



Short Communication

A survey of storage insect pests among some selected species of smoked fish sold at Hadejia Fish Market, Jigawa State, Nigeria

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Available online at: www.isca.in, www.isca.me

Received 1st September 2020, revised 20th January 2021, accepted 28th July 2021

Abstract

A survey was carried out to evaluate the insect pests attacking different species of smoked fish at storage. Ten freshly preserved smoked fish samples, each of *Claria* spp, *Tilapia* spp and *Heterotis* spp were obtained from Hadejia fish market and transported to the laboratory of Biological Sciences Department, Sule Lamido University, Kafin Hausa Jigawa. The samples of the smoked fish species were placed separately in plastic containers, covered with muslin cloth and stored for eight weeks under ambient temperature and humidity. The adult and larvae of the insect pest were counted and identified based on their morphological features and recorded. The results showed that the level of insect pests infestation among three species of the smoked fish did not differ significantly ($p > 0.05$). The comparison between the two insect pests was significant ($p < 0.05$) with high number of *Necrobia* spp and few *Dermestes* spp. There is need to established safe measures for the control of these insects in order to curb the damage causes on both quality and quantity of cured fish.

Keywords: *Clarias*, *Dermestes*, Infestation, *Necrobia*, Hadejia.

Introduction

Fish is very rich with amino acids, vitamins and other important minerals¹. Smoked fish is among the most popular distributed and cheapest protein containing food in Nigeria². Therefore, is served as a source of income to fish mongers and play a vital role in creating jobs and self-reliance. A number of coleaptra attacked and destroyed large amount of smoked fish in a developing country while it is either being processed or stored³. Osuji⁴ reported that 71.5% of dried fish infestation in most of producing area was caused by *Dermestes* spp. Ito and Ighea⁵ reported that during storage, transportation and market, smoked fish is readily being attacking by several insect pests like *Dermestes maculatus*, *D. ater* and *Necrobia rufipes*. Insect infestation result to physical loss where the quantity of the fish is reduced for human consumption, economical loss where by the physical loss depletes the amount of fish available for sale. Nutritional loss which is direct consequences of both physical and economic loss and result the retail value of the fish increase beyond the buying capacity of the poor⁶. In Nigeria about 1.2 million metric tons of fish are consume annually, making the country high fish consumer⁷. Fish are harvested in large quantity and only few quantity are consume freshly, this make it necessary to preserved and stored fish. Smoking method of preservation is one of the most popular mean of preservation leading to long period of storage. Insect pests infestation of the smoked preserved fish pose a threat to this method of preservation. Therefore, the current study is designed to

determine these insect pests and their occurrence on different species of smoked preserved fish.

Materials and methods

Study area: The area of study is Hadejia a Local Government Area of Jigawa State, located in the North Western part of Nigeria, approximately on longitude 10⁰05' East and latitude 12⁰30' North. The ecosystem of Hadejia is tropical wet and dry with annual rainfall of 315mm. The vegetation is sudan savanna⁸.

Collection of samples: The method of was Wahedi and Kefas⁹ was adopted with slight modification. Ten freshly cured fish samples, each of *Claria* spp, *Tilapia* spp and *Heterotis* spp were purchased from Hadejia fish market in a vial and transported to Biological Sciences Department laboratory, Sule Lamido University Kafin Hausa, Jigawa State. Each sample of the smoked fish species was place in a separate plastic container, covered with muslin cloth and held tightly with rubber band to prevent entry and exit of the insect pests. These were kept on the laboratory bench under ambient temperature and humidity.

Assortment of insect pests from different stored fish species: After eight weeks of storage the sorting of the insect pest was done according to procedure of Wahedi and Kefas⁹. Each of the containers with a specific fish species was emptied on a tray and the fishes were break opened to expose the insect pests. Using

had lens and forceps both the larvae and adults of the insects were isolated and preserved in a labeled specimen bottles containing 70% alcohol.

