

## NEW RECORDS OF SCARABID WHITE GRUB SPECIES AND DIPTREAN GENUS IN SUGAR CANE SOIL IN UPPER EGYPT (COLEOPTERA: SCARABIDAE)

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### Abstract

The present work deals with the survey of the soil fauna on sugar cane in Upper Egypt. Samples from soil under sugarcane (planted and ratoons) in different governorates in Upper Egypt (Aswan, Qena and Sohag) during the period of June, 2004- June, 2005 were collected. Six species of scarabid white grubs were collected from sugarcane grubs from different governorates in Upper Egypt. Five of the collected spp. were recorded here for the first time attacking sugar cane. As well as The present work also recorded genus *Sciara* for the first time in the Egyptian soil fauna of sugar cane.

### INTRODUCTION

In Sugarcane fields, white grubs feed on both the roots and the underground portions of the stems. Damaged sugarcane is stunted, lodges readily and yields poorly. Damaged stools are inadvertently pulled out at harvest and the damage reduces the ability of the plant to produce subsequent crops (ratoons). Hence, damage in one year can affect not only the yield in that year, but also the yield of ratoon crops in succeeding years Abd-Rabou (2005).

In Egypt, Sugarcane scarabid white grub has been recorded causing damage to sugar cane in Egypt (Tantawi *et al.* 1983). Later Abd-Rabou and Abd-El-Samea (2005) stated that during the past three years the sugarcane white grub became a major pest of considerable importance due to the drastic effects of this insect species within this instar. Identification of white grubs on sugar cane and different host plants was studied by Britton (1974) and Miller and Allsopp (2000). Host plants and distribution of white grubs in Egypt were also studied by Alfieri (1976). Later Abd-Rabou and Abd-El-Samea (2005) recorded the white grubs and their distribution all over Egypt. Tantawi *et al.* 1983 and Hafez and Bishara (1961a) recorded the white grub *Pentodon bispinosus* recently = *Pentodon algerinum* (Herbst) attacking sugar cane in Egypt.

Abd-Rabou (2005) observed from the literature review of the survey of the white grubs in Egypt that there only one species attacking sugar cane in Egypt (unpublished data in his project Funded from Regional Councils for Agricultural Research and Extension).

Members of the cosmopolitan family Sciaridae are moderately common in the fossil record, both in abundance of specimens and numbers of species. Adults of extant forms are commonly found in moist habitats, sometimes in large numbers, associated with larval haunts. Larvae feed chiefly on decaying plant matter or fungi. Some are pests in sugarcane farms (Steffan,1974).

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### MATERIALS AND METHODS

Samples from soil under sugarcane (planted and ratoons) in different governorates in Upper Egypt (Aswan, Qena and Sohag) during the period of 2004-2005 were collected. In case of white grubs, for killing larvae and preserving their shape and color for the Identification . Two kinds of solutions were used .

#### **The first solution which is made up as follows:**

30cm<sup>3</sup> ethyl alcohol 95%.

12 cm<sup>3</sup> formalin 40% .

4 cm<sup>3</sup> glacial acetic acid.

60 cm<sup>3</sup> distilled water .

The second solution

100 parts distilled water

13 Parts formaldehyde.

5 parts glacial acetic acid

Living larvae were placed in one of these solutions for about 12-24 hrs. and then transferred into 70% ethyl alcohol. The preparation of the last abdominal segments of the larvae for examining the raster and the arrangements of setae and pallida were done by cutting off these last abdominal segments. They were placed in 10% cold caustic soda solution for about 2-3 days to dissolve the body tissues. The cuticle was washed with distilled water for several times and passed through series of alcoholic concentrations of 50%, 70%, 90%, and 96%, respectively.

Specimens remained in each concentration for about ½ - 1 hr. and finally cleared in xylene and mounted in Canada balsam. The head capsules of the larvae were carefully removed with a fine needle and their appendages were separated under the stereoscopic binocular microscopic. The mouth parts and antennae were mounted in Canada balsam dried in the incubator. Slides of the antennae, mouth parts and spiracles of the adult were prepared in the same manner as those of the larvae. The thorax, elytra, legs and abdomen without mounting on slides. After preservation the specimens were examined under a binocular microscope.

