



## Wellcome Film Project

### **Safety in Store**

**Presented by Cooper, McDougall & Robertson Limited  
in collaboration with The Cooper Technical Bureau, 1964.**

**A Cinechrome Film**

**Colour**

**Duration: 00:17:37:15**

**00:00:00:00**

#### **<Narration over film, unspecified narrator>**

Feeding the greatly expanding population of the world is already a serious problem with many millions living at starvation level. The loss of a single crop through insects may mean disaster. It has been estimated that foodstuffs lost annually to insects would be enough to feed 150 million people. Scientific control is reducing these losses in the field but even when the crop is gathered it must still be protected from attack by insects.

#### **<Opening title>**

**Safety in Store**

#### **<Narration continues over film>**

Bulk transport and storage of foodstuffs on a large scale greatly encourage the rapid breeding and distribution of insect pests. From production to consumption, grain, foodstuffs and other commodities must be stored, often for considerable periods, and they're always open to attack. Therefore constant care must be taken to prevent insect infestation.

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The Cooper Technical Bureau makes a special study of the control of insect pests in foodstuffs at all stages from the time of harvesting to marketing. Cooper entomologists are regularly employed in the examination of infested premises, identifying the pests concerned and advising on control measures.

Poor conditions of storage lead directly to infestation by insects. Here grain has been heavily attacked by the grain weevil, *Sitophilus granarius*. Grain weevils attack sound grains of all kinds and cause immense losses throughout the world. The female weevil, by boring a small hole, can lay eggs inside the grain which the developing grub eventually reduces to a mere husk. Infestation by the grain weevil is not confined to wheat alone; maize and many other cereals are liable to attack.

Whether stored in the small farm granary or huge multiple silo, cereals are susceptible to infestation by many beetle and moth pests. In Great Britain and many parts of the world, the saw-toothed grain beetle or *Oryzaephilus surinamensis* is a serious economic pest. The modern farmer uses up-to-date machinery for harvesting his crops and matches it with good storage conditions. This farmer reaped a good harvest and by careful handling has ensured minimal losses. Such clean, sound grain is readily accepted by the miller.

Many a picturesque mill can conceal some of the most complex machinery to be found in the food industry. During processing, most commodities are highly vulnerable to insect attack. In the mill constant vigilance is essential to prevent infestation as well as to ensure the production of good quality flour. Conditions in flour mills are ideal for the development of the mill moth, *Anagasta kuehniella*, which flourishes within neglected machinery and the fabric of the mill. The larvae produce a dense webbing that clogs the flour into useless lumps which block conveyors and screens and cause production stoppages.

The mill moth is not the only pest to find harbourage in milling machinery. Of equal importance are the flour beetles, *Tribolium confusum* and *Tribolium castaneum*. The latter is active in tropical countries, infesting ground nuts as well as cereal products.

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After processing, the danger of insect attack still cannot be ignored. A wide variety of cereal products and foodstuffs are attacked in store by the spider beetle, *Ptinus tectus*. It is active throughout the warehouse favouring cool, temperate conditions. It's also fond of dried soups and meat cubes.

Special care has to be taken with dried fruit which is particularly susceptible to moth attack. Examination of a sample of muscatels reveals infestation of by larvae of the warehouse moth, *Ephestia elutella*. These larvae leave the fruit to pupate in the fabric of the store; the moths emerge next season causing re-infestation and damage to new stocks. In common with other pests the warehouse moth does not confine its activities to dried fruits; the larvae attack whole wheat, clumping the grains together with webbing and eating the embryos thus reducing milling quality. The nuts in slab chocolate, and indeed the chocolate itself, are highly attractive to the larvae of this and other moth pests. The warehouse moth is also found in tobacco together with the tobacco beetle, *Lasioderma serricorne*. This beetle is chiefly a pest in tropical countries where a heavy infestation can devour the entire leaf leaving only the bare ribs.

Blow flies are attracted to meat, bacon and dried fish, causing considerable damage and possible loss of prestige. The female blow fly, on finding a suitable site, lays large egg masses in folds and cavities left by bone removal. The maggots, which hatch in about 24 hours, rapidly consume and spoil the meat.

Although it causes no material damage the housefly, *Musca domestica*, is a well-known carrier of disease depositing filth and germs everywhere and must not be tolerated in any place where food is present. In catering premises the appearance of a single fly often causes much concern and demands swift action, but even when all is apparently well, trouble can still exist. Dark, warm, humid conditions are ideal for the German Cockroach, *Blattella germanica*. Cockroaches foul and taint stored foodstuffs and they can withstand the most adverse conditions.

Working conditions involving continuous high temperatures are experienced in bakeries, hospital kitchens and similar places. Here scrupulous attention to hygiene

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maintains freedom from insects during the final preparation of the product. Neglect, on the other hand, can lead to infestation by the tropical pharaoh's ant, *Monomorium pharaonis*. The minute queens and worker ants forage widely for sweet substances such as this granulated sugar.

The development of successful control measures depends on a thorough knowledge of the life-cycles and the habits of the pest insect. In the Cooper Technical Bureau this entails keeping large breeding colonies of numerous insect species for experimental purposes. Initially many chemical compounds are screened for insecticidal activity. When a promising compound is found, often among many thousands tested and rejected, it must undergo a succession of tests to determine its biological efficiency against a wide range of insect pests. Flies are also used in this small experimental chamber to test the effectiveness of a spray formulation designed to control flying insects.

