

**SOME FIELD OBSERVATIONS ON TWO
MYCOPHAGOUS COLEOPTERAN SPECIES
FEEDING ON THE SPORES OF SMUT DISEASE AT
SUGARCANE FIELDS IN UPPER EGYPT.**

By

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ABSTRACT: A mycophagous beetle, *Phalacrus fimetarius* Fab. (Phalacridae: Coleoptera) and a saprophyte species, *Cryptophagus dentatus* Herbst (Cryptophagidae : Cleoptera) were observed at sugarcane plantation in Upper Egypt.

Both adults and larvae of *P. fimetarius* found associated with the smut fungus, *Ustilago scitaminea* and fed on the teliospores. The most dominant species was *P.fimetarius* , while *C. dentatus* found with few numbers. The feeding behavior of both adults and larvae of *P.fimetarius* was observed. Also the seasonal abundance of adults was recorded. This species found on sugar cane in spring and summer seasons and disappeared in autumn and winter seasons.

INTRODUCTION

Sugar cane plantation is one of the most important crops for industry of sugar production in Egypt. More than 300 thousand feddans are cultivated especially in Upper Egypt. Sugar cane plantations are subjected to infestation with many agricultural pests. The main insect pests are two stem borers *Sesamia cretica* and *Chilo agamemnon* and two coccoid species, *Saccharicoccus sacchari* and *Pulvinaria tenuivalvata*. The two stem borer species are successfully controlled by applying biological control program by release the egg parasitoid *Trichogramma evanescens* which proved to be a successful toll for controlling these two pests, while

the other two coccoid species are now in equilibrium position with the natural enemies

The sugar cane smut is one of the most serious diseases which caused by the fungus, *Ustilago scitaminea*. The smut " Whip " is a curved black structure which emerges from the leaf whorl and causes significant losses to sugar cane yield. The use of pesticide to control sugar cane pests may cause several ecological problems. So, the use of biological control agents may be useful in this concern (Brian, 2002). In this respect some studies were conducted by **Bowler et al. (1977)**; **Pruett and Colque (1984)** and **Sabalpara and Vaishnav (1997)**.

The present works aim to throw some light on some mycophagous coleopteran beetles which found feeding on the spores of the sugar cane smut disease in Upper Egypt plantations in order to use them as biological agent for controlling the sugar cane smut disease in sugar cane fields.

MATERIAL AND METHODS

This study was carried out at El-Mataana Agricultural Research Station, Qena Governorate during 2007-2008 season. The experimental area was cultivated with sugar cane variety (Giza 99/103).

Sampling procedures were conducted from the 1st ratoon of autumn plantation from August, 2007 and lasted to July, 2008. Monthly samples were picked at random of ten sugar cane plants infested with smut disease. The number of beetles found associated with the spores of this fungus were counted in the field. The feeding behavior of both adult and larvae on fungus spores were observed. The collected adults were persevered by dry mounting, then sent to Plant Protection Research Institute, Dokki, Cairo for identification.

RESULTS AND DISCUSSION

A. Identification:

Identification procedure showed that the most common species was *Phalacrus fimetarius* Fab.(Coleoptera : Phalacridae) **Fig. (1- A)**. **Alfieri (1976)** recorded this species and one subspecies belonging to this genus, i.e. *Phalacrus fimetarius* Fabricius and *Phalacrus fimetarius rufipes* Tournier , while **Shalaby (1958)** recorded this species under another specific name, *Phalacrus coruscus* Panzer which considered as synonym for this species.

