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Wild Bird Survey and Damage Estimation for Some Field Crops at Giza Governorate, Egypt

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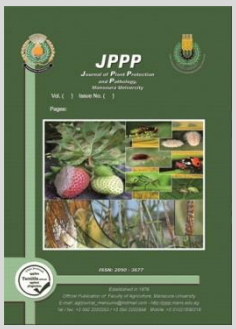

ABSTRACT

About 470 bird species known from Egypt. The majority are non-breeding migrants, passing through the country, exploiting the wide range of habitat types unique for their life, including agricultural habitats. A survey of wild bird carried out in three agricultural districts, El-Badrasheen, El-Aayyat and El-Hawamdiah districts, in Giza Governorate, from March 2018 to February 2020, using the point transect method. Twenty-eight species belonging to nine orders and twenty-five families recorded. House sparrow (*passer domesticus niloticus*) and Hooded Crow (*Corvus corone cornix*) were the only recorded noxious species, damaging wheat and corn crops. House sparrow damage to wheat start after the first week of the panicles emergence causing 21.4 % and 19 % losses, with the highest loss rate of 5.7 and 6.1% during 1st of April at El-Badrasheen and El-Aayyat districts, respectively. The damage percent were 16.3 and 14.5% to corn by hooded crow in both districts from the 1st week of August up to the 2nd week of September and the highest loss rate were 5.4 and 4.2% during the 4th week of August in the two districts, respectively. It is advisable to apply damage control programs against house sparrow populations at the beginning of February in wheat fields, and against hooded crow populations at the beginning of June in corn fields in these areas.

Keywords: Survey, Point transect technique, Wild Bird species, Crop damage assessment, Wheat, Corn, IPM.

INTRODUCTION

Birds plays a role in environmental balance. Some species attack many crops, fruits, and vegetables, a food source and transits pathogens. Causing losses in different stages of plant growth. There are about 10000 bird species in the world, spread over more than 20000 regions, according to the world bird database. Godman *et al.*, (1989) reported more than 470 species known from Egypt. Many researches recorded bird species, either resident or migratory, in different governorates of Egypt, Some bird species cause great damage to different fruits and field crops. From these are the House sparrow, *passer domesticus niloticus* and the hooded crow because they are the most abundance in different Egyption habitats (Kattab, 1998; Wilson, 1993; El-Mallah, 2004; Abd EL-Gawad *et al.*, 2004 and Eman 2008). El-Danasory *et al.*, (2017) and Attia (2006) recorded some species belonged to eight orders, Gruiformes, Upupiformes, Falconiformes, Columbiformes, Ciconiformes, Passeriformes, Coraciformes and Cucaliformes as resident bird species. In Assiut Governorate Omar (2005) Surveyed 23 resident bird species and 5 migratory bird species under the different order. Abd-allah *et al.*, 2012 at different habitats in Damietta costal indicated that, six species of birds were censuses to 12 orders and 28 families. The wide spread of birds in agriculture habitats, to provide appropriate factors for reproduction, clear losses on agricultural crops in field and stores. Birds cause the quantitative and qualitative damage amount to 60% for crops. Anderson *et al.*, (2013) reported that, birds are an economic pest of crops and lose ten million dollars each years. Many scientists recorded hooded crow attack to different crops in Egypt, e.g. wheat, sorghum, barb, rice, broad bean, sunflower, pea and grape (Metwally *et al.*, 1995; Mostafa *et al.*, 2008 and Attia, 2013). Abbasy *et al.*, (2011) found that several variables enter into the complex picture of bird damage, including season, local weather, time of harvest, amount of crop, production and availability as well as distribution of insects and other food materials.

This study aims to record and identify noxious and beneficial wild bird species existing in three Egyptian agricultural districts (El-Badrasheen, El-Aayyat and El-Hawamdiah), at Giza Governorate, and estimate the damage caused by noxious species to major crops at these districts.

MATERIALS AND METHODS

Survey and damage assessment carried out during two years, from March 2018 to February 2020, in three districts representing the Egyptian rural agricultural areas (El-Badrasheen, El-Aayyat and El-Hawamdiah districts), at Giza Governorate.

