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— Short Communication

STUDY ON THE INSECT INFESTATION OF DRY FISHES AT SINGRA

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Drying is regarded as a traditional, cheapest and simplest method of preservation of fishes. It plays a vital part in the developing countries of the world like Bangladesh. Bala (2000) reported that about 30% of the freshly harvested fish is spoiled every year due to lack of proper preservation facility in the country and this amount is 0.308 million metric ton and about 40% of the remaining harvested fish was sun dried and this amount was 0.072 million metric ton. Significant portion of dried fish approximately 622 tons were exported that earns a good amount which is 25.06 crore taka of foreign currency (DoF 2011). Dried fishes are not only economically important but also an important source of animal protein in Bangladesh which supplements 60% of animal protein (DoF 2012). Graikoski (1998) also reported that, dried fish products are the pre-dominant food bringing vital protein to people in rural areas. Besides protein source dried fishes are also rich in vitamins and minerals, which are often overlooked in developing countries (Hossain and Afroze 1991, Nettleton 1992, Basu and Gupta 2004 and Ross *et al.* 2007). Dried and drying fishes are susceptible to many types of spoilage which can affect the quality and shelf life. Physical and organoleptic qualities of many traditional sun-dried products are un-satisfactory for human consumption (Nowsad 2005). Damages occurring due to flies and insects are of great significance in open drying under the sun and this is a serious problem in traditional drying. A good number of researchers worked scattered on insect infestation and protection policy (Azam 2002 and Samad *et al.* 2009) but there is little work particularly in Chalan beel area. Chalan beel is an extensive low land area at the lower *Atrai* basin in the northeastern region of Bangladesh and spread across the districts of Natore, Naogaon, Pabna and Sirajgang (Samad *et al*. 2009). It consists of a series of *beels* connected to one another by various channels during the rainy season. A very dense water network over the entire Chalan beel is formed by rivers and their tributaries. The total area covered being slightly above 150 square miles (375 sq. km.). Since this area is a great source of fresh water fishes of north-western region of Bangladesh and many people engage with drying activities the present investigation was conducted in different dry fish yards at Singra in Chalan beel area of Natore district to study the conditions of dry fish infestation and the protection policy which are normally used. The studied fish drying yards and their detail information are shown in Table 1. A questionnaire was developed in logical sequence of information include both qualitative and quantitative values of findings, so that the respondents could answer easily and chronologically. A total of 25 dry fish professionals in different drying points was interviewed.

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Table 1. Detail description of the study area.

Location of the Yards	Area (Decimal)	Number of fish drying points	Number of man power engaged	No. of interviewed professionals
Dakin Domdoma	33	3	7-8	4
Zolar Bata	38	3	8-9	5
Ningoil	69	4	12-15	6
Baria	18	1	5-6	2
Chaugram	15	1	4-5	3
Kalam Nazarpur	16	1	3-4	2
Dahia	19	2	4-5	3
Total	208	15	43-52	25

Insect Infestation: During rainy season, humidity levels are high, sufficient drying cannot be achieved using traditional methods, processed and stored dried fishes re-absorb moisture and become susceptible to insect attack. Losses also result during storage from attack by pests which can gain access. The amount of quantitative loss by insect infestation was nearly 10%. This amount increases during the rainy season (15-20%) at Singra drying yards. It was noticed that two major infestations damage the dry fish products such as larvae (maggots) of several species of fly (*Diptera*) during the early stages and Beetle (both larvae and adult). Mite also infests during storage and in distribution. Mainly adult females lay their eggs on fish flesh. After hatching young larvae then feed fish muscle vigorously. Most of the damage in dry fishes is caused by the larval stage. More or less same results were reported by FAO (1981) and Nowsad (2007). They opined that insect infestations are the real problems in dry fish in Bangladesh. Bala (2000) reported that, in tropical climates under highly humid conditions, heavy infestation of unsalted dry fish by beetles may cause up to 30% loss of the products. Doe (1977) and Ahmed (1978) reported that both quantitative and qualitative losses occurred through spoilage and insect attack in dry fish processing.

Protection Policy: In the fish drying point (Singra, Chalan beel) there was no fly proof netting system (Plate 1). For this reason infestation by flies and beetles was very much common problem (Plate 2. A and B). To protect the dry fishes from the insects, dry fish professionals used different insecticides in different doses. Name of the insecticides and its doses are presented in Table 2.

Plate 1. Showing open drying activity in the study area.

A B

Plate 2. Showing the infestation of dry fish by cheese flies (A) and houseflies (B).

Table 2. Name and doses of the insecticides.

Sl. No	Name of the insecticides	Name of the company	Price Tk.	Doses		
				Amount of medicine	Amount of water mixed with medicine	Amount of fish spread by medicine
01.	Basudin	Sinzenta, Bangladesh	315 (2kg)	0.5 kg	---	200 kg
02.	Finish	Standard finish oil company, Dhaka	27 (100g)	No actual amount	No actual amount	No actual amount
03.	Booster	Padma oli company, Chittagong	432 (400ml)	400 ml	5 liter	500 kg
04.	Ripcord	National agricare import and export limited	465 (400ml)	400 ml	5 liter	500 kg
05.	Diazinon	The limit company, Chittagong	300 (400ml)	400 ml	5 liter	500 kg
06.	Camcrone	---	60 (50 ml)	50 ml	2 liter	200 kg

Cypermethrin

Often the extent of pesticide use was sharply reduced in sunny days. If the storage time prolongs, processors check the condition of the stored products at certain intervals. If further infestation was found, the product was treated with the pesticides again after a day of drying. There was no indigenous method of protection of dried fishes from insects but salting. Most dry fish professionals use salts to protect their products from insects. Some fish traders use additional salt to increase the weight of dry fish but the quality of salts is very poor and not proper ratio of salt and fish is maintained.

In the study area the dry fish processors or labourers have no knowledge on pesticide action, dose limit and residual effects. Nowsad (2007) worked on tolerance limit of pesticides in dried fishes. For example 100 g Basudin (active ingredient: 100 g Diazinon in 1 kg) is applied to 100 kg dried fish in gunny sacks during storage. He also reported, during processing *Nogos*, *Nuvacron, Endrin, Malathion, Dimacron* etc. are popularly used, while in storage of the product, DDT*, Basudin* and *Malathion* were preferred ones. Both insects and insecticides comprise about 60% of the total dried product that is considered to be unfit for human consumption (Nowsad 2005). Fish processors in Thailand were found to rely on the application of illegal insecticides to control blowfly infestation (Esser 1992). Clucas and Ward (1996) recommended insecticides applications by properly instructed trained people. Samad *et al* (2009) reported that generally mixed 25-50 kg commercial salt for 1 kg of fishes. Mushi and Chiang (1974) suggested that dried fish containing 13% or more salt could prevent the growth of insect at all developmental stages. Doe (1977) and Ahmed (1978) also reported that damage can be heavy where salt is not used and drying condition is poor, as much as 25-30% under very humid conditions in Bangladesh.

To keep the dried product free from the insect infestation proper training should be necessary for improvement of traditional sun-drying, good handling, sanitation and public health. Use of insecticides in dried fishes must be stopped and tent or funnel sun drier developed by AERC and BCIRL must be ensured.

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