SAFESTORE: Fact Sheet
CONFUSED & RUST RED FLOUR BEETLES
Tribolium sp.

DISTRIBUTION & HABITAT:

*Tribolium sp. h*ave world distribution. They are always associated with stored food products, and have achieved their extensive distribution through transportation in these commodities. In temperate climates, infestations are often supplemented by these imports. *Tribolium sp.* are especially common in feed and flour mills.

BIOLOGY:

Females may lay up to 450 eggs over an extended period of time, but as with all insects, levels of fecundity may vary with temperature and other environmental conditions. Single eggs are laid loosely within the food material, hatch occurs generally in under a week. Larvae feed on many different types of stored foods, but generally favour cereal products. Other stored foods readily infested include nuts, rice bran, oil cake dried fruits and spices. Larvae develop over 3 - 9 weeks through between 5 and 11 instars until pupation. Pupae appear white and un - schlerotised (i.e. integument or skin is not hardened). Hatch will occur 6 - 14 days later at temperatures of 22 - 27˚c. Adults are long lived, sometimes reaching 20 months old. The entire life cycle takes between 3 and 9 weeks depending on conditions.

Female flour beetles emit both aggregation and sex pheromones producing different behaviours upon detection by conspecifics (members of the same species). Aggregation pheromone may produce "clumping" behaviour whereas sex pheromones tend to illicit an approach response from the male. In tropical and warm conditions, Flour beetles are able to fly, and hence may disperse much more easily than in temperate conditions where they are limited to dispersal methods such as crawling and phoresy ("Hitching rides").

SIGNIFICANCE AND PEST STATUS:

Flour beetles are a primary pest of the milling industry, and a secondary pest of grain storage, preferring only to feed on already damaged grains. Adult *Tribolium* emit secretions such as 1, 4 - Benzoquinnone which taint food products and have been associated with health risks. The red flour beetle *T. castaneum* has shown resistance to several Organophosphorous, Carbamate and Pyrethroid insecticides, whereas no evidence of resistance has been documented for the confused flour beetle *T. confusum*.

SAFESTORE: Instructions
CONFUSED & RUST RED FLOUR BEETLES – *Tribolium sp.*
With Diamond Traps

Tribolium sp. population monitoring kit contains ten "Diamond Trap" units, 10 individually packaged pheromone septas with food attractant. A chart for record keeping can be printed from our website, www.jfoakes.com

Best results can be obtained by using the SAFESTORE system to set up a monitoring program. When in place, such a program can help you to identify when and where infestation problems will arise.

RECOMENDED: that a thorough inspection of the area involved be carried out, and potential infestation "hotspots" are identified and marked on a site plan or map. The position of the traps can be marked on this map when they are placed, to facilitate the reading of catch levels.

PREPARATION: hold the diamond trap at the top (hole punch is located at the top of the trap) and grab the underside fold and pull down. The diamond trap is now open and ready for placement of the pheromone & food lure. Open the foil package and remove the rubber septa. Insert the rubber septa in the center of the glue area inside the trap. It is now ready to hang in place (wire hanger provided).

PLACEMENT: can affect the amount of insects that will be caught, so for an effective program, it is important that the traps are placed in the best position available, and when they are replaced, the positioning is altered as little as possible so that information from different times of the year can be compared. Traps should be placed when temperatures are 55°F or higher.

BEST POSITIONING: varies from site to site, so there is a certain amount of choice available in the placing of the traps, however good results can be obtained by following a few guidelines:

- Wherever possible, place units where insects are likely to fly or have been observed.
- If possible, positions should be chosen that offer shelter for the trap (fire hoses, fire extinguishers).
- Ensure that sanitation staff is informed of the program to prevent trap removal.
- Mark the position of the traps on the site plan, and assign them a number.
- Never store monitoring equipment with insecticides.
- Wash hands before placing or inspecting trap units.
- Avoid placing traps in areas where large volumes of air are moving out of the building.
- Place traps in a grid pattern (30 – 50 feet) or shorter intervals to pin-point infestations.

REGULAR CHECKING: once per week is recommended, however it may be necessary to inspect more often if you have a zero insect tolerance policy.
The sensitivity of the area to be monitored dictates how often they should be inspected, but whatever frequency they are checked should be kept constant so that the records you keep can be compared to each other. Click here to see our Record Charts for monitoring of specific and non-target pests. These tables can be printed, photocopied, completed and filed for future reference.

Trap units should be replaced every 4 - 6 weeks. Care should be taken during inspections to check the condition of the glue areas in the units, especially in dusty conditions or high insect catch situations, which may cause the glue surface to deteriorate. Should this occur, the trap should be replaced.

Store un-used lures/pheromones and traps in a cool place, avoid direct sunlight. Lures/pheromones can be refrigerated for long life.

The information given in this instruction sheet is provided as a general guide, and is by no means extensive. The biology of pests is the subject of a great many texts and although every effort has been made to provide factually correct information, Russell Fine Chemicals nor J.F.Oakes Sales & Marketing will in no circumstance be liable in respect of any omission or error.

SAFESTORE is a trademark of Russell IPM