Tested locations:

The cities of El-Badrasheen, El-Aayyat and El-Hawamdiah located to the west of the Nile River in the southeast of Giza Governorate. They bordered by the desert to the west with an expansion of reclaimed lands. The most important grown crops are sorghum, corn, sunflower, sesame, wheat, clover as well as few vegetable crops (e.g. tomato, pepper, eggplant) and many scattered date palm trees, grape-yards and nurseries of ornamental plants.

Survey and classification:

Five monitored areas, west east, north, south and middle for each district (3 Feddans representing the general habitat) chosen. One hour during two days per week, birds observed in each area with the naked eye and a binocular (10×50) from a rising position, which gave clear-sight

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vision of the plats at sunset and sunrise during the two years (Sarkar *et al.*, 2009). Bird classification were carried out, using Sibley and Monroe (1990).

Damage assessment:

House sparrows attack wheat crops, while hooded crows attack corn at El-El-Aayyat and El-Badrasheen districts.

A- Wheat damage assessment:

Two fields, 2 Feddans each, at El-Aayyat and El-Badrasheen chosen for bird damage assessment. In each field, 25 equally spaced fixed spots randomly selected along a diagonal transaction. Using a wooden foot rule frame (40*40 cm) and placing it in every selected spot, all the tillers found inside this frame counted and used in damage estimation. The loss due to bird damage expressed mathematically using the following formula

$$\text{Damage\%} = \frac{\text{total damaged tillers}}{\text{total damaged tillers} + \text{total undamaged tillers}} \times 100$$

B- Corn damage assessment:

Damage to corn fields assessed during summer season 2019 after the silky stage until harvest. Two faddans, cultivated with maize plants, selected in both El-Aayaat and El-Badrasheen. Plants inspected immediately after pollination, where the ears start filling. The field divided randomly into 20 subplots (approximately 200 m² each). Twenty successive plants inspected in each plot to estimate the degree of damage in the investigated ears (El-Deeb, 1991) according to Hamelink (1981) by using the following equation:

$$\text{Damage \%} = \frac{0.0XS1 + 0.25XS2 + 0.5X\,S3 + 0.75\,X\,S4 + 1.0\,X\,S5}{N} \times 100$$

Where:

S1 = number of undamaged ears
S2 = number of 1/4 damaged ears
S3 = number of 1/2 damaged ears
S4 = number of 3/4 damaged ears
S5 = completed damaged ears
N = Total number of examined ears

RESULTS AND DISCUSSION

Survey of wild birds

Table (1) showed beneficial and noxious bird species that were recorded at Giza governorate, during two successive years (March 2018 to February 2020).

Beneficial species

Data in Table (1) showed that thirteen beneficial bird species, recorded in the study areas, (March 2018 to February 2020). Eleven of which were resident and two were migratory. The resident species were: Barn owi, *Tyto alba alba*; Black winged kite, *Elanus coeruleus*; cattle egret, *Areola ibis ibis*; common bulbul, *Pycnonatus barbatus*; fantailed warbler, *Cisticola juncidis*; hoopoe, *Upupa epops epops*; kestrl, *Falco tinnunculus*; little owi, *Athene noctua*; spur winged plover, *Hoplopterus spinosus*; swallow, *Hirundo rustica savignii*; and Yellow wagtail, *Motacilla flava*. The migratory species were: chiffchaff, *Phylloscopus collybita* and white wagtail, *Motacilla alba alba*.

Noxious species:

