

## **BIOLOGICAL FEATURES OF SORGHUM SHOOTFLY, *Atherigona soccata* RONDANI LARVAE FED ON SORGHUM AND MAIZE VARIETIES**

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### **ABSTRACT**

The sorghum shootfly, *Atherigona soccata* Rondani, is a major seedling pest of sorghum in Egypt particularly in Sohag province. Rearing of shootfly on seven sorghum cultivars (Giza 15, Giza 113, Local 29, Dorado, Mina, Shandweel 1 and Shandweel 2) plus maize variety Giza 2 as compared with sorghum varieties in the laboratory at Faculty of Agriculture, South Valley University. Results indicated that, the average larval duration varied from 11.8 days on variety Dorado to 0.63 days on variety maize Giza 2. But the pupal duration were 12.7 days on the variety Dorado to 7.58 days on the variety Giza 15. There were no larval survival on the variety Giza 2 to reach pupal stage.

### **INTRODUCTION**

The sorghum shootfly, *Atherigona soccata* Rondani (Diptera: Muscidae), is one of the most destructive pests in Upper Egypt particularly in Sohag province. During the last decade, the sorghum shootfly, *A. soccata* recorded for the first time in Egypt causing considerable damage to sorghum and other graminaceous and weeds. Normally damage occurs from one week to about one month after seedling emergence. After hatching the maggots bore into the shoot of the young plants. As a result of larval feeding, the central leaf wilts and later dries up, giving a typical "deadheart" symptom. The damage can lead to a complete kill of the plant if it occurs early enough, particularly in dry unfavourable growing conditions, or production of numerous tillers. If they are, a typical rosetted plant is produced. Late sowing increases likelihood of attack (Salman 1995).

Abroad, the sorghum shootfly, *Atherigona soccata* Rondani is a key pest of sorghum in Asia, the Middle East and East Africa. In West Africa, its status as a pest have not been fully investigated. Deeming (1971) described 50 species of atherigona, including those injurious to cereal crops in northern Nigeria. Adesiyn (1978) reported the failure of late sorghums in Nigeria due to shootfly attack and pest damage on seedlings .

### **MATERIALS AND METHODS**

#### **Rearing technique:**

A culture of shootfly larvae collected from infested sorghum field. Larvae were maintained in incubator at constant temperature of 27±1°C and R.H.% of 60-70%. One larvae was kept in clean glass tube 2x15 cm,

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provided with fresh food of sorghum seedling of 7-10 days old. Food was renewed until pupation. Pupa obtained were then transferred to clean tube 2x15 cm., supplied with a piece of moistened cotton wool. The tubes were covered with muslin fixed to the rim with rubber bands until adult emergence. After adult emergence adults were sexed and pairs of male and female were released into large oviposition cages 20x20x17 cm, made of a wooden frame with glass and wire and younger plants of sorghum and pearl millet has been reported from the sudanosahelian zone (Risbec, 1950 and Breniere, 1972).

The damage level on the millet crop remains low, but it is considered to be one of the major pests of traditional sorghums (Gahukar, 1980). Early attack results in the death of seedlings and plant population is reduced to a considerable extent. In late attacks, plants tiller excessively and no ear heads are produced (Salman 1995). This investigation describes the host range and biology immature stages of sorghum shootfly, *A. soccata* screen sides. The cage was consisted of one side closed by a removable wire screened frame. The front muslin sides facing the light source for oviposition of eggs of the sorghum plant. The third side had a movable sleeve in order to provide the cage with new seedling pots. The fourth side was made of glass, and the bottom from wood the roof from glass (Salman 1995). The emerged adults were fed on a mixture of baker yeast and sugar 1:1 and distilled water in Petri dishes (Unnithan and Delobel 1985). Seedlings were planted in 8x8 cm. Plastic pots (2-4 seedling per pot) and kept outdoor cage until they were 7 days old. Cages were provided with seedling pots at intervals. Leaf pieces bearing newly deposited eggs were transferred onto moist filter paper in Petri dishes. These rearing cages were placed inside incubator at constant temperature of 27±1°C and RH 60-70% provided with 12 hours light day. Thermo-hygrograph was used to record prevailing temperature and RH% in the incubator during rearing period. Sorghum shootfly, *A. soccata* leaf pieces bearing eggs, were transferred onto moist filter paper in petri dishes.

### **1 - Larval stage:**

To study the larval duration of sorghum shootfly, *A. soccata* rearing on seven sorghum varieties and maize variety namely, Giza 15, Giza 113, Local 29, Dorado, Mina, Shandweel 1, Shandweel 2 and Giza 2.

Sorghum shootfly, *A. soccata* was rearing out using 100 newly hatched larvae distributed in four replicates of variety. Larvae were scattered individually in glass tube 2x15 cm, on seedling of sorghum and maize varieties (7-10 days old). Using a moist camel hair brush. Tubes were then covered with museline fixed to the rim with rubber bands and placed in the incubator at constant temperature of 27±1°C. The seedling were dissected and replaced with other fresh until pupation. The time required for larvae development to each variety were recorded.

### **2 - Pupal stage:**

To study the pupal duration the newly formed pupa were then transferred to clean glass tube 2x15 cm, supplied with a piece of moistened cotton wool. The tubes were then covered with rubber bands until adult

emergence. The time required for pupal development was recorded for each pupa for each variety.

