ON THE PREVALENCE OF ENDEMIC INSECT INFESTATION IN MILLED FOODSTUFFS AT FLOUR MILLS AND THE REMEDIAL MEASURES

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ABSTRACT

Observations recorded on 400 samples of atta drawn *at random* during over one year from a flour mill (milling wheat for the Armed Forces) revealed endemic insect infestation to an extent of 44 per cent prevailing in the product released from the mill. The possible sources of insect infestation, and the anti-insect measures required to be taken in processing, packing and despatch of atta are briefly discussed.

Introduction

In the context of the general shortage of foodstuffs in the country and the particular problem of institutional feeding of the Armed Forces, spoilage caused by insect pests poses an important problem to reckon with. Such damage from insects can originate either from the harvest in the field itself or when the grain is milled, stored and consumed.

The object of the present investigation is confined to assess the type and extent of insect infestation in atta at a selected mill for over an year, so that based on the specific data, preventive measures can be augmented.

Sampling

400 samples of atta were drawn at random in glass bottles at periodical intervals during one year, and the bottles kept duly covered with 2 layers of muslin which was firmly secured by rubber rings to provide aeration to the contents. Of them, 189 were from the atta coming out of the spouts, and 211 from the bags in wagons at the time of despatch.

Examination of Samples

The samples were examined thoroughly for insect infestation initially and twice/thrice a week subsequently. The examination was carried out first visually and then by sieving on appropriate sieves (coarser and finer) of suitable mesh to detect the presence of insects. The observations were summarised below:—

Observations

(*a*) *Type of infestation*:—The following types of insects have been observed in the infested samples:—

Name of insect	*No. of instances*
1. *Triboleum sp.* larvae and adults	144
2. *Ephe tia sp.* webs & adults	36
3. *Laemophleus sp.* adults	7
4. Cadelle larvae	3
5. *Rhizopertha sp.* adults	3

(*b*) *Extent of infestation*—Table showing number of samples drawn, number showing infestation and percentage of infested samples during the period of observation is given below:—

	Samples from		Total
	Spouts	Bag in wegons despatch	
(*i*) No. of samples	189	211	400
(*ii*) No. of samples showing infestation	67	96	163
(*iii*) Percentage of infested samples ..	38·51	48·48	43·82 (overall per cent)

(*c*) *Frequency distribution of infestation*

Of 163 samples showing infestation, only 38 were found infested initially, and the infestation in the remaining 125 samples was noted within 3 to 7 weeks of the date of drawing the samples.

Results

It will be seen from the data given above that—

(*a*) the incidence of insect infestation in the samples was 43·82 per cent.

(*b*) the incidence was comparatively higher in the samples drawn from the bags in the wagons than those drawn at the spouts.

(*c*) the infestation was of an endemic nature prevailing in the atta at the mill during the period under observation.

Discussion

The endemic insect infestation observed may be traceable to the following sources :—

(*a*) Contamination of original grain

(*b*) Contamination during milling

(*c*) Contamination from containers

(*d*) Unhygienic conditions and absence of general cleanliness in the mill premises

(*e*) Want of prophylactic measures in sheds and sites

(*f*) Absence of turnover/segregation of infested material

(*g*) Absence of proper disinfestation of infested stock.

To counteract the above, necessary steps have to be taken.

Anti-insect measures vis-a-vis milling operation

The following anti-insect precautions are to be observed in milling wheat for the Armed Forces:—

(*a*) Wheat received from godowns is initially cleaned in cleaning machines where a large part of insects and foreign matter are removed. The cleaned wheat is then filled into the silos.

(*b*) The wheat is then fumigated in the silos with Killoptera 25 : 75 Vol. /Vol mixture of carbon tetrachloride and ethylene dichloride. After the fumigation is over the wheat is fed by conveyors to the crushing mills through chutes.

(*c*) Before commencing the milling, the milling machinery is stopped, the tops of the machinery are opened and cleaned with vacuum cleaners and blowers. Gammexane smoke generators are then used in the milling rooms for disinfestation—particularly of flying insects. After disinfestation, the exposed parts of the machinery are thoroughly cleaned. Thus the cleanliness of the machinery is ensured before milling begins.

(*d*) After milling is complete, the atta or flour is passed through entoleters before it is filled in bags.

(*e*) The atta or flour as it is filled in bags is sieved to find out the presence of any adult or larva of insects. This testing is continued, until no insect is found on sieving. As an additional precaution the first few bags of atta are set aside so that all the insects derived from chutes, spouts, etc. are cleared by the time the subsequent bags are filled. The atta which is set aside is added in small quantities on subsequent days of milling so that it undergoes another cleaning before it is finally collected/filled in bags.

(*f*) The condition of the milled products from time to time is determined by taking samples from a few bags and sieving to detect the presence of any insect.

(*g*) Once used bags are cleaned for a second fill of atta by first shaking thoroughly in the cleaning machine to remove all dirt, dust and adhering atta or flour. These are then fumigated with Killoptera under fumigation covers before being utilised for refilling.

(*h*) Empty wagons are disinfested with gammexane dust/smoke.

(*i*) Prophylactic measures such as use of vacuum cleaners, DDT spraying of the premises, disposal of refractions and spraying pyrodust or pyrocolloid on the spouts, conveyors and grinders of the mill machinery are ensured.

Conclusion

If in spite of all the above precautions, insect infestation in atta did occur, the reasons have to be sought elsewhere. One of the points worth investigating is the effectiveness of fumigation of the grain itself with the existing fumigant Killoptera. Trials carried out on this subject and search for other fumigants to disinfest grain and mill machinery will be reported later.

Acknowledgements

Grateful acknowledgements are due to the ISSPO,