Table (1) revealed eight noxious bird species during two study years (March 2018 to February 2020) at Giza governorate. The common and scientific names of these species are: crested lark, *Galerida cristata*; hooded crow, *Corvus corone cornix*; house sparrow, *Passer domesticus niloticus*; little green bee, *Merops orintalis clepatra*; moorhen, *Gallinula chloropus chloropus*; palm dove, *Streptopelia senegalensis egyptica*; pied kingfisher, *Ceryle rudis rudis* and rock dove and *Columba livia schimpari*. All of these bird species were resident over the year. Omar (2010) recorded eleven beneficial bird species and six noxious bird species in the farm of the Faculty of Agriculture, AL-Azhar University in Assiut governorate during the four seasons of 2007 & 2008. Desoky and Omar (2015) recorded thirteen noxious and beneficial bird species belonging to the different orders and families in the farm of the Faculty of Agriculture, Suhag University at El-Kawther city. They found; six noxious bird species: house sparrow, hooded crow, crested lark, palm dove, rock dove and little green bee; as well as 7 beneficial bird species: cattle egret, common bulbul, fantailed warbler, hoopoe, swallow and white wagtail. Noura-Barakat (2016) recoded 14 harmful bird species , and 10 beneficial bird species. Eman *et al.*, (2018) recorded 22 common birds in El-Wady El-Gadid, as follows: Black-winged Kite, Black Kite, Common Hoopoe, Spur-winged Plover, Black-winged Stilt, Eurasian Collared Dove, Rock Pigeon, Palm Dove, Blue-cheeked Bee-eater, Pied Kingfisher, Common Quail, Common Moorhen, Eurasian Coot, House Sparrow, Brown-necked Raven, White Wagtail, Bar-tailed Desert Lark, Cattle Egret, Little Egret, Squacco Heron, Little Grebe and Little Owl.

Table 1. Survey and identification of bird species at Giza governorate during two successive years

Identification of birds	Common name	Scientific name	Migratory birds	Resident birds
Beneficial birds	Barn Owi	*Tyto alba alba*		√
	Black Winged kite	*Elanus coeruleus*		√
	Cattle Egret	*Ardeola ibis ibis*		√
	Common bulbul	*Pycnonotus barbatus*		√
	Chiffchaff	*Phylloscopus collybita*	√	
	Fantailed Warbler	*Cisticola juncidis*		√
	Hoopoe	*Upupa epopes epopes*		√
	Kestrl	*Falco tinnunculus*		√
	Little Owi	*Athene noctua glaux*		√
	Spur Winged plover	*Hoplopterus spinosus*		√
	Swallow	*Hirundo rustica savignii*		√
	White wagtail	*Motacilla alba alba*	√	
	Yellow wagtail	*Motacilla flava*		√
Noxious birds	Crested lark	*Galerida cristata*		√
	Hooded Crow	*Corvus corone cornix*		√
	House sparrow	*Passer domesticus niloticus*		√
	Little green bee	*Merops orintalis clepatra*		√
	Moorhen	*Gallinula chloropus chloropus*		√
	Palm dove	*Streptopelia senegalensis*		√
	Pied Kingfisher	*Ceryle rudis rudis*		√
	Rock dove	*Columba livia schimari*		√

Results in Table (2) and Figure (1) revealed that, the total loss of the Wheat crop were 21.4% and 19.0% in El-Badrasheen and El-Aayyat districts. The highest loss rate recorded in the 3rd week of April (5.7% and 6.1%), at the two districts respectively. While the damage percent were zero in 1st of March. After 1st week of April, 4th week from panicles emergence, the loss rate reduced gradually up to 1.7% and 0.9% in the last week of the same month at the two districts, respectively. The damage percent increased through the weeks of March, from (0 , 0) and (0.7, 0.2) and (2.3, 1.6) and (5.1, 3.2) at 1st, 2nd, 3rd and 4th week at the two districts, respectively.

The percentage of wheat damage recorded as 10.8%, 9.3% and 16.5%, 14.9% and 19.7%, 18.1% and 21.4%, 19.0% during 1st, 2nd, 3rd and 4th week of April, at the two districts, El-Badrasheen and El-Aayyat, respectively. The highest records of bird count were 46 and 45 bird in both districts at the last weeks of April, respectively.

Table 2. Count and damage of house sparrow in wheat at two districts Giza Governorate.

