

CHRONOLOGY OF BIRD DAMAGE TO SUNFLOWER

Soliman, A. M.

Plant Protection Research Institute, Agricultural Research Center, Dokki, Giza

ABSTRACT

The present work was conducted in 2005 & 2006 sunflower seasons at the farm of Sakha Agricultural Research Station (Kafr El-Sheikh Governorate) which occupies the northern part of Delta. Bird damage was assessed once every five days just after sunflower anthesis until harvest. Damage chronology due to birds was similar in both seasons, concentrating within the first 25 days after anthesis when the seeds were in the dough stage of development and amounted 75% of all damage. However, bird accumulated damage was quite low (25%) during 20 days before harvest. Peak bird damage occurred 15 days after anthesis. Type of damage in periphery and interior plots in two seasons was similar. Bird monitoring using binocular revealed that the house sparrow, *Passer domesticus niloticus* L. dominated the crested lark, *Galerida cristata* L., with 87% and 13%, respectively. In both seasons, 70% of damage occurred on sunflower heads with green and green-yellow bowls, and 64% occurred when heads were half-inverted.

INTRODUCTION

Bird damage to sunflower is a major economic problem for growers all over the world. Blackbird, *Agelaius phoeniceus* and common grackle, *Quiscalus quiscula* caused approximately losses of \$ 3.6-6.5 millions in sunflower in North Dakota (Hothem *et al.*, 1998). Studies of Linz *et al.* (1994) revealed that sunflower represented 86% of the total oesophageal contents of male redwings blackbird. In Egypt, house sparrow, *Passer domesticus niloticus* L. is an important pest to sunflower (El-Deeb, 1991, Lokma, 1992 and Metwally *et al.*, 1995) resulting in considerable yield losses.

The purpose of this study was to determine the sunflower stage most preferred to bird attack, and what the type of damage exists. Knowledge of relationships between sunflower maturity and temporal and spatial type of bird damage within fields can allow growers to adjust cultural practices and plan more effective and economic strategies for bird control.

MATERIALS AND METHODS

The present work was conducted at the Experimental Farm of Sakha Agricultural Research Station, Kafr El-Sheikh Governorate, which occupies the northern part of Delta, during two successive sunflower season (2005 and 2006). We aimed to assess bird damage in an area of one feddan each year during different growth stages of sunflower. The sunflower (cultivar Mayak) was sown on 1 & 15 June in the two studied seasons, respectively, at 20 x 20 cm, and the plants were thinned 21 days after sowing. Fertilizers were applied at the rate of 30 kg N, 100 kg P₂O₅ and 50 kg K₂O/feddan. All recommended cultural practices were adopted during the growing season. No control measures were followed against the birds. By the end of anthesis (flowering period) which is recognized by emergence of the last anther coinciding with the beginning of yellow ray flower drop (Siddiqui, 1975), the damage survey

started. At this stage, most of sunflower seeds in the peripheral tiers in heads become vulnerable to bird damage. The considered birds were house sparrow, *Passer domesticus niloticus* L. and crested lark, *Galerida cristata* L. are the most popular birds in North Delta. Bird damage was assessed every five days beginning from ray petal drop until harvest. Sampling was practiced at 20 random plots, each consists of 15 consecutive sunflower plants in one row. Each plot was marked with a plastic flag attached to the base of the plants near ground level. The method of Dolbeer (1975) was used to measure the total surface area of developed and undeveloped seeds in the area of the bird damage on each head. Data from each head were converted to percent total damage using De Haven (1974) method. We also compared the amount of damage that occurred within 25 m from the edge of the field towards the inside to determine if bird damage was associated with surrounding crops. Colour of sunflower back bowl (green, green-yellow, yellow, yellow-brown, or brown), position (upright, half-inverted or inverted) and stage of seed development (milk, dough or mature) were recorded to find out the stages of sunflower most subject to bird attack.

Numbers of attacking birds were assessed every five days by monitoring and counting individuals for an hour twice a day at sunrise and sunset. Birds counting covered milky, dough and maturing stages using the field glass bionocular (Meanley, 1985). Bird numbers were converted to numbers per hour per feddan.

