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## Survey of Storage Pests of Shelled Melon (*Citrullus vulgaris*) Schrad, in Benin City, Nigeria

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**ABSTRACT:** Melon, *Citrullus vulgaris* Schrad. (Cucurbitaceae) is a vine-like herb with stems, which are slender and hairy. Its seeds are extracted, dried and then stored. Some stored shelled melon samples were collected fortnightly from Markets in Benin City. The survey showed a variety of insect pests, which reduce the quality of the products by feeding, reproducing and excreting in it. A study of these pests revealed that they belong to the order Coleoptera and Arachnida. The Coleopterans included, *Oryzaephilus mercator*, *Cryptolestes ferrugineus*, and *Tenebroides mauritanicus* while the Arachnids included the *Tyroglyphus* species *Glycyphagus* species. Although Psocopterans and lymenoteran were also identified in the melon samples, studies revealed that their rates of causing damage were minute compared with the Copeoptera and Arachnida. Their status of occurrence and amount of damage are discussed.

**Key word:** *Citrulus vulgaris*, melon seeds; Coleopteran, Arachnids.

### Introduction

Melon *Citrulus vulgaris* Schrad is a fruit crop native to tropical and subtropical Africa and in most parts of South Eastern Asia (Tindall 1983). It is a member of the family Cucurbitaceae that are annuals with a few short-lived perennials. The seeds are rich in vitamin E, protein (25-32%) and oil (20-45%) while the leaves are rich in vitamin A and mineral. These seeds when dried and shelled, are used as food and the oil extracted from it is suitable for cooking (F.A.O 1988). The seeds are usually brown or yellow in colour.

The field pests of melon include *Epilacha* sp (Ladybird beetle, *Aphis gossypii* (melon aphid), *Zonocerus variegatus* and *Dacus cucurbitae* (melon fly) (FA.O 1988, Tindall 1983, and Wood *et al* (1987).

Some common storage pests are often associated with stored melon. After harvesting, the melon seeds are extracted, dried and stored in sacks or bags by local traders, sometimes they are shelled before storage, so that it becomes difficult to know the variety at this stage.

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About 8 species of genus *Cryptolestes* infest stored products including melon (Ree *et al* 1990), the commonest being, the red rust beetle *Cryptolestes ferrugineus* (Evans 1981). They are dorsoventrally flattened and can enter very small flat seeds of melon. Other stored product pests include *Oryzaephilus meicator*, which are secondary pests of stored melon (Rees *et al* 1990) and *Tribolium castaneum*, which do not breed on undamaged seeds. A vast range of stored products such as yam and cassava products, groundnut, melon and palm kernel are attacked by *T. castaneum* (Agboola 1982).

In this work an attempt was made at extracting and identifying the storage pests of shelled melon obtained from markets in Benin City.

## Materials and Methods

The study areas include the Oba market, New Benin market and Urelu market in Benin City. Collections were made fortnightly between the months of August October 2000. One cup shelled melon (115g) were collected from each market and checked for infestation. This was irrespective of their damage status. The various pests were counted and recorded. Fresh samples of seemingly uninfested samples were collected frozen at - 10°C for about two weeks after which they were allowed to equilibrate at room temperature. Ten unsexed individuals of the three different species of the insects which were obtained were used to infest 20g of the seeds and left for a month after which the number of emergents was counted and corresponding weight loss noted. The insects were then preserved and identified using the methods of DEGESCH (1973) and Whittick (1948) and Wood *et al* (1987).