Period		El-badrasheen			El-ayyaat		
Month	Weeks	Bird number	Damage %	Loss rate	Bird number	Damage %	Loss rate
March	1st	32	0	0	35	0	0
	2nd	36	0.7	0.7	38	0.2	0.2
	3rd	35	2.3	1.6	36	1.6	1.4
	4th	36.5	5.1	2.8	39	3.2	1.6
April	1st	42	10.8	5.7	44.5	9.3	6.1
	2nd	41	16.5	4.7	46.5	14.9	5.6
	3rd	44.5	19.7	3.2	46	18.1	3.2
	4th	46	21.4	1.7	45	19.0	0.9

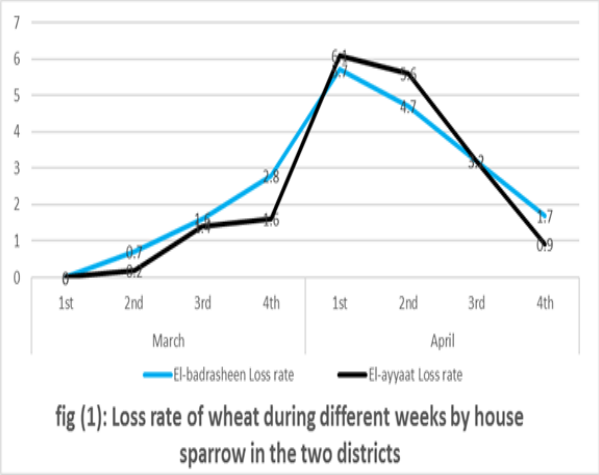

fig (1): Loss rate of wheat during different weeks by house sparrow in the two districts

Kandil and Mobarak (2017) showed that house sparrow causes damage to wheat, sorghum and rice crops in El-Wady El-Gadid. Khattab (1998) reported that after 15 days from wheat emergence, house sparrow start to attack panicles due to the increase of protein and carbohydrate level. Attia (2013) found that birds attack wheat at the beginning of the third week from panicles emergence and the highest damage recorded during the 4th and 5th weeks of panicles at El-Tall El-Kabeer (36.18 and 33.79), Fayed (25.78 and 23.3%) and El-Qantra (19.24 and 15.52%), respectively. However, he found that the lowest losses were during the 1st and 2nd weeks of panicles at all districts.

Data in Table (3) and Figure (2) cleared that, after the silky stage at the 3rd and 4th weeks of July the damage percent of hooded crow to corn plants were zero in El-Badrasheen and El-Aayyat districts. At the 1st week of August, crows attacked the plants and damage increased weekly (2.4 and 1.7%, 3.6 and 3.9%, 5.9 and 5.2% and 11.3 and 10.4%) during the 1st, 2nd, 3rd and 4th weeks, at the two districts, respectively. The 1st and 2nd weeks of September, the damage percent were 14.2, 16.3 and 12.4, 14.5% at the two districts, respectively. The highest attack of crows was record in the 6th. week from the silky stage (4th week of August) and the rate of loss was 5.4% and 4.2% decreasing to 2.1% and 1.9% in the 8th. week (2nd week of September), despite the increasing number of crows during September. On the other hand, the average number of crows were 8 and 8.75 bird, 14.75 and 15.5, 20.25 and 22.75 bird during July, august and September at El-Badrasheen and El-Aayyat districts, respectively. The highest number of crow were 22.5 and 24 bird in 2nd, Sep. and the lowest number were 8 and 7.5 in 3rd week, July. Abbasy, *et al.*, (2011) reported that, hooded crow and house sparrow attack corn and the damage percentage were the lowest in the second week (4.57%) then increased to 6.5 and 8.45% in the seventh and sixth weeks, respectively, at Ismailia Governorate. Kattab *et al., (*2002) revealed that hooded crow, *oneCorvus cor sardinus*, prefer corn because its strong stems that birds use as perch and attack the cubs with the husks and later feed on the grains. Hooded crow prefer feeding on corn after 35 to 42 days from the silky stage, and the damage percentages were 13.21% and 13.9% in ear without pruning and 19.61, 20.89% in those with pruning.

Table 3.Count and damage of hooded crow to corn plants at two districts, Giza Governorate.