Identification started by the key of Coleoptera, beetles by Britton (1974) followed by the Key of identification of cane grubs (Miller and Allsopp, 2000). Specimens were identified and confirmed by the Principal Investigator of the project and Department identification and classification, Plant Protection Research Institute Dokki, Giza, Egypt, together with the appropriate works of Alfieri (1976).

In case of family Sciaridae, the adults were collected and put in absolute Alcohol and sent to Prof. Dr. Ray Gagne, the dipterist for the Systematic Entomology Laboratory, USDA, USA for identification.

### RESULTS AND DISCUSSION

As we know, there is only one species of white grubs that attack sugar cane in Egypt, however after investigation it became apparent that there are six species. The six species of white grubs were collected from sugarcane fields from different governorates in Upper Egypt are:

Order : Coleoptera

Family : Scarabaeidae

Subfamily: Dynastinae

1. *Heteronychus licas* Klug\*
2. *Pentodon algerinum* (Herbst)
3. *Pentodon deserti* Heyden\*
4. *Pentodon variolopunctatum* Fairmaire\*
5. *Temnorhynchus baal* Reiche\*

Subfamily: Cetoniinae

6. *Tropinota* sp.\*

#### Key to the species of white grubs were collected from sugar cane fields based on females:

1. Front coxae transverse. Body usually convex from above. Mandibles bent, expended and leaf-like, generally visible from dorsal /side. Males usually with large horns on head and or pronotum, lateral margin of elytra without a shallow imargination behind humeri, length 20-60 mm.....**Dynastinae** .....**2**
- Front coxae conical, more or less prominent. Body convex or flattened from above . Mandibles not bent and usually not visible from dorsal /side. No horns on head and or pronotum, lateral margin of elytra often with a shallow imargination behind humeri, size variable. Scutellum pointed at apex, protibia tridentate ..... **Tropinota** sp.
2. External margin of mandible not dentate, elytral punctured, slightly dense, arranged in lines ..... **Temnorhynchus baal**
- External margin of mandible dentate ..... **3**

3. Pronotum impunctuated or finely punctuated, frons not tuberculated, clypeus truncated, with two elevated tubercles, sides sinuated, pronotum entirely impunctuated ..... *Hetermnychus licas*  
- Pronotum strongly punctuated, frons with one or two tubercles ..... 4
4. Pygidium with one lateral callus on each side ..... *Pentodon deserti*.  
Pygidium regularly convex without callus ..... *Pentodon algerinum*

Hafez and Bishara (1961a,b) and Tantawi *et al.* (1983) recorded only one species of white grub species [ *Pentodon bispinosus* Kuster = *Pentodon algerinum* (Herbst)] attacking sugarcane fields in Egypt. During the period of the study, six species were recorded here for the first time attacking sugarcane (planted and ratoons) in Upper Egypt. The new recorded species being notified here clearly by asterisk.

The present work also recorded genus *Sciara* for the first time in the Egyptian soil fauna of sugar cane.

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تسجيلات جديدة من الجعال البيضاء و جنس من رتبة ثنائية الأجنحة من  
تربة قصب السكر في صعيد مصر

شعبان عبدربه ، سعية عبد البصير عبد السميع

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

هذا البحث تضمن عمل حصر لأفات التربة الخاصة بقصب السكر (الغرس والخلفة) في صعيد مصر أثناء الفترة من ٢٠٠٤-٢٠٠٥. وقد أتضح من النتائج أنه تم تسجيل ستة أنواع من الجعال البيضاء منهم خمسة أنواع تسجل لأول مرة في مصر على قصب السكر. ومن خلال العمل أيضا تم تسجيل جنس جديد لأول مرة من رتبة ثنائية الأجنحة في التربة الخاصة بقصب السكر.