## RESULTS AND DISCUSSION

### 1- The larval stage:

The data obtained for the laboratory in Table (1) indicated that the durations of the larval stage of *A. soccata* as a whole varied greatly. Means of 11.8, 10.23, 9.85, 9.18, 8.73, 7.63, 7.45 and 0.63 days were recorded on varieties of Dorado, Shandweel 1, Shandweel 2, Mina, Local 29, Giza 113, Giza 15 and Giza 2 respectively. It observed that the shortest larval duration observed on the maize variety because the first instar larvae could not reach maturity (growing point) on maize. A significant "F" values were yield between the larval durations at different varieties table (1). These results are agreement with those of Raina and Kibuka (1983) and Salman (1995) whome reported that larvae fed on both sorghum and maize plants but caused very little damage to maize. First instar larvae failed to reach the growing point on maize variety. The larval duration of *A. soccata* has been previously studied by many investigators. Joshi and Khan, 1968; Guirati et al., 1988 (6-10 days); Raina, 1981 (6-11 days); Deeming, 1971 (6-12 days); meanwhile Singh and Jotwani, 1980 (8-15 days), Barry, 1972 (11.5 to 14.5 with an average 13 days), Taksdal and Balidawa (1975) 12-21 days. However, Salman (1995) with an average 7.61 days.

**Table (1): Duration of the different stages of shootfly, *A. soccata* rearing on eight varieties of sorghum and maize in laboratory.**

Varieties	Means duration		Total means
	Larval stage	Pupal stage	
Giza 15	7.45	7.58	15.03
Giza 113	7.63	8.36	15.99
Local 29	8.73	9.23	17.96
Dorado	11.8	12.7	24.5
Mina	9.18	9.67	18.85
Shandweel 1	10.23	10.65	20.88
Shandweel 2	9.85	10.40	20.25
Maize (Giza 2)	0.63	-	0.63
F	92	25	
LSD	1.02	0.99	

### 2- The pupal stage:

Data also presented in Table (1) indicated that the longest pupal period (12.7 days) was obtained on the variety Dorado while the shortest (7.58) was that for pupa reared on the variety Giza 15. When the analysis of variance was carried out, it yielded a significant (F value = 25 and L.S.D. = 0.99) indicating the differences between the duration of the pupal stage and corresponding tested varieties were highly significant. These results were in agreement with the finding of, Deeming, 1971 (6-8 days), Raina, 1981 (6-10 days). While Gahukar, 1985 (7-13 days), Singh and Jotwani, 1980 (8-15 days), Barry, 1972 (an average 10.4 days) and Salman, 1995 (an average 6.46 days).

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السمات الحيوية ليرقات ذبابة البرعم الطرفى ( القمة النامية ) Sorghum  
وذرة شامية فى المعمل shootfly, *Atherigona soccata* Rondani  
ذرة شامية فى المعمل  
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أجرى هذا البحث بمعمل قسم وقاية النبات بكلية الزراعة بسوهاج بهدف تربية الطور اليرقى الضار لهذه الآفة وبذلك بتغذيته على ثمانية أصناف ذرة رفيعة وذرة شامية الموصى بها بصعيد مصر وهي (جيزه ١٥ ، جيزه ١١٣ ، محلى ٢٩ ، دورادو ، مينا ، شندويل ١ ، شندويل ٢ ، جيزه ٢ ذرة شامية . وذلك لمعرفة مدى تفضيل الطور الضار لهذه الأصناف .  
وأشارت النتائج المتحصل عليها بالآتى :

١ - طور اليرقة :

١-١- طول فترة الطور اليرقى :

أ- كان متوسط فترة الطور اليرقى الضار ١١ر٨ ، ١ر٢٣ ، ٩ر٨٥ ، ٩ر١٨ ، ٨ر٧٣ ، ٧ر٦٣ ، ٧ر٤٥ ، ٦٣ يوم على الأصناف ( دورادو ، شندويل ١ ، شندويل ٢ ، مينا ، محلى ٢٩ ، جيزه ١١٣ ، جيزه ١٥ وجيزه ٢ ذرة شامية ) بالترتيب .

ب- يتضح من ذلك أن أطول فترة تطور كانت على الصنف دورادو (١١ر٨) وكانت أقصر فترة تطور على الصنف جيزه ٢ ذرة شامية لأن العمر الأول من اليرقات يفشل فى الوصول الى منطقة التغذية وهي ( القمة النامية ) .

٢ - طور العذراء :

١-٢- طول فترة العذراء :

أ- كانت فترة طور العذراء ١٢ر٧ ، ١٠ر٦٥ ، ١٠ر٤٠ ، ٩ر٦٧ ، ٩ر٢٣ ، ٨ر٣٦ ، ٧ر٥٨ على الأصناف ( دورادو ، شندويل ١ ، شندويل ٢ ، مينا ، محلى ٢٩ ، جيزه ١١٣ ، جيزه ١٥ ) .  
ب- تم استبعاد الصنف جيزه ٢ ذرة شامية لفشل العمر الأول من اليرقات للوصول الى منطقة النمو وبذلك يموت ولا يصل الى طور العذراء .

٣- يتضح من ذلك أن أصناف السورجم شديدة الحساسية خاصة أصناف الذرة الرفيعة جيزه ١٥ ، جيزه ١١٣ ، محلى ٢٩ ، بينما الذرة الشامية من الأصناف التي لاتفضلها اليرقات وبذلك تكون شديدة التحمل لهذه الآفة . ويمكن القول بأنه ينصح بالتوسع فى زراعة الذرة الشامية لتفادى خطر هذه الآفة على أصناف السورجم .