## Results

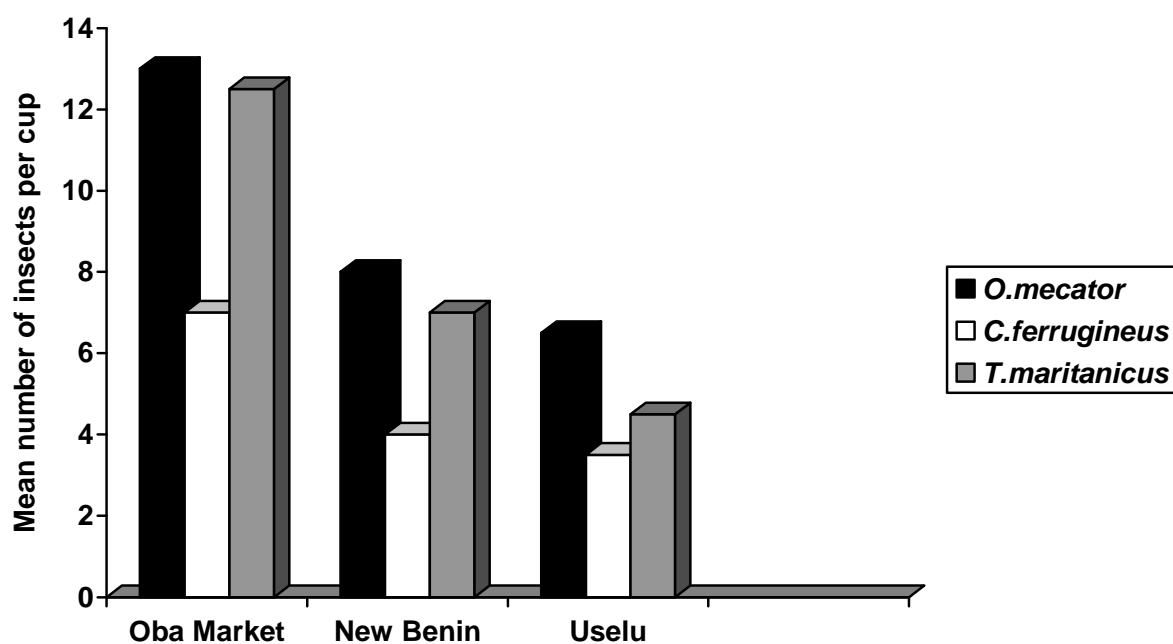
The insects collected from the samples in the Benin City markets are as shown in Table1. The mean number of insect per cup were more in samples from Oba market and least in those grain Urelu market fig 1. In all the markets *O. meicator* had the highest occurrence followed by *T. mauritanicus* while *C.ferrugineus* had the lowest of occurrence. There was no significant different in the number of *O. meicator* and *T. mauritanicus* on samples from each market while *C. ferrugineus* were significantly fewer than them.

On the monthly distribution of these insects, between the months of August and October there was decrease in number of each insect species as the year progresses (fig 2) *T. mauritanicus* had an emergence of 39% for a weight loss of 35.40% followed by *C. ferruginesus* with an emergence of 36% for a weight loss of 33.76% while *O. meicator* had an emergence of 24.32% for a weight lost of 31.2%. Percentage weight loss correlated with emergence in the three pest species. ( $r = 1.41$ ). Although *Glyeyphagus* sp and *Tyroglyphus* sp were present it was difficult to determine the extent of damage done by them or estimate the number of these mites. The Psocoptera present and the hymenoptera are part of the succession and are likely to be feeding on insect frass and parasitizing on the pests respectively.

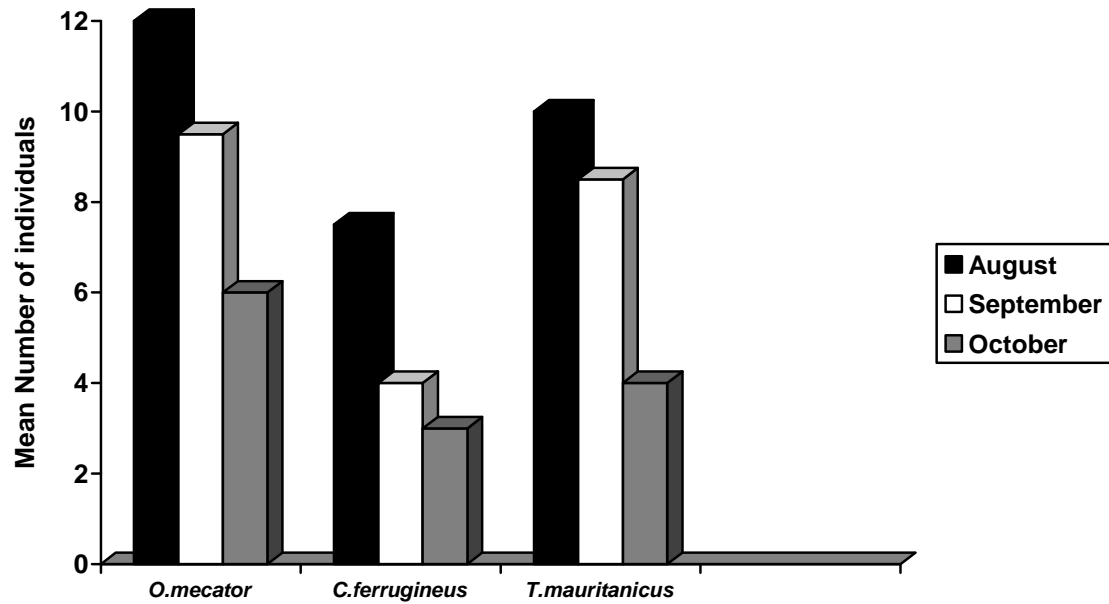
**Table 1: Insects collected during the study period**

