Stored Product pests. Lecture 8. Grade 3

D-Quarantine methods:

Stored grain pest species are so widespread that they can be found in almost all countries. The pests spread due to frequent trade between countries. During trade operations, insects can transport through commodities and transport cabins. The quarantine law usually restricts the spread of further insect pests of stored grains by preventing the entry of an insect which is not found in a particular area or country before.

Storage losses due to Vertebrates:

1- Rodents: Rodents belong to the class Mammalia and have an external covering hair. Its order Rodentia includes a large number of animals including rats and mice. Rodents inflict serious losses on different food grains in stores and warehouses. Rodents not only feed on grains but also contaminate 20 times more than what they consume with their dropping, urine, hair, and even sometimes with their dead bodies.

Kingdom: Animalia

Subkingdom: Vertebrata

Phylum: Chordata

Class: Mammalia

Order: Rodentia

Family: Muridae

Some of the important rodent species found in storage area

House rat / *Rattus ratus*. This species is responsible for spreading the plague. It feeds on cereals, vegetables, meats, fats, and carbohydrates and can also damage wood, plastic, paper, rubber, and leather. This species is responsible for contaminating food with hairs, and urine and also for spreading Salmonella bacteria. It feeds on grains, damages containers like bags, and cartons, pollutes grain with hairs, and spreads various diseases.

Signs of rodent infestation;

There are a large number of clear signs of rodent infestation:

1-Live animals: Rodents are mainly active at night. If animals are nonetheless seen during the daytime, this is a sign of an already advanced stage of infestation.

2-Droppings: The shape, size, and appearance of droppings can provide information as to the species of rodent and the degree of infestation. The droppings of Norway rats are around 20mm in length and are found along their runs. The droppings of Black rats are around 15mm long and are spindle-shaped. Mouse droppings are between 3 and 8mm in length and irregular in shape. Droppings are soft and shiny when fresh, becoming black or grey after 2 - 3 days.

3-Footprints and tail marks: Rats and mice leave footprints and tail marks in the dust. If you suspect there might be rodent infestation, scatter some sort of powder (talcum powder or flour) on the door at several places in the store and later check for traces.

4-Tell-tale damage: Rats leave relatively large fragments of grain they have nibbled at (concern marks). They generally only eat the embryo of maize. Sharp and small leftovers are typical for mice. Damaged sacks where grain is spilled and scattered can be a further sign of rodent attack. Attention should be paid to damaged doors, cables, and other materials.

5-Urine: Urine traces are fluorescent in ultraviolet light. Where available, ultraviolet lamps can be used to look for traces of urine.

6-Burrows and nests: Depending on their habits, rodents either build nests inside the store in corners as well as in the roof area or burrows outside the store. Rat holes have a diameter of between 6 and 8cm, whereas mice holes are around 2cm in diameter. These holes can be found particularly in overgrown areas or close to the foundations of a store.

Rodent Management;

Several methods of rodent management need to be integrated in a manner to manage the rodent population, as a single method may not achieve success. The following methods can be used to control rodents in store:

1-Habitat manipulation: Availability of food, shelter, and water are main affecting rodent population. Thus, removing garbage and maintaining good hygiene conditions will minimize rodent infestation.

2-Repelling: various chemicals have been considered rodent repellent such as laurontirate, actidione, and analine but disappear quickly. Sound waves emitted by ultrasonic devices are unbeatable by rats but are unheard of by humans thus without any harm to human beings.

3-Poisoning: The most popular and effective method of controlling rats is the use of poison baits. The poisons used in the baits are of two types:

1-Acute poisons: which are used in a single dose, i.e. zinc phosphide and thallium sulfate. Rodents are very suspicious of new objects as well as new foods. Before rats are given poison baits, plain baits, i.e. eatable with some edible oil without poison are fed to rodents for 2-3 days. This makes the rat habituated to feeding on that particular food. This process is

called pre-baiting. Then the poison bait is placed similarly in the same location to obtain a good killing result. If pre-baiting is not used because of fast poisons symptoms the rodent will develop bait shyness so that other rodents avoid feeding on the bait.

2-Chronic poisons: These act as blood anticoagulants and are used in multiple doses, i.e. warfarin, fumarin, recumin. These poisons are lethal when consumed for several days, as they cause external and internal hemorrhage and make the blood vessels more permeable. hemorrhage will occur in blood vessels found on the nose, eyes, and urinary system till the death of the animal. Using multiple-dose poison baits, pre-baiting is not required and bait shyness will not happen in this case, but baiting should be continued for 21 days to get an effective kill.

4-Chemo-sterilization: The chemical that makes the rodents sterile is called chemo-sterilants such as furadantine and colchicine. These are generally used as a mixture of one tablet of furadantine and half of colchicine to make both sexes sterile.

5-Fumigation: Use of fumigation like cyano gas and phosphine, calcium cyanide is used as a fumigant, and for phosphine gas, aluminum phosphide is utilized. Two tablets are put per hole and should be immediately closed tightly after fumigation by wet soil. The process should repeat twice in the following days on noticing any new burrows.