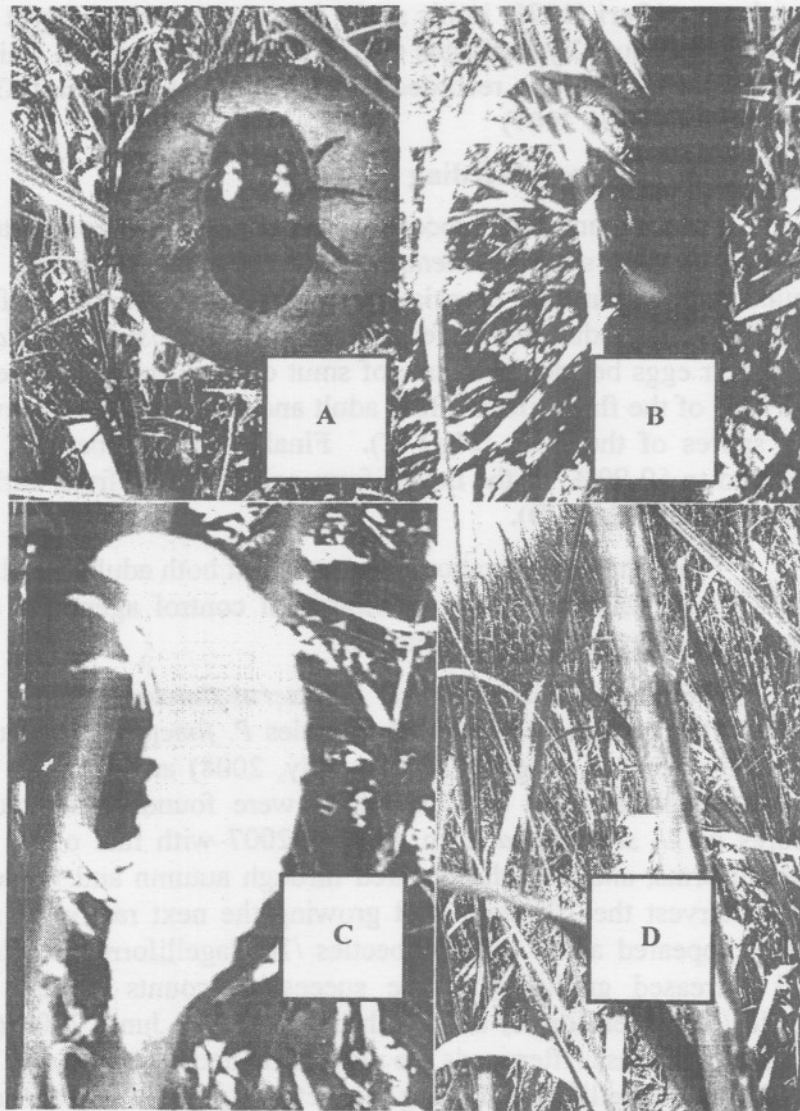


Fig. 1, (A): Adult of *Phalacrus fimetarius* (Fab.)
(B): Teliospores of smut fungus, *Ustilago scitaminea*
(C): Larvae of *Phalacrus fimetarius*
(D): Smut fungus after feeding the beetle.

Another saprophyte coleopterous species was also observed during this study for the first time in Upper Egypt, i.e. *Cryptophagus dentatus* Herbst (Coleoptera: Cryptophagidae). But this species found with few numbers. Alfieri (1976) in his study for coleopteran of Egypt recorded 4 species of genus *Cryptophagus* one of them *C. dentatus* in Cairo vicinity. Also, this species was recorded in Upper Egypt in Assiut Governorate (El-Torkey, et al. 2007)

B. Observation of feeding behavior:

During sampling procedures throughout one complete year, the feeding behaviors of *P. fimetarius* were carefully observed. The beetle found in great numbers especially during summer months on flagelliform hall (Fig.1-B). Adult female fed on teliospores of *Ustilago scitaminea* and laid their eggs beside the spores of smut disease on the infested plants at the base of the flagelliform. Both adult and larvae observed developing in the spores of the smut (Fig.1-C). Finally, the numbers of the spores reduced to 50-90%, so the flagelliform colour turned from dark brown to white colour (Fig.1- D).

From these observations, it seems that both adults and larvae of *P. fimetarius* found to be a good biological control agent for controlling smut disease in sugar cane plantation.

C. Seasonal abundance of *Phalacrus fimetarius*

Data of the monthly counts of the beetles *P. fimetarius* throughout one complete year (August, 2007 to July, 2008) are given in Table (1). These results showed that the adults were found associated with the spores of *U. scitaminea* from August, 2007 with rate of 50 beetles/10 flagelliforms, and then disappeared through autumn and winter seasons. After harvest the 1st ratoon and growing the next ratoon in spring, the insect appeared again with 30 beetles /10 flagelliforms in March, 2008 and increased gradually in the successive counts through May (79 beetles/10 flagelliforms) and reached its peak in June, 2008 (81 beetles /10 flagelliforms) Afterwards the population decreased in July, 2008 to 70 beetles /10 flagelliforms. During this activity period the plant leaves were juicy and infested with the smut fungus. While during the period from September to December, 2007 the plant leaves become dried and loss their moisture and smut fungus disappeared.

Table (1): Seasonal abundance of *Phalacrus fimetarius* beetles on smut fungus at sugar cane plantation in at El-Mattana Agricultural Research Station, Qena Governorate during 2007-2008 season.

Month	Aug., 2007	Sep.	Oct.	Nov.	Dec.	Jan., 2008	Feb.	Mar.	Apri.	May	Jun.	Jul., 2008
No. of beetles /10 flagelliforms	50	0	0	0	0	0	0	30	65	79	81	70

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الملخص العربي

بعض الملاحظات الحقلية لنوعين من الخنافس التابعة لرتبة غمدية الأجنحة تتغذي على فطر التفحم السوطي في حقول قصب السكر في مصر العليا

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لوحظ وجود نوع من الحشرات التابعة لرتبة غمدية الأجنحة *Phalacrus fimetarius* يتغذى في طوري الحشرة اليافعة والبرقات على جراثيم فطر التفحم السوطي في حقول قصب السكر (الخلفة الأولى) في محطة البحوث الزراعية بالمطاعة - محافظة قنا، جنوب مصر. وقد تم رصد طبائع التغذية و متابعة النشاط الموسمي لهذا النوع في حقول قصب السكر حيث لوحظ وجوده في موسمي الربيع والصيف حيث يرتبط نشاط الحشرة بنمو الفطر على أوراق نباتات القصب بينما الفترة الباقية من العام خلال الخريف والشتاء تكون حالة النباتات غير ملائمة لنمو الفطر وبالتالي تتجه الحشرة لمحاصيل أخرى مصابة بفطريات التفحم. كما لوحظ وجود نوع آخر من الخنافس هو *Cryptophagus dentatus* مترمما على الفطريات.