In this large test room, a pressure-packed dispenser is under trial against flies in conditions of controlled temperature and humidity. Other tests involve cockroaches and beetles to measure the persistency of residual spray deposits. On the roller mill, a powder grain protectant is thoroughly mixed with wheat samples before exposure to weevil attack. Once proved on this small scale, development moves on to extensive field trials, and if successful large scale production begins. Such stringent testing techniques resulted in the development of Pybuthrin, consisting of pyrethrum synergised with piperonyl butoxide. This versatile insecticide is internationally accepted as one of the safest in use. It provides rapid knockdown and kill of a broad spectrum of insect pests, yet may be used without risk in the presence of food.

**00:08:29:17**

In some small communities where conditions of cropping, handling and storage are less advanced, insects may completely destroy the crop. This is particularly liable to happen in tropical and subtropical countries where high temperatures favour the rapid breeding of insects. Stored maize, for example, is especially subject to attack

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which may begin in the ripening crop and continue after husks are removed from the cob and the kernels separated.

Fortunately, even at this stage, some degree of protection can be given by mixing in a protectant before the grain is bagged and placed in a storage house. If a problem exists here, how much greater is it when grain is stored for many months in silos holding hundreds of thousands of tons? Infestation here could lead to serious losses and shortages on a national level but, as in the African homestead, cereals in store can be protected against insect attack by a simple but efficient process. A liquid protectant is accurately applied to the grain as it passes along the conveyor, here shown uncovered, using precision-spraying equipment. In this way the grain is protected by a minute deposit of insecticide which, although deadly to insects, is in no way harmful to humans. Such treatment of foodstuffs is officially approved by health departments throughout the world.

Dosages involving the addition of 1½ pints of liquid to 1 tonne of grain mean a negligible increase in its moisture content. Grain and other cereals treated like this will remain free from infestation in store for at least 6 months, thus passing on to the consumer the full benefits reaped at harvest. Similarly, the concentrations of a nation's food in the docks and depots throughout the country makes constant vigilance and efficient pest control methods absolutely essential.

The bulk storage of commodities in good condition cannot be fully effective without intelligent hygiene. Stores must be kept clean and light; temperature, ventilation and humidity properly controlled. Modern handling techniques and storage on pallets, as in this dock warehouse, have brought about a revolution in warehouse management. Spillage of any kind if neglected provides ideal conditions for pest development.

In the tobacco bond, a case of strip tobacco is opened and made ready for weighing, necessary for payment of customs duty. In the process, spillage occurs and must be reclaimed, but this is only a small part of an overall cleaning routine. An industrial vacuum cleaner is ideal for this purpose, efficiently removing dust and debris from all internal surfaces. However, owing to the ever increasing quantities of food in store,

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practical hygiene matters are not enough; chemical control must also be employed. After cleaning, a persistent residual insecticide is applied to the building fabric for crawling-insect control. A light, easy-to-operate, knapsack sprayer provides a simple and efficient means of treatment.

For flying-insect control, be it fly, wasp or moth, a fine mist of Pybuthrin droplets is produced by an electrically-operated mist generator based on the spinning disc principle. Droplet size can be varied with the control valve from a light air mist to a coarse wetting spray. The machine's strong air-blast blows the particles forward and they circulate to every corner of the store.

Pests do not respect international boundaries. For example – Italian spaghetti manufacture has its own insect control problems, mainly from moths and weevils infesting pasta debris in the drying cabinets and other machinery. In this situation too, misting with Pybuthrin, using an electrical fogging machine, provides a rapid method of control, allowing penetration of the insecticide deep into machinery.

With the increase in storage capacity, perhaps involving millions of cubic feet, powerful thermal fogging machines, capable of producing a dense insecticidal fog, are now in regular use. At the rate of many gallons of Pybuthrin per hour, routine fogging of the largest stores has become a more practical proposition. This treatment involves no toxic risk to commodities exposed during spraying even after daily fogging.

Bacon is most vulnerable to blow fly attack during processing and marketing. Complete protection in the smokehouse, warehouse, transport or shop is assured by a light application of Pybuthrin powder. This protectant is repellent as well as insecticidal, yet it is destroyed by cooking and cannot harm the consumer.

The pressure-packed aerosol provides an easy and efficient means of controlling flying insects in food premises. Flies, wasps and moths can be a nuisance wherever food is stored or displayed, but freedom from these pests can be automatically achieved by the installation of a Coopermatic unit. A measured dose of highly

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concentrated Pybuthrin formulation is released from a special dispenser at 15 minute intervals, making the atmosphere deadly and highly repellent to all common flying-insects. When operated for 8 hours a day, the dispenser only needs changing every 3 months and even this is a simple process. In larger premises installation of several units, one machine in every 6000 cubic feet, gives overall protection.

Even when the commodity is packaged, it is still open to attack. Insects can penetrate waxed paper, polythene, cellophane wrap, silver foil and many other materials. But a simple cardboard pack can be made insect-proof by the application of a repellent coating of Pybuthrin. After printing the carton boards are varnished before being cut into separate packs. In the Cooper code process a Pybuthrin coating replaces the normal varnish and the appearance of the pack is unaffected. No special machinery or processing is required for its application. Under poor conditions of storage, unprotected cartons can become as heavily infested as this *<film of carton containing foodstuff completely broken down and infested with larvae>*. In contrast the Cooper code process ensures safety in store over a prolonged period.

Infestation of foodstuffs must be controlled – in the crop-growing areas of the world, in the warehouses, in the processing factories of food manufactures, in the storerooms of wholesalers and retailers, in shops, canteens, restaurants and all places where food is present.

**<End credits>**