Period		El-badrasheen			El-ayyaat		
Month	Weeks	Bird number	Damage %	Loss rate	Bird number	Damage %	Loss rate
July	3rd	8	0	0	8	0	0
	4th	8	0	0	9.5	0	0
Aug.	1st	12.5	2.4	2.4	13	1.7	1.7
	2nd	12	3.6	1.2	12.5	3.9	2.2
	3rd	16	5.9	2.3	16.5	5.2	2.3
	4th	18.5	11.3	5.4	20	10.4	4.2
Sep.	1st	18	14.2	2.9	21.5	12.4	2.0
	2nd	22.5	16.3	2.1	24	14.5	1.9

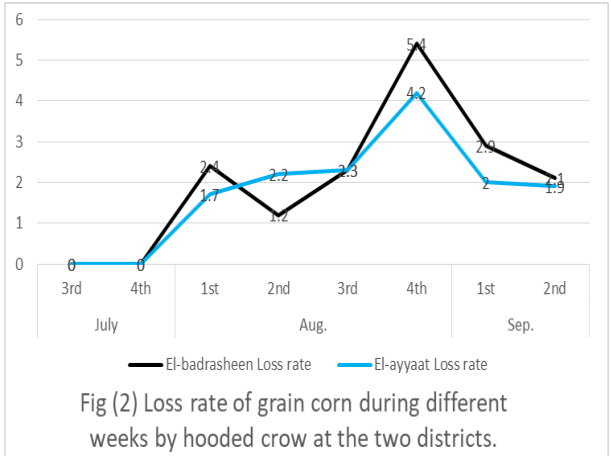

Fig (2) Loss rate of grain corn during different weeks by hooded crow at the two districts.

Overall, the obtained results cleared that, many Species (twenty-eight) belonged to different orders (nine) preferred wide regain of Giza governorate due to sustainability of suitable clime, food and shelter. Some bird species, house sparrow and hooded crow represent noxious species attacking cereal crops in the field and loss by house sparrows reached 16.3% and 14.5% in El-Badrasheen and El-Aayyat districts during the two study years.

Field observations revealed that birds prefer feeding on the dough stage in wheat and corn. There is a relationship between the morphological and physiological characteristics of cereal crops and bird attack. February and June are appropriate dates to start bird damage control programs against house sparrow and hooded crow in the field of wheat and corn, respectively. In general, measures must be taken to preserve the habitats of non-noxious birds, and at the same time, develop integrated damage control programs to alleviate bird damage to economic important crops in Egyptian fields.

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حصر أنواع الطيورالبرية وتقدير أضرارها لبعض المحاصيل في محافظة الجيزة - مصر

أحمد محمد رزق[1]، أمال حلمى السيد عبد الرحمن[1] ، هانى أحمد عبد العاطى أحمد[1] و محمد عبد العظيم محمد الدناصورى[2]

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حوالي 470 نوع من الطيور المعروفة من مصر. الغالبية من الطيور المهاجرة لا يتكاثرون، ويمرون عبر البلاد، ويستغلون مجموعة واسعة من أنواع البيئات الفريدة من نوعها في حياتهم، بما في ذلك البيئة الزراعية. تم إجراء مسح للطيور البرية في ثلاث مناطق وهي البدرشين والعياط والحوامدية بمحافظة الجيزة في الفترة من مارس 2018 إلى فبراير 2020 م باستخدام طريقة تقاطع النقاط. تم تسجيل ثمانية وعشرين نوعًا تنتمي إلى تسعة رتب وخمسة وعشرين عائلة. كان العصفور الدورى (*Passer localus niloticus*) والغراب المقنع (*Corvus corone cornix*) من الأنواع الضارة الوحيدة المسجلة، مما أدى إلى إتلاف محاصيل القمح والذرة. يبدأ ضرر عصفور البيت على القمح بعد الأسبوع الأول من ظهور السنبلة الذي تسبب في خسائر 21.4٪ و 19٪، مع أعلى معدل خسارة 5.7 و 6.1٪ خلال الأول من أبريل في منطقتي البدرشين والعياط ، على التوالي. كانت نسبة الضرر 16.3 و 14.5٪ للذرة من قبل الغراب المقنع في كلتا المنطقتين من الأسبوع الأول من أغسطس حتى الأسبوع الثاني من سبتمبر وأعلى معدل خسارة كان 5.4 و4.2٪ خلال الأسبوع الرابع من أغسطس في المنطقتين، على التوالي. من المستحسن تطبيق برامج السيطرة على الأضرار ضد العصفور الدورى في بداية فبراير في حقول القمح، وضد تجمعات الغراب المقنع في بداية يونيو في حقول الذرة في هذه المناطق.