RESULTS AND DISCUSSION

In both seasons, 75% of the total damage due to sparrows to sunflower seeds occurred up to 25 days after anthesis (Table 1), then damage decreased gradually until harvest. However, 44% of bird damage occurred up to 15 days after anthesis, recording the greatest damage due to birds. The chronology of bird damage in the fields of two seasons followed the same pattern. Peak bird damage occurred at the 15th day after anthesis exhibiting 22.5%. This findings agrees with that of Cummings *et al.* (1987) mentioned that 66% of bird damage to sunflower occurred within the first 15 days after anthesis. Type of damage in 2005 & 2006 seasons was similar between plots on periphery of fields versus those in the interior. The current finding is different from that found by Knittle *et al.* (1992) who showed that damage in fields was 2.1 times greater in the periphery (46 m from the edge of the field).

Bird monitoring using binocular revealed that the house sparrow, *Passer domesticus niloticus* L. dominated the crested lark, *Galerida cristata* L., with 87% and 13%, respectively. Peak numbers of birds attacking the field ranged from 125 to 200. The average numbers of birds entering test fields were 19 and 12 individuals/minute per feddan in the two seasons, respectively. About 66% were observed between 5 and 25 days after anthesis.

In both seasons, seventy percent of damage occurred on sunflower with green and green-yellow bowls, and 64% occurred when heads were half-inverted. Also, during the seed development stages, dough-seed received

75% of the damage (Fig. 1), coinciding with 25 days after anthesis. Cummings *et al.* (1989) reported that a damage of 68% occurred when heads were half inverted, and dough-seed received most of damage (76%). Bird numbers tended to peak as fields reached the dough stage. This suggests that dough stage of sunflower seed is most preferred. Thus, major damage control efforts should be made during this short period to minimize losses in sunflower seeds due to birds. Efforts to disperse birds during the peak damage period should spread bird feeding over larger areas, allowing growth compensation to keep sunflower yields in lightly damaged fields near those from undamaged areas. The length of peak periods may vary slightly from year to year because of bird numbers, and other environmental factors. Consequently, growers should be advised to start dispersal efforts at the end of anthesis (when sunflower heads are green-yellow) when bird attacks are expected.

Table (1): Damage in sunflower seed due to sparrow attacks as influenced by days after anthesis (average of 2005 & 2006 seasons).

Days after anthesis	Damage %	Accumulated damage %
5	8.0	8.0
10	13.5	21.5
15	22.5	44.0
20	20.0	64.0
25	11.0	75.0
30	9.5	84.5
35	8.0	92.5
40	4.5	97.0
45	3	100

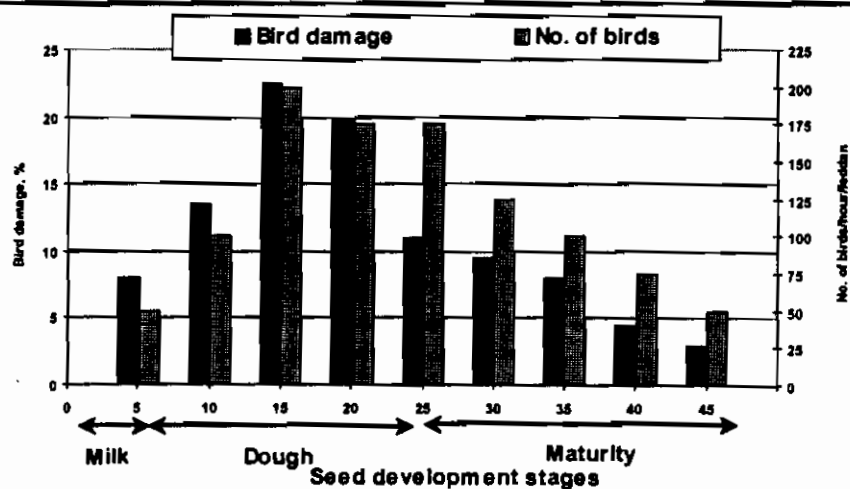


Fig. (1): Bird damage to sunflower seeds at Kafr El-Sheikh as related to seed development and number of birds (average of 2005 and 2006 seasons)

