INSECTS IN RELATION TO NATIONAL DEFENSE

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Circular 5

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MEAT AND ANIMAL PRODUCT INSECTS

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INTRODUCTION

Meat products held without refrigeration should be kept under careful inspection to avoid their being affected ruinously by insects. The importance of insects attacking both cured and fresh meats and other animal products, such as cheese, has been lessened greatly by the universal use of modern refrigeration in well-screened commissaries. Fresh meats are so handled today in civic life and in fixed military camps that the blowflies and closely related

flies, discussed in Circular 8, seldom do harm to them. As far as possible, fresh and cured meats should be held under refrigeration until ready for issue, and then exposed only in well-screened rooms or containers.

PRINCIPAL PESTS

The principal pests of cured meats and cheese are the cheese or ham skipper, the red-legged ham beetle, the larder beetles, and mites, all of which are cosmopolitan in distribution.

Ham Skipper

The ham or cheese skipper (Piophila casei L.) is a very persistent pest. The adult is a shining black fly about 3/16 of an inch long and shaped as indicated in Fig. 1. The adult fly lives on an average about 3 or 4 days during warm weather and deposits about 140 eggs. The tiny white eggs are laid scatteringly over the surface of exposed meats and hatch in about 24 hours at 80 to 90° F. The larvae, or maggots, (Fig. 2) are white and may become fully grown in 5 days when they are about 3/8 of an inch long. Another 5 days may be passed as a pupa in the puparium which is about 5/16 of an inch long (Fig. 3). The life cycle--from the laying of the egg to the emergence of the adult--may require only 12 days, and 2 generations a month in warm weather is common. Reproduction proceeds actively between 56° and 120° F.

The ham skipper is so called because the larva infests hams and has the ability to bring both ends of its body together and to suddenly hop or jump a distance of 3 or 4 inches. The ham skipper infests primarily cured pork products, especially hams, and also many cheeses. It will develop in dried beef, salt pork, cured fish, and a variety of inedible animal products, such as green hides and bones. The characteristic injury to ham and shoulders consists

Fig. 1. Ham or cheese skipper - adult fly.

Fig. 2. Ham or cheese skipper--well-grown larvae.

Fig. 3. Ham or cheese skipper--puparia.

of eaten out areas among the large muscles. These affected areas often extend to the center of the meat, close to the bone. Very fat meat, such as bacon, is not extensively injured since the insect prefers connective and muscular tissue. As many as 52,627 skippers have matured in a 21-pound ham.

Ham Beetle

The ham beetle (Necrobia rufipes De Geer) is a small, shining, bluish-green beetle with black eyes, and with the legs and the first five segments of the antennae of a reddish-yellow color. It is not more than 1/4 of an inch long (Fig. 4). The larva is elongated about 3/8 of an inch long when well grown (Fig. 5). When about to transform to

Fig. 4. Red-legged ham beetle; adults.

Fig. 5. Red-legged ham beetle; larvae.

the pupal stage the larva constructs a white paper cocoon from droplets of a frothy material emitted

from its mouth. These white cocoons are much in evidence when ham beetle infestations are heavy, and often are the first indication the inspector has of the insect's presence. The adult beetles feed chiefly on the surface of the meat, but the larvae bore small holes into it, preferring to burrow in the fat parts. Adult ham beetles may live 14 months during which time individuals have laid as many as 2,100 eggs. In warm weather, incubation of eggs may require only 4 days, larvae become well grown in 17 days, and 13 days after constructing the cocoon may emerge as adults. The life cycle--from the laying of the egg to the emergence of the adult--may be completed in as few as 34 days in warm weather.

Larder Beetles

The important larder beetles attacking cured meats or other dried animal products, such as cheeses and dried meats used in concentrated rations, are the hide beetle, Dermestes vulpinus Fabr., and the larder beetle, Dermestes lardarius L. These are robust, brownish-black beetles, shaped as indicated in Fig. 6. The true larder beetle is easily distinguished from other larder beetle species by the broad yellowish-gray band across the basal portion of its wing covers (Fig. 6). Larder beetle larvae are half an inch long when well grown, brownish in general color, with a lighter brown stripe running lengthwise along the center of the back. They are white underneath and have two rather short but distinct spines on the rear near the end of the body. These features, together with the conspicuous, long, blackish spines (Fig. 6) on the body, make larder beetle larvae readily recognizable.

The adult larder beetles are strong fliers during warm weather or in heated rooms. Individuals have lived from 3 to 7 months and may lay several hundred eggs. Although the incubation period for

Fig. 6. Larder beetle (Dermestes lardarius): adult beetles above; larvae below.

eggs is no more than 3 to 8 days during warm weather in summer, larval growth may require from 2 to 3 months. It is seldom that a generation can mature in less than 3 months under favorable summer weather.

