

## **SIMULATING THE DAMAGE CAUSED BY CERTAIN INSECTS FOR WHEAT PANICLES IN RELATION TO YIELD LOSSES**

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### **Abstract**

An experiment was carried out to clarify the effect of an artificial insect damage, at different rates, for wheat panicles on the yield. The experiment was established at Sharkia governorate, using Sakha 93 variety, during 2002/2003 season. Six levels of damage, 2, 10, 20, 30, 40, and 50% cut panicles were done on 27/3/2003, beginning of the flower stage. Mean weight of the grain yield was significantly affected with the damage and showed a regression coefficient of 0.94%. Also, mean weight of the panicles was affected and had a regression coefficient of 1.01%. On the other hand, mean weight of 100 grains was not significantly affected and had a regression coefficient of 0.086% only.

### **INTRODUCTION**

Wheat crop, in Egypt, is an important source for grains and flour used in the different human and animal purposes. This crop exposes to several insect pests either in the field or in the store. Some of these insects cause a pronounced reduction in the yield due to feeding on the foliage and panicles in the field. The most harmful damage is happened when the panicles are destroyed with certain insects such as *Tropinota squalida* Scop., *Gryllotalpa* spp., *Cnephasia* sp. *Aphid* sp. and *Cephus tabidus* F. Several entomologists had estimated the grain yield losses for some field crops, Sherif *et al* (1991) and Khadr *et al* (1991) on rice, El- Borai *et al* (1992) and Lotfalla *et al* (2003) on soybean, Abd-Alla *et al* (1997) on maize and El-Serwy (1999) on wheat.

All previous trials, in this respect, on the wheat depended on the destroyed leaf area. So, the present work is considered a new trial for estimating wheat yield losses due to the destroyed panicles which artificially executed to simulate those resulting from the natural insect infestation. Thus will be helpful to determine the economic injury level in wheat fields.

## MATERIALS AND METHODS

At Minia El – Kamh (Sharkia governorate), an area was chosen to carry out this work during 2002/2003 season. The area was cultivated with Skha 93 wheat variety on 15/11/2002. All normal agricultural practices were done and using the recommended insecticides, 10 days intervals, to suppress the natural insect infestation level. On 27/3/2003, six groups of healthy plants, 50 individuals each, were used to carry out 6 reduction rates (treatments) for the panicles, 2, 10,20,30,40 and 50%. These rates were done by using sharp scissors for cutting 1, 5,10,15,20 and 25 panicles from the treatments, respectively. Each treatment was repeated three times in addition to another three similar replicates were completely untouched to be used as a check. All groups were randomly distributed in the area and the plants of each replicate were carefully surrounded together, with a plastic rope, to avoid the breakage and also to be easy for doing the desired treatments.

At harvest, on May 8, all panicles in each replicate were gathered in a plastic bag and transferred to the laboratory. Mean weights of each panicle, net grain yield and 100 grains were calculated. Simple regression and F- test were used in this work.

## RESULTS AND DISCUSSION

Data found in Table (1) revealed that, mean weight of grain yield was significantly affected with the damage especially at rates up to 10%. While this mean was 68.00 and 65.57 gm at 2 and 10% damage, respectively, it sharply decreased to 54.28, 47.79, 44.35 and 36.88 gm at the levels of 20, 30, 40, and 50% damage, respectively compared with 70.22 gm in the check. The reduction was calculated as 3.16, 6.62, 22.70, 31.94, 36.84 and 47.48% at the different levels of the damage, respectively with a regression coefficient value of 0.94%. El – Serwy (1999) reported 5.26 % losses in the wheat grain for 1 or 2 mines in the flag or sub-flag leaf, respectively. Sherif (1991) found similar results in the rice, each 1% white heads caused 0.86 – 1.19 % yield loss according to the variety.

Mean weight of the panicles was also significantly affected with the damage, 90.6 and 90.3 gm for the 2 and 10% levels, respectively decreased to 78.1, 65.0, 57.5 and 49.2 gm for the other respective levels with 94.0 gm for the check panicles. The reduction was calculated as 3.62, 3.94, 16.92, 30.85, 38.83 and 47.66% for the six damage treatments, respectively. Regression coefficient value in this case showed that, each 1% damaged panicles caused 1.01% reduction in the weight.