Identification and counting of insect pests: The larvae and adults of the storage insect pests assorted were identified based on morphological features to species level with aid of guide provided by Haines and Rees¹⁰. The species of insects identified, both at larval and adult stage were counted and recorded separately for each fish species.

Data analyses: The obtained data was subjected to one-way ANOVA to determine the level of insect pests' infestation among the sampled smoked fish species and t-test analysis was also conducted to compare the two insect pest species. All analyses were conducted with Sigma Stat statistical software (version 3.5).

Results and discussion

The species of storage insect pests identified infesting the studied fishes were *Necrobia* spp and *Dermestes* spp. Table-1 showed that the level of infestation among the three species of the smoked fish by the storage insect pest did not differ significantly ($p > 0.05$). However, *Heterotis* spp had the highest level of infestation, this was followed by *Tilapia* spp and the least infested fish species during the period of the study was *Clarias* spp.

The comparison between the two storage insect pests species infestation on different fish species differ significantly ($p < 0.05$). The *Necrobia* spp had the highest level of infestation on the three smoked fish species while the *Dermestes* spp had little infestation level.

Table-1: Observed storage insect pests of smoked fish among different species of fish sold at Hadejia fish market.

Insect pests	Fish species		
	<i>Heterotis</i> spp	<i>Clarias</i> spp	<i>Tilapia</i> spp
<i>Dermestes</i> spp	2	0	0
<i>Necrobia</i> spp	28	27	26
Total	30	27	26
Mean	15.000 ^a	13.500 ^a	13.000 ^a
SD	18.385	19.092	18.385

Means with the same letter within column are not significantly different from each other, SD- Standard deviation.

Table-2: Comparison of storage insect pests species observed among different species of smoked fish sold at Hadejia fish market.

Species of fish	Storage insect pests species	
	<i>Dermestes</i> spp	<i>Necrobia</i> spp
<i>Heterotis</i> spp	2	28
<i>Tilapia</i> spp	0	27
<i>Clarias</i> spp	0	26
Total	2	87
Mean	0.667	27.000
Standard deviation	1.155	1.000
t-test	29.859	
Difference	26.333	
P-value	<0.001	

Discussion: Cured smoked fish species from Hadejia fish market were infested most by *Necrobia* spp at storage. This is in contrast with the findings of Wahedi and Kefas⁹ who reported that *Tribolium* spp as the major insect pests of smoked fish followed by *Necrobia* spp in Mub, in Adamawa State and Anime *et al.*¹¹ who reported that *Dermestes maculatus* appeared more than half percent of all the insect pests infested the fish species, also followed by *Necrobia rufipes* in Benue State. The low infestation level of the smoked fish by *Dermestes* spp was in agreement with the research work of Wahedi and Kefas⁹ who reported that *Dermestes* spp were the least observed insect pests on the cured fish. The only two species of insect pests recorded infesting the fish species was in agreement with the findings of Folorunso *et al.*¹² who reported that only *D. maculatus* and *N. rufipes* were identified to be associated with dried fish products in Plateau State. Both the two storage insect pests *Necrobia* spp and *Dermestes* spp infested *Heterotis* spp and are the most infested fish species. This does not agree with the investigation results of Osuji⁴ signifying that *Clarias* fish is most preferred by storage insect pests to all other cured fish species. In the study only *Necrobia* spp infested *Tilapia* spp and *Clarias* spp. This finding conflates with Wahedi and Kefas⁹ who reported 31.9% and 80.0% *Necrobia* spp infestation respectively. Fish infestation level by storage insect could be impugned to handling of fish during the preservation processes and period of storage by fish sellers. This observation is in agreement with that of Eyo¹³ who stated that long period of storage permits the insects enough time to breed.

Conclusion

In conclusion, *Necrobia* spp is the predominant storage insect pest infesting smoked fish in Hadejia fish market leading to

significant losses in quality and quantity of cured fish. Further research should be carried out to establish safe control measures particularly plant based insecticide to avoid the use synthetic chemicals.

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