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A Note on the Insects Associated with Stored Onion in Khartoum State

Susan M. A. El-Nazir[1] and Ishraga O. Musa[2]

[1]Shambat Research Station - Agricultural Research Corporation, Shambat - Sudan
[2]Gezira Research Station- Agricultural Research Corporation, Medani – Sudan

Abstract: A survey was conducted during 2011-2012 in Khartoum State. The survey focused on the identification of insects associated with stored onion. Insects encountered were, the fig moth *(Ephestia cautella*), the dried fruit beetle *(Carpophilus hemipterus*), the sap beetle (*Carpophilus obsolitus*), the humpbacked fly *(Megaselia scalaris*), the ant beetle *(Anthicus floralis*), the hairy fungus beetle (*Typhaea stercorea*), the confused flour beetle *(Triboleum confusum)*, the scavenger fly *(Chrysomyza demandata*), the dung beetle *(Aphodius lividus*), the minute pirate bug *(Orius leavigatus*), and the rove beetles *(Aleochara bipustulata*, four *Quidius* spp. and *Lithocharis* sp.).

Key words: Stored onion; insect pests; vectors; predators; scavengers

In the Sudan, the main factors contributing to storage losses of onion are shrinkage (30%) and pests and diseases (10%-28%); after 6 months of nion storage, over 80% were infected with *Aspergillus niger* and about 50% were the total losses (Musa *et al.* 1973). The objectives of this study were to determine, identify and record the main insects associated with stored onion in Khartoum State and their intensity.

A preliminary survey was conducted during 2011-2012 in Khartoum State. Rotten samples of onion bulbs were collected from different local markets and some production areas. They were taken for inspection in the laboratory. Different insect species were identified according to the keys of Aitken (1963), Herring (1966), Jessop (1986), Bousquet (1990), Pollock and Ivie (1996), Lescchen and Marris (2005) and Lott and Anderson (2010). The results were referred to the specimens of the Insect Collection Section, Agricultural Research Corporation, Medani.

The traditional method of onion storage in Khartoum State is to pile the bulbs on wooded racks, raised off the floor, in straw cottages built

specially for the purpose. Insect species encountered associated with stored onion were *Ephestia cautella* (Walker), the fig or tropical warehouse moth (Lepidoptera: Pyralidae); up to three larvae were found in a single onion bulb and only one larva can destroy the whole bulb. The last larval instar (migratory stage) was seen migrating upwards to pupate in crevices between the straw. Infested onions were damaged severely and contaminated with frass and webbing of the larvae.

Carpophilus hemipterus , the dried fruit beetle, and *Carpophilus obsolitus* (Erichson), and the sap beetles (Coleoptera: Nitidulidae) were the most dominant species. The damage was done by both adults and larvae, which feed on the flesh of the fruit; they pupate in the soil. Adults are strong fliers and they vector a wide variety of microorganisms.
Megaselia scalaris (Loew), the phorid (scuttle or humpbacked) fly (Diptera: Phoridae), was detected developing in rotting onion, rotting banana and ordinary agar laboratory culture plates and contaminated them by *Aspergillus niger*.

Anthicus floralis, the narrow-necked grain beetle, or the ant beetle (Coleoptera: Anthicidae) was present in grain stores and fruits. *Typhaea stercorea*, the hairy fungus beetle (Coleoptera: Mycetophagidae) is a pest of stored products, although it is generally considered as a mould feeder associated with poor storage conditions. *Triboleum confusum* (DuVal), the confused flour beetle (Coleoptera: Tenebrionidae), is a pest of wide range of stored products.

Chrysomyza (*Physiphora*), *demandata* (Fabricius), the scavenger fly (Deptera: Ortalidae), found favouring decomposing organic matter and attracted to the rotting tissues.
Aphodius lividus (Olivier), the dung beetle (Coleoptera: Scarabaeidae) is an important component of dung fauna that prefers cattle dung, decomposing materials and rotting fruits (Cambefort 1991).
Orius leavigatus (Fieber), the minute pirate bug (Hemiptera: Anthocoridae) nymphs and adults can both pray on thrips, eggs and larvae of *Carpophilus* spp. and eggs of *Ephestia cautella* (Chambers *et al.* 1993; Wang 1999).

