U. of K.J. Agric. Sci. 17(3), 419-424, 2009

A Note on Sugarcane Infestation by White Grubs (Coleoptera: Scarabaeidae) in Relation to Crop Cycles and Variety *

Elnour A. Elnour, Ahmed Elbashir M. Hassan[1], Rudwan M. Khafagi[1] and Yousif F. Mohammed[1]

Sugarcane Research Department, Kenana Sugar Company, P.O.Box 2632 Khartoum, Sudan

Abstract: Seventy two sugarcane fields in the sugarcane plantation of Kenana Sugar Company, Sudan, were inspected during 2003/2004 and 2004/2005 seasons to study the extent of infestation by the white grubs in relation to cane crop cycles and variety. Five standard pits were made in different locations across each field, and the insects in each pit were counted. The results showed that in all crop cycles sugarcane was infested by the grubs with variable levels. Significantly lower infestation was recorded from the plant cane than the second or the fourth ratoon which were equally infested. The two main sugarcane varieties, Co6806 and Co997, were comparably infested by the grubs. The trend of infestation during the two seasons was not different.

Key words: Sugarcane; white grubs; infestation; crop cycles; variety

---

Sugarcane, *Saccharum officinarum* L., is a tropical gramineous crop. Plant cane (first crop) is normally followed by two to four ratoon crops; and in certain cases, up to a maximum of eight crops is taken, each requiring about one year to mature. The major pests attacking the crop are moth borers, froghoppers, white grubs and rodents (Blackburn 1984). The white grubs are highly polyphagous and have a wide adaptability to different hosts and can survive even on grasses in the absence of the preferred hosts (Veeresh 1977). Cherry and Lentini (1991) reported that the white grubs damage sugarcane by feeding on roots and underground stem.

---

*Part of a Ph. D. thesis by the first author, Faculty of Agricultural Sciences, University of Gezira, Wad Medani, Sudan

[1]Faculty of Agricultural Sciences, University of Gezira, P.O.Box 20 Wad Medani, Sudan

Vercambre (1997) suggested that the problem of white grubs in sugarcane in Kenana, Sudan, may achieve further importance with the expansion of cane plantation, advancing in crop cycles and the changes in the agroecosystem. Despite these suggestions, knowledge about the magnitude of infestation is scanty. Therefore, the present work was conducted with the objective of studying the extent of infestation in relation to cane crop cycles and variety.

An experiment was conducted during 2003/2004 and 2004/2005 seasons in Kenana Sugarcane Plantation, Sudan, to determine the white grubs infestation with regard to the cane crop cycles and variety. During each season, plant cane, first ratoon and fourth ratoon were inspected as representative crop cycles. Eighteen fields (field area =50 - 200 feddans; 1fed. = 0.42 ha) from each of the two dominant varieties (Co 6806 and Co 997) were sampled, i.e., six fields per crop cycle. The sampled fields were chosen in such a way as to represent the different geographical regions of Kenana Estate. The infestation by the grubs was determined in terms of number of insects per standard pit, according to Jepson (1957). Pit dimensions were 100 cm along the ridge, 80 cm across and 30 cm in depth. Each pit enclosed one sugarcane stool. Inspection was undertaken during a short period (December - January) and coincided with the prevalence of the third larval instar (Abdalla 2007). During each inspection visit, five pits were made per field in randomly selected locations. The total number of larvae present at the time of inspection was counted per pit. Data were transformed to $\sqrt{X+0.5}$, and least significant difference test was used to separate means.

In all crop cycles, the two varieties were infested by the grubs, with variable levels (Table 1). During the first season, the population density of the grubs (number of larvae per pit) recorded in the plant cane of variety Co6806 was significantly lower ($P \leq 0.05$) than that in the second or the fourth ratoon which were equally infested. No increase in the infestation was recorded beyond the second ratoon. The same trend of infestation was shown by variety Co997. Similar trend of infestation was recorded during the second season.

The significantly low infestation recorded in the plant cane in the two varieties during the two seasons (Table 1) may be attributed to the fact that the one-year fallow after the previous crop, adopted at Kenana, led to the reduction of the white grubs population as indicated by Elnour *et al*. (2008). Moreover, the same land after the fallow received three ploughing operations in preparation for growing the plant cane. Such land is expected to be free of any soil insect pests as stated by Wilson (1969). Moutia (1935) reported that ploughing destroys at most 80% of the grub, *Lachnosterna phytalus* Smithi, in Mauritius. However, despite the fallow practice and ploughing operations, there was some incidence of infestation in the plant cane (1.2, 0.4, 0.6 and 0.4 grubs/pit). This could be a result of new colonization from the neighbouring fields to the newly planted cane rather than carry over from the previous ploughed ratoon crop.

The increase in infestation in the second ratoon over the plant cane could be related to the buildup of the grubs population through time. However, the stability beyond that may be attributed to the competition between the increasing grubs population, according to Symes (1929). Moreover, Vercambre (1997) reported that some larvae died in their niche for unidentified reasons. However, the effects of the biotic and abiotic factors can not be ruled out as reasons behind this stability in the later ratoons. Evidently, the limited use of pesticides in Kenana encouraged the development and multiplication of the natural enemies, in general. It is worth mentioning that some exceptionally long ratoon fields (more than 10 cycles) in Kenana showed similar or lower infestation than the second or the fourth ratoon (Anon. 2000).

