

Incidence of Arthropods in Dried Fish Products

N. KALAIMANI, T. S. UNNIKRISHNAN NAIR and M. MOHANASUNDARAM*

Calicut Research Centre of Central Institute of Fisheries Technology, Calicut - 673 005

Arthropods have been recorded from various types of insect infested dried fish products stored in the laboratory. They have been identified as *Suidesia nesbetti* Hughes (Acaridae) infesting dried anchovies and dried mussel, *Dermestes ater* (Dermestidae Coleoptera) attacking wet cured sardines and smoked catfish and *Stegobium panicum* infesting smoked catfish and dried mussel. Incidence of *Stegobium panicum* in dry fish products and *Suidesia nesbetti* in dried mussel have been recorded for the first time.

In India large quantities of dried fish are produced for internal consumption as well as for export. Effective availability of cured fish would be increased if postcure losses could be eliminated. Heavy loss of cured fish can occur due to attack by insects. Insect attack can be due to blow fly (maggots) on wet fish or by arthropods such as *Dermestids*, *Necrobia* or by mites such as *Suidesia* or *Lardoglyphus* on dried fish. Insect attack depends on the moisture of the product and the environmental conditions. Various species of insects that cause significant losses by attacking fish late or after the curing processes have been identified. They are *Dermestes maculatus*, *D. frischii*, *D. ater*, *D. carnivorus*, *Necrobia rufipes* and *Lardoglyphus konoi* (Wood, 1982). Pillai (1957) recorded a number of pests attacking stored dry fish and prawns. A study was conducted to identify the various insects present in various species of infested dry fish stored in the laboratory and this paper presents an account of two insects and one mite attacking dried fish products.

Materials and Methods

Dried mussels were prepared by the method of Nair *et al.* (1983). Commercial samples of dried anchovies were collected from the dry fish market at Calicut. Smoked catfish was prepared by the method of Muraleedharan *et al.* (1986). Wet cured sardines were prepared by mixing

cleaned and dressed sardines with salt in the ratio 3:1 and stacking them in layers in a wooden tank, salt being sprinkled between layers. The product was allowed to remain in the wooden tank. Dried mussel, anchovies and smoked catfish were stored in glass bottles. The products were observed periodically for insect infestation. When they were found to be infested significantly, the insects were collected by Berlese funnel method and preserved in 70% alcohol. Insects were identified and the salt and moisture contents were estimated by the method of AOAC (1980).

Results and Discussion

The insects and mites identified are presented in Table 1 along with salt and moisture contents of the products. A brief account of each of the species is given below.

Dermestes ater: This beetle, dark brown in colour measures about 8-9 mm long and 4 mm wide. The incidence of this beetle was noted on wet cured sardines as well as smoked catfish. Eggs are laid on the stored materials; the grubs which hatch out are elongated, hairy cruciform larvae. They feed on the product and reduce it into powder. Pupation of the grubs takes place in the powdered debris in a thin silken cocoon and the adults emerge. Infested materials have overlapping generations and hence all stages of the beetle can be encountered in the product. *Dermestes ater* has been recorded as infesting cured fish (Pillai, 1957; Sasa, 1964; Hughes, 1976). Adults

*Department of Entomology, Tamilnadu Agricultural University, Coimbatore - 641 003

Table 1. Incidence of infestation in cured fishery products

Product	Insect identified	Period of storage (weeks)	Moisture %	Salt % (MFB)
Smoked catfish	<i>Dermestes ater</i> & <i>Stegobium panicum</i>	20	33.67	6.08
Dried mussel	<i>Stegobium panicum</i> & <i>Suidesia nesbetti</i>	16	18.61	6.06
Dried anchovies	<i>Suidesia nesbetti</i>	10	20.46	31.12
Wet cured sardines	<i>Dermestes ater</i>	8	44.34	20.67

were collected from smoked catfish whereas plenty of larvae were seen moving over wet cured sardines. This observation is in agreement with earlier finding that *D. ater* larvae damage mostly in the larval stage (Wood, 1982). Trials conducted at Malawi have shown that high salt in the product gives protection from *D. maculatus* and *Necrobia rufipes* (Walker & Wood, 1985). But our observations have shown that higher salt does not give protection from *D. ater*. These insects were observed moving amidst salt crystals placed over wet cured sardines in wooden tank, suggesting the salt tolerant activity of *D. ater* compared to *D. maculatus* or *N. rufipes* commonly associated with *Dermestes* sp. in dried fish (Walker & Wood, 1985). In our study *N. rufipes* was not seen in association with *D. ater*. This may be due to non specificity of species or the period of storage was not sufficient for the incidence of *N. rufipes* which acts as a predator of *Dermestes* sp. (Walker & Wood, 1985).