Rove beetles (Coleptera: Staphylinidae): Adult beetles are easily recognized by their relatively slender bodies and very short elytra (Lott and Anderson 2010). The rove beetle *Aleochara bipustulata* adults prey mainly on eggs, larvae, and pupae, while the larvae are parasitoids of pupae inside puparia of many families of Diptera (Pierron 2011). Four *Quidius* spp. (Stephens) and *Lithocharis* sp. (Dejean) were found; both genera are scavenger rove beetles. They are important in that they vector microorganisms because of their quick movement (Lott and Anderson 2010).

Table 1 and Fig 1 present the first records of insects (mentioned above) in the Sudan and their host plants according to Insect Collection Section records, and their percentage composition, respectively.

Table 1. First records of insects associated with stored onion in Khartoum State and their host plants according to the records of Insect Collection Section, Agricultural Research Corporation

Insect species	First Records			Host plants
	Crop	Date	Location	
Ephestia cautella	Onion	1940	Wadi Halfa	Mango seeds and stored dates
Carpophilus hemipterus	Tomato, potato and maize	1939	Port-Sudan	Onion bulbs , sorghum cotton bolls and decaying fruits
Carpophilus obsolitus	Cotton bolls	1929	Shambat	Dates and guava
Megaselia scalaris	Potato	1941	Wadi-Halfa	Potato
Anthicus floralis	Sorghum stems	1928	-	Sorghum stems
Typhaea stercorea	Potato	1929	Khatoum	Sorghum, cotton and potato
Triboleum confusum	Stored flour	1932	Jabal Marra	Groundnut, sorghum, maize, oat meal, imported cigarettes and rice
Chrysomyza demandata	Date palm	1913	Kamlin	Sorghum, decayed date, cotton bolls, cabbage, horse dung
Aphodius lividus	Cow dung	1923	Medani	Cow dung
Orius leavigatus	-	-	-	-
Aleochara bipustulata	-	-	-	-
Quidius spp.	-	-	-	-
Lithocharis sp.	-	-	-	-

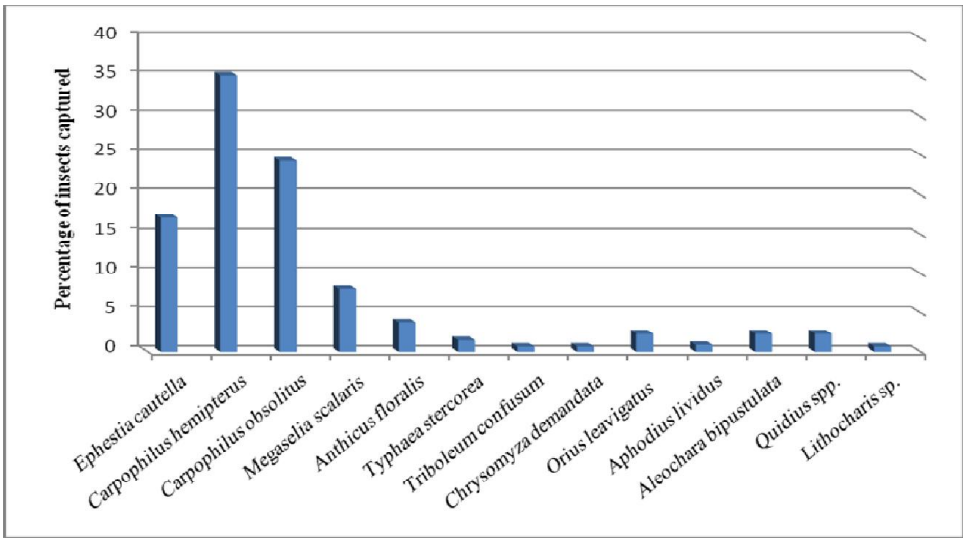

Fig. 1: Percentage composition of insects associated with onion samples collected from Khartoum State

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