Table 1. White grubs infestation of sugarcane according crop cycle and variety (2003/04 and 2004/05 seasons)

C.C.	No. of insects per pit. Mean (±SE)			
	2003/2004		2004/2005	
	Var. Co6806	Var. Co997	Var. Co6806	Var. Co997
P.C.	(01.2±0.5) 1.2±0.2 a	00.4±0.1) 0.96±0.06 a	(00.6±0.2) 1.0±0.1a	(00.4±0.2) 0.9±0.1a
R2	(10.0±1.1) 3.2±0.2 b	(10.0±1.4) 3.2±0.2 b	(09.3±0.6) 3.1±0.1 b	(08.4±1.4) 3.0±0.2 b
R4	(09.5±1.1) 3.1±0.2 b	(09.5±1.1) 3.1±0.2 b	(09.1±0.6) 3.1±0.1 b	(10.2±1.7) 3.2±0.3 b
C.V. (%)	16.9	17.3	9.1	16.9
$LSD_{0.05}$	0.6	0.5	0.3	0.5

Data were transformed to $\sqrt{X+0.5}$. Figures in parentheses are actual data.
C.C. = Crop cycle; P.C. = Plant cane; R= Ratoon.
Means in the same column followed by the same letter are not significantly different at P = 0.05, using Duncan's multiple range test.

REFERENCES

Abdalla, E.A.E. (2007). *Ecology and Management of White Grubs (Coleoptera: Scarabaeidae) in Sugarcane at Kenana Estate, Sudan*. Ph.D.thesis. University of Gezira, Wad Medani, Sudan.

Anon. (2000). Surveys for pest and diseases. Annual Report, Sugarcane Research Department, Kenana Sugar Company, Kenana-Sudan.

Blackburn, F. (1984). *Sugarcane*. Longman Inc., London and New York. 414 p.

Cherry, R.H. and Lentini, R.S. (1991). White grubs in Florida sugarcane. In: *Florida Sugarcane Handbook*, R. A.Gilbert (Ed.). Institute of Food and Agricultural Science, University of Florida, U.S.A.

Elnour, A.E.; Hassan, A.E.M.; Mohmmed, Y.F. and Khafagi, R.M. (2008). Effect of some cultural practices on the population density of the white grub *Schizonycha* sp. (Coleoptera: Scarabaeidae) on sugarcane at Kenana-Sudan. *University of Khartoum Journal of Agricultural Sciences* 16 (2), 272 – 283.

Jepson, W.F. (1957). The biology and control of the sugarcane chafer beetles in Tanganyika. *Bulletin of Entomological Research* 47, 377 – 397.

Moutia, L.A. (1935). The sugarcane white grubs *Lachnosterna phytalus* Smithi Arrow. in Mauritius. *Proceeding of V Congress of the International Society of Sugarcane Technologist,* Brisbane, pp. 436 – 445.

Symes, C.B. (1929). The black maize beetle (*Heteronychus licas* Klug.). Observation on life history and control. *Rhodesian Agricultural Journal* 22, 83 – 93.

Veeresh, G.K. (1977). Studies on the root grubs of Karnataka. U.A.S Monograph, No. 2: 87 p.

Vercambre, B. (1997). Consultancy Report on Sugarcane Entomology at Kenana Sugar Company - Sudan. CIRAD. Montpelier, France 64 p.

Wilson, G. (1969). White grubs as pests of sugarcane. In: *Pests of Sugarcane*, pp 237 – 258. J.R. Williams (Ed.). Elsevier, Amsterdam, London, New York.

مجلة جامعة الخرطوم للعلوم الزراعية: المجلد السابع عشر- العدد الثالث، 2009م

الاصابة بالديدان البيضاء (Coleoptera: Scarabaeidae) فى خلف و أصناف قصب السكر بكنانه- السودان

النور احمد النور و احمد البشير محمد حسن[1] و رضوان محمد خفاجة[1] و يوسف فضل الله محمد[1]

شركة سكر كنانة ، ادارة بحوث قصب السكر ، ص ب 2632 الخرطوم – السودان

موجز البحث: فحص 72 حقلا من الحقول التجارية لانتاج قصب السكر بمزرعة شركة سكر كنانة بالسودان خلال موسمى الانتاج 2004/2003 و 2005/2004 وذلك بغرض دراسة مدى الآصابه بالديدان البيضاء فى خلف و أصناف قصب السكر. حفرت خمس جورات (حفر) متساويه فى مناطق مختلفة من كل حقل وسجل عدد الحشرات الموجودة فى كل جورة. دلت النتائج على وجود الاصابة فى كل الخلف بمستويات مختلفة. وأصابة أقل معنويا فى القصب الغرس مقارنا بالخلفة الثانية او الرابعة اللتان تساوتا فى الاصابة، كما كانت الاصابة متساوية فى صنفى قصب السكر Co6806 وCo997. ولم يختلف نمط الاصابة خلال الموسمين.

[1]جامعة الجزيرة، كلية العلوم الزراعية، ص ب 20 ود مدنى - السودان