Stegobium panicum: This is commonly called as drug store beetle attacking a wide variety of spices, condiments, medicinal and herbal products including turmeric and ginger (Ayyar, 1940). The beetle is reddish brown, measuring about 2 mm in length with a finely pubescent elytra. The beetles lay their eggs on the dried mussel and smoked catfish. The grubs are pale dirty white in colour with a small brown head, which bores into the dried fish products and reduces them into powder. The grubs pupate in the bore holes and emerge out as adults, leaving the product with a number of holes measuring around 1 mm in diameter. Here also there

is overlapping of generations and the product is infested till the whole material is reduced to a powdery state of excrement of the grubs. The heavy infestation of this beetle over smoked catfish have made the comparatively large fillets of catfish into powder by making bore holes in the product. The beetle has made bore holes in the dried mussel (Fig. 1a,b). This beetle has been recorded for the first time in cured and smoked catfish and dried mussels.

Fig. 1a. Bore holes in smoked catfish and dried mussel infested by *Stegobium panicum*

Suidesia nesbetti Hughes (Acaridae): These mites are minute, measuring around 300 -500 μ in length and white in colour. The mites have been observed both on the commercial samples of dried anchovies and dried mussels. Though it has been recorded already over dried anchovies (Pillai, 1957) its presence in dried mussel has been



Fig. 1b. Smoked catfish infested by *Stegobium paniceum*

recorded for the first time. The mites transform these products to a dust like mass. This makes the product unsuitable for human consumption (Fig. 2). *Lardoglyphus konoi* already recorded (Pillai, 1957) in cured fish products was not seen in our observations.

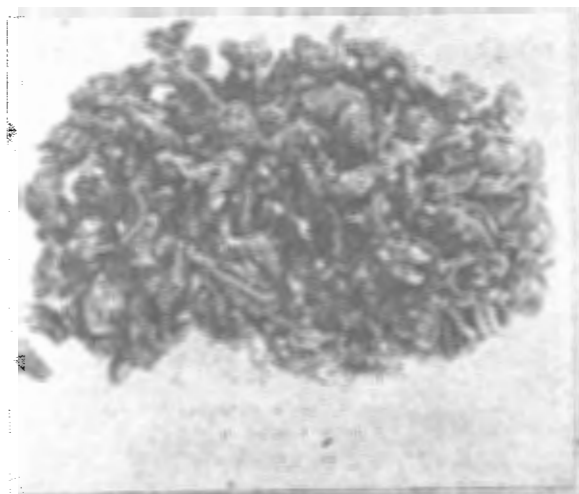


Fig. 2. Infestation of dried mussel by *Suidesia nesbetti*

This was probably due to the absence of *Dermestes* and *Necrobia* with which these mites are usually associated (Hughes, 1956; Pillai, 1957).

The authors are thankful to Shri M.R. Nair, Director, Central Institute of Fisheries Technology, Cochin for his kind permission to publish the paper. Thanks are also due to Dr. K. Gopakumar, Joint Director, CIFT for critically going through the manuscript and suggesting improvements.

References

- AOAC (1980) *Official Methods of Analysis*, 13th edn. Association of Official Analytical Chemists, Washington
- Ayyar, T. V. R. (1940) *Handbook of Economic Entamology for South India*. Government Press, Madras.
- Hughes (1976) *Mites of Stored Food Houses*. Tech. Bull. Minist. Agric. Fish Foods. G. B. (9) 2nd edn.
- Muraleedharan, V., Kalaimani, N., Nair, T. S. U. & George Joseph, K. (1986) *Fish. Technol.*, 23, 106
- Nair, T. S. U., Muraleedharan, V. & George Joseph, K. (1983) *Fish. Technol.* 20, 115
- Pillai, P. R. P. (1957) *Bull. Cent. Res. Instt. Univ. Kerala (Ser C)* 5, 3
- Sesa, M. (1964) *Acarologia*, 6, 390
- Walker, D. J. & Wood, C. D. (1985) *FAO, FII: FTA* 185/43 p. 2
- Wood, C. D. (1982) *Prevention of Losses in Cured Fish* FAO, FII: U/T 219 p. 24