Insect species	Family	Order
<i>Oryzaephilus mercator</i> Saw-toothed grain beetle	Silvanidae	Coleoptera
<i>Cryptolestes ferrugineus</i> Red-rust grain beetle	Cucujidae	Coleoptera
<i>Tenebroides mauritanicus</i> Unidentified Insect Type A	Tenebrionidae Unidentified	Coleoptera Psocoptera
Unidentified Insect Type B	Unidentified	Hymenoptera
<i>Glycyphagus</i> spp. 'Grain mite'	Glycyphagidae (Acaridae)	Acarina
<i>Tyroglyphus</i> spp. 'Grain mite'	Tyroglyphidae (Acaridae)	Acarina

**Fig 1. Occurrence of the main pests in samples from 3 markets**



**Fig 2: Monthly Distribution of Insects in Shelled Melon from the markets.**



## Discussion

The results show that in samples of shelled melon obtained from Benin City markets *O. meicator* and *T. mauritanicus* are the major pests followed by *C. ferrugineus*. That occurrence reduced as the year progressed in all these three pests. However when bred in the laboratory *T. mauritanicus* showed the highest percentage emergence and weight loss followed by *C. ferrugineus* and *O. meicator*. These results were obtained when they were bred as isolates, but as a pest complex as seen from the samples in the markets *O. meicator* has proved to survive better in mixed cultures while *C. ferrugineus* seem to be suppressed. *C. ferrugineus* is a common pest of stored products attacking seeds with very slight imperfection (Rees et al; 1990). *O. meicator* is a cosmopolitan pest of oil seeds such as melon preferring the germ layer of the seeds (Hawe 1956). It is possible that in the market samples *C. ferrugineus* came in as a secondary pest after *O. meicator* and *T. mauritanicus* have created entry points. With their performance in the laboratory cultures they would have exceeded the *O. meicator* in number if they started at the same time without competitive pressure. The mites *Tyroglyphus* sp and *Glycyphagus* sp are not usually considered due to their small sizes but they cause a lot of damage to store products. (Chandler *et al* 1981). They could be regarded as major pests of stored melon although their rates of multiplication and virulence could not be ascertained due to their minute size. They were evidently present and numerous in every stored melon sample collected from the market. The Psocopteras which were very few are known to feed on microflora and organic debris including preserved dried insects. Some have adapted to living in food stored granaries warehouse and bulk grain in transport (Sinha 1988). The hymenoptera which were very few and occurred only in one of the samples from the market could be a parasite of a stored product pest and may play a role in biological control.

## References

- Agboola, S.D (1982), Research for effective food storage in Nigeria. *Nigeria Stored Product Res Int Mimeo* 1-27
- Chandler A. and Read C.P (1981). Introduction to Parasitology Published by John Wiley and Sons Inc. New York & London pp. 1-820
- DEGESCH (1973). Efficient and modern Protection of Stored Products fumigants and Equipments. Federal Republic of Germany.
- Evans, D.E (1981). The biology of stored products Coleoptera. Proceedings of the Australian Development Assistance Course, On the Preservation of Stored Cereals CSIRO, Canberra 1: 149 – 185.
- F.A.O (1988). Traditional food plants; A resource book for promoting the exploitations and Consumption of food plants in arid, semiarid, and sub humid land in Eastern Africa. F.A.O Rome. Food and Nutrition Paper 42 pp 186-553.
- Howe R.W. (1956). The biology of two common storage pests species of *Oryzophilus* (Coleoptera:Cucujidae) *Ann. App Biol*, **44** (21): 341-355.
- Rees, D.P, Rivera, R.R and Herrera F.J. (1990). Observations on the Ecology of *Teretriosoma nigrescens* (Coleoptera: Histeridae) and its prey *Protephanus truncatus* (Horn) (Coleoptera: Bostrichidae) in Yucatan Peninsula, Mexico *Trop. Sci.* **30**: 153-165.
- Sinha, R.N (1988). Population dynamics of Psocoptera in Farm Stored grains and oil Seeds. *Can. J.Zool*, **66**: 2618-2627.
- Tindall, H.D (1983) Vegetables in the tropics. Macmillan Education Limited Houndmills, Basing Stoke Hampshire pp 147-197.
- Whittick, R.J. (1948). A handbook of Identification of Insects of medical Importance: Arachnida. Printed by Jarrold and Sons Ltd. Norwich pp 247-295.
- Wood, A Ambridge, L. Bigger, M. and Irving S. (1987). A Guide to Insect Pest of Nigeria Crops; Identification Biology and Control Nigeria Federal Ministry of Agriculture and Natural Resources and the Overseas Development Administration of the British Government 204-244.