REFERENCES

- Cummings, J.L.; J.L. Guarina and C.E. Knittle (1989). Chronology of blackbird damage to sunflowers. *Wild. Soc. Bull.*, 17(1): 50-52.
- Cummings, J.L.; J.L. Guarina; C.E. Knittle and W.C. Royall (1987). Decoy plantings for reducing blackbird damage to nearby commercial sunflower fields. *Crop Protection*, 6(1): 56-60.
- De Haven, R.W. (1974). Bird damage appraisal methods in some agricultural crops. P. 246-248. In *Proc. Sixth Vertebrate Pest Conference*, Davis, California.
- Dolbeer, R.A. (1975). A comparison of two methods for estimating bird damage to sunflower. *J. Wild. Manag.*, 39: 802-806.
- El-Deeb, H.I.H. (1991). Birds damage to some ripening field crops under different conditions in Egypt. *Zagazig. J. Agric. Res.* 18(3): 825-841.
- Hothem, R.L.; R.W. DeHaven and S.D. Fairaizl (1998). Bird damage to sunflower in North Dakota, South Dakota and Minnesota, 1979-1981. *U.S. Fish and Wild. Serv. Tech. Rep.* 15, 11 pp.
- Knittle, C.E.; J.L. Cummings and J.L. Guarino (1992). An evaluation of a mechanical, audio-visual, scare-device for reducing D damage to ripening sunflower. *Bird damage Rept. No. 254*, Denver Wild. Res. Ctr., Denver, Colorado, 16 pp.
- Linz, G.M.; D.L. Vakoch; J.F. Cassel and R.B. Carlson (1994). Food of red-winged blackbird *Agelaius phoeniceus* in sunflower fields and corn fields. *Can. Field. Nat.*, 98: 38-44.
- Lokma, H.E. (1992). Pre-harvest losses due to birds in different varieties of broad bean and wheat. *Zagazig. J. Agric. Res.* 19(3): 1447-1456.
- Meanley, B. (1985). The roosting behaviour of the red-winged blackbird in the southern United States. *Wilson Bull.*, 77: 217-228.
- Metwally, M.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 (June): 413-424.
- Siddiqui, M.Q. (1975). Growth stages of sunflowers and intensity indices for white blister and rust. *Plant Dis. Rept.* 59: 7-11.

تزامن الإصابة بالطيور مع مراحل نضج عباد الشمس

أحمد محمود سليمان

معهد بحوث وقاية النباتات - مركز البحوث الزراعية - الدقى - جيزة

أجريت هذه الدراسة في المزرعة البحثية لمحطة بحوث سخا (محافظة كفر الشيخ) عامي ٢٠٠٥ ، ٢٠٠٦ م بهدف تقدير نسبة إصابة بذور عباد الشمس بالطيور خلال الفترات المختلفة لنمو المحصول. تم تقدير نسبة الإصابة لأقراص عباد الشمس مرة كل ٥ أيام ابتداء من نهاية فترة التزهير وحتى الحصاد. وقد لوحظ أن تزامن الإصابة كان متماثلاً في كلا الموسمين حيث تركزت الإصابة خلال ٢٥ يوماً من نهاية التزهير وكان ذلك في مرحلة الطور المجيني ووصلت إلى ٧٥% (حيث كان القرص في وضع قائم وكذلك نصف مقلوب) ، بينما كانت الإصابة بالطيور منخفضة في مرحلة طور النضج وبلغت ٢٥% في العشرين يوماً الأخيرة قبل الحصاد (عندما كان القرص في وضع مقلوب) ، كما سجلت أعلى إصابة عند اليوم الخامس عشر بعد التزهير. وأظهرت النتائج تشابه درجة الإصابة في المنطقة من الحواف وحتى ٢٥ متراً داخل الحقل ، وبين وسط الحقل. تم تقدير أعداد الطيور المهاجمة لعباد الشمس وهي عصفور النبل الدوري *Passer domesticus niloticus* L. والقنبرة المتوجة *Galerida cristata* L باستخدام نظارة الميدان كل خمسة أيام لمدة ساعة عند الشروق وساعة عند الغروب. وكان عصفور النبل الدوري أكثر تواجداً (٨٧%) في منطقة الدراسة ، بينما تواجدت القنبرة بنسبة ١٣% من إجمالي الطيور الموجودة. كما أظهرت النتائج أيضاً أن ٧٠% من الإصابة حدثت عندما كانت أقراص عباد الشمس في لونها الأخضر والأخضر المصفر ، كما بلغت الإصابة ٦٤% عندما كانت الأقراص في وضع نصف مقلوب.