage of maize ripening.

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دراسة مقارنة على بعض أصناف الذرة الشامية وعلاقتها بالخسارة المسببة بواسطة الغراب البلدي (*Corvus corone sardonius*) بمحافظة قنا، مصر

محمود مبارك عبدالعال عمر

قسم الحيوان الزراعي والنيوماتودا - كلية الزراعة - جامعة الأزهر فرع أسبوط.

الملخص

أجريت هذه الدراسة بهدف تقييم الخسارة الناجمة عن الغراب البلدي في بعض أصناف الذرة الشامية الهجين والبلدي في الأراضي القديمة بقرية الدهسة - مركز فرشوط - محافظة قنا - مصر، خلال الموسم الصيفي لعام ٢٠١٩م، وقد تم في هذا البحث دراسة سبع أصناف من الذرة الشامية، ٢ من الهجن الفردية البيضاء (الهجين الفردي وطنية ٤ والهجين الفردي وطنية ٦) ، ٢ من الهجن الثلاثية البيضاء (الهجين الثلاثي وطنية ١١ والهجين الثلاثي وطنية ٣١٠) ، ٢ من الهجن الفردية الصفراء (الهجين الفردي هاي تك ٢٠٥٥ و الهجين الفردي هاي تك ٢٠٦٦) بالإضافة إلى الصنف البلدي كمقارنة (ذرة صفراء). ومن خلال الدراسة أظهرت النتائج التالية:

أولاً: من خلال المقارنة بين الخسارة المسببة بواسطة الغراب البلدي (*C. corone sardonius*) على أصناف الذرة الشامية البيضاء الأربعة المختبرة (الهجن الفردية والهجن الثلاثية) تبين أن الهجين الثلاثي وطنية ١١ كان أعلى الأصناف في متوسط نسبة الخسارة (١,٨٣%) يليه الهجين الثلاثي وطنية ٣١٠ (١,٣٣%) وكانت الخسارة متوسطة في الهجين الفردي وطنية ٤ (٠,٦٧%)، مقارنة بالهجين الفردي وطنية ٦ الذي سجل أقل نسبة خسارة على مستوى الأصناف المدروسة (٠,١٧%).

ثانياً: اتضح من خلال دراسة الخسارة المسببة بواسطة الغراب البلدي (*C. corone sardonius*) على أصناف الذرة الشامية الصفراء أن الهجين الفردي هاي تك ٢٠٦٦ سجل أقل الضرر (٢,١٧%)، زاد عنه زيادة طفيفة الهجين الفردي هاي تك ٢٠٥٥ (٢,٥٠%) مقارنة بالصنف البلدي الأصفر الذي سجل أعلى نسبة خسارة على مستوى الهجن الستة المدروسة الفردية والثلاثية (٧,١٧%).

ثالثاً: اتضح أيضاً من خلال المقارنة بين نسبة الخسارة في الهجن الفردية والهجن الثلاثية البيضاء:

أن أعلى نسبة خسارة كانت في الهجن الثلاثية البيضاء (١,٥٨%) بينما كانت أقل نسبة خسارة في الهجن الفردية البيضاء (٠,٨٣%).

رابعاً: تم دراسة مقارنة بين الهجن الفردية البيضاء والهجن الفردية الصفراء وتبين من خلال الدراسة أن أعلى نسبة خسارة كانت في الهجن الفردية الصفراء (٢,٣٣%) مقارنة بالهجن الفردية البيضاء (٠,٨٣%).

خامساً: تفيد هذه الدراسة في أنه لخفض الضرر الناجم عن مهاجمة طائر الغراب البلدي لكيزان الذرة الشامية وهي في مرحلة الطور اللبني يتم ذلك بزراعة الأصناف غير المفضلة للغراب البلدي، مع تجنب زراعة الأصناف الصفراء مبكرة النضج مثل الصنف البلدي لتحقيق أعلى إنتاجية للقدان.