Practically all injury to cured meats is caused by the larvae which burrow into and pollute hams, shoulder, sides of bacon. Although they prefer the muscular parts, they will burrow in the fatty portions. Dry smoked meats in neglected storage are reduced to a powder by continued feeding of larvae.

Ham or Cheese Mites

Meat-infesting mites (Tyroglyphidae) are not insects, being eight-legged, but are often troublesome on cured meats, cheese, and in showcases where such products are exposed in commissary stores. They are tiny, soft-bodied creatures, almost colorless, which appear as whitish specks. They multiply fast, molting frequently. Often the molted skins are so abundant that they give a brownish, powdery appearance to the surface of the infested ham. Mites are seldom troublesome on meats in clean establishments. Unless the cases in which meats are exposed, or the immediate surroundings, such as the wooden gratings often placed behind cases, are kept scrupulously clean, mites become abundant enough to irritate workers and to attract unfavorable comment from those to whom the meats are issued. It is seldom that ham mites materially injure the meat itself in commissary supplies.

CONTROL

Scrupulous cleanliness is the foundation of control of meat insects. Destroy daily all trimmings so that insects have no opportunity to mature in them. Scrubbing floors, benches, and cases frequently

with hot water and soap will prevent the breeding of meat mites. Sawdust on floors should be changed daily and destroyed by burning.

Cold Storage.- Refrigerated storage below 50° F. will prevent or arrest any infestation except that of mites. Mites may live 11 days in storage at 30° F., but are killed at 0° F. within a few hours. Mites can feed and probably breed slowly in cheese in cold storages held as high as 37 to 40° F. The use of refrigeration does more than anything else to reduce insect damage and contamination.

Heat and Steam.- Meat and cheese counters, cases, and surroundings can be rid of mites by the liberal use of hot water or steam. Boiling water kills mites in 2 to 3 seconds, and live steam kills them in 15 to 20 seconds when the temperature of the infested surface is raised to about 170° F. These temperatures, in fact, will kill all insect life exposed to them.

Screened Storage.- All rooms in which meats are exposed for issue or sale should be properly screened against insects. When the ham skipper is troublesome and refrigeration is not practical, susceptible dried and smoked meats should be kept in closets or cages well screened with 30-mesh wire cloth, and equipped with doors shutting against rubber gaskets. Great care should be taken that the adult skipper flies do not fly or crawl into the enclosures thus screened when they are opened for the addition or removal of meats.

Wrapping Meats.- Cured meats, free of infestation, usually can be kept so if they are wrapped tightly and thoroughly with good wrapping paper, and the whole then slipped into heavy, tightly-woven cotton bags kept tightly tied and hung so that the individual bags do not touch. Wrapping does no good if meats are already infested. The wrapping should be carefully applied, broken at no point, and not allowed to become too softened by exudations from the meat. A number of water-, mold-, and supposedly insect-proof coatings have been developed for use on

cured meats. These are useful chiefly in curing plants and rarely need be applied after purchase for use in commissaries.

Fumigation.- Fumigation of cured meats with hydrocyanic acid gas is permitted by federal regulation when the fumigations are conducted with the approval of a local federal meat inspector. A dosage of one pound of liquid hydrocyanic acid gas or its equivalent per each 1,000 cubic feet of space for 24 hours is effective unless insects have penetrated deeply, in which case it is difficult to kill all individuals. For detailed directions in the use of liquid hydrocyanic acid, as well as the precautions to be observed, see Circular 22 of this Series.

In tight vaults mites and other pests not buried too deeply can be killed in 24 hours at 58 to 63° F. with a dosage of 20 lbs. per 1,000 cubic feet of the ethylene oxide-carbon dioxide mixture (1:9), and with from 8 to 20 lbs. per 1,000 cubic feet of a mixture of 6.8 percent methyl formate and 93.2 percent carbon dioxide. The ethylene oxide mixture in no way affects the taste or smell of cheese. The methyl formate mixture causes an unpleasant taste to cheese which extends about 1/4 inch below unwaxed and exposed surfaces, but upon exposure of the cheese to air for 36 to 48 hours, this flavor disappears.

Trimming.- Hams and other meats infested by skippers, ham beetles, and larder beetles can be reconditioned by trimming. The portions not actually infested with burrowing insects are fit for human consumption, but the infested areas should be trimmed away and promptly rendered for soap stock, or destroyed by burning to prevent spread of the insects. Trimming of slightly infested hams is a common control method employed in many establishments.

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