With regard to the mean weight of 100 grains, it insignificantly affected with the previous levels of damage when recorded 5.18, 4.34, 4.13, 4.33, 4.64 and 4.61 gm opposite the same respective treatments with 5.21 gm in the check. Reduction percentages in this case ranged 0.58 – 20.73 and regression coefficient value was too little (0.086%).

Table 1. Reduction in wheat grain yield due to different levels of artificially damaged panicles during 2002/2003 season.

Damage level (%)	Grain wt.		Panicles wt.		100 - grains wt.	
	gm	%Reduction	gm	%Reduction	gm	%Reduction
2	68.00 a	3.16	90.6 a	3.62	5.18 a	0.58
10	65.57 a	6.62	90.3 a	3.94	4.34 a	16.7
20	54.28 b	22.7	78.1 ab	16.92	4.13 a	20.73
30	47.79 c	31.94	65.0 bc	30.85	4.33 a	16.89
40	44.35 c	36.84	57.5 c	38.83	4.64 a	10.94
50	36.88 d	47.48	49.2 c	47.66	4.61 a	11.52
Check	70.22 a		94.0 a		5.21 a	
$b_{yx}$	0.94		1.01		0.086	
Calculated F	36.6		11.08		2.69	
L.S.D <sub>0.05</sub>	6.34		16.34			

- Tabulated F 0.05 = 2.85

- Numbers, within each column, had similar letters not significantly differed

**REFERENCES**

1. Abd-Alla, F. E., F. I. Aly, M. F. El-Mitwally and G. A. Khadr. 1997. Corn yield losses caused by simulated damage of three seedling pests, Pink stalk borer, Black cut worm and Mole cricket. *Fayoum J. Agric.Res. & Dev.* Vol. 11, No. 1: 205 – 208.
2. El-Borai, M. A., M. M. Radi, M. B. A. A. Habeeb and Hassan. 1992. Field evaluation of some soybean genotypes for insect resistance. *J. Agric. Tanta Univ.*, 18(2): 328-335.
3. El-Serwy, S. A. 1999. Yield losses in wheat caused by the cereal leaf miner *Agromyza nigrella* (Rondani), *Diptera: Agromyzidae*. *Bull. Ent. Soc. Egypt*, 77 (15): 15 – 23.
4. Khadr, G. D., M. R. Sherif and M. F. El-MITWALLY 1991. Effect of *Chilo agamemnon* Bles. Dead hearts simulated at different rates on rice yield. Fourth Arab Congress of Plant Protection Cairo 1-5: 53 – 58.
5. Lotfalla, A. F., K. A. Al-Assily, M. A. El-Naggar, M. S. Ali, M. M. Khewa and E.A.H.Sherief. 2003. Effect of simulated infestation levels caused by leaf feeding larvae on soybean plant traits and crop yield. *J. Appl. Soc.* 18 (11B): 607-620.
6. Sherief, M. R., G. D. Khadr and M. F. El-Mitwally. 1991. Losses in rice yield due to dead hearts and white heads caused by *Chilo agamemnon* Bles. infestation. *J. Agric. Res. Tanta Univ.*, 17 (1): 130 – 135.

## محاكاة ضرر بعض الحشرات لسنايل القمح وعلاقته بالفقد في المحصول

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أجريت تجربة لمعرفة تأثير غياب سنايل القمح ( بطريقة تحاكي الغياب الناتج عن الاصابة الحشرية ) علي المحصول الناتج . تم زراعة الصنف سخا ٩٣ بمحافظة الشرقية موسم ٢٠٠٢/٢٠٠٣ وتم عمل ستة مستويات من الغياب بطريقة صناعية بمعدل ٢ ، ١٠ ، ٢٠ ، ٣٠ ، ٤٠ ، ٥٠ % عند بداية التزهير ( ٢٧/٣/٢٠٠٣ ) بالاضافة الي المقارنة. تأثر محصول الحبوب كثيرا وبدرجة معنوية وكان معامل الانحدار ٠,٩٤ % نقص في متوسط الوزن لكل ١ % غياب سنايل. كذلك تأثر متوسط وزن السنايل بصورة معنوية وكان معامل الانحدار ١,٠١ % - أما متوسط وزن مائة حبة فكان التأثير عليه ضعيفا وغير معنوي وبمعامل انحدار ٠,٠٨٦ % فقط.