

Bad Bugs...

Tribolium castaneum / *T. confusum*

Flour Beetle

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The red and confused flour beetles (*Tribolium castaneum* and *T. confusum*) are beetles that have a long life as an adult beetle. Typically they can live 6–12 months and sometimes longer. Because of this biology they produce a pheromone called an aggregation pheromone. They do not produce a sex pheromone like stored food moths.

Stored food moths only live for a few days to a week or so. As a result, the use of a sex pheromone is important. Males will respond to female very quickly and will fly long distances to follow the pheromone trail. Typically, monitoring traps can be set 25–50 feet apart and still detect the presence of moths within that area.

The flour beetles, however, do not have a strong attraction to the aggregation pheromone. They live long enough that they can encounter another male or female beetle during its random wandering in search for food. They are mostly food oriented rather than solely motivated by pheromones.

The distance of attraction for flour beetles to a pheromone trap is greatly reduced. Typically the range of attraction for flour beetles to a trap is less than 10 feet. It will rarely be caught on traps further than this distance from an infested food source. If pallets are stored above ground and the traps are below on the floor, these traps will not attract the beetles. In fact, because the beetle is happily feeding on a high quality food product

(like flour or milk powder) it may not be attracted to a trap that is within 3 feet of the source. This makes flour beetles one of the most difficult stored food pests to detect and monitor.

Flour beetles will enter into packages with defects; it cannot penetrate into intact packaging (with the exception of very thin paper). Once they have entered the package, reproduction will occur with a cycle being completed in about 30 days at 90°F. Red flour beetles have optimum development temperatures about 5°F higher than confused flour beetles. Females can lay 200–400 eggs over a period of 2 months. This infestation will continue to produce new generations until at some point the package is overcrowded and food becomes limited. The beetles then produce another pheromone called benzoquinones that repel each other (anti-aggregation) and direct beetles to leave the package.

It is only after product is heavily infested (several months) that we may discover their activity. It is during this time the beetles are exiting infested products that they may become caught in shrink wrap. This is a good spot to use flashlight inspections of pallets to discover infestations that cannot be picked up by pheromone traps. When beetles are wandering around floors they can be in search of food and pheromone to direct them to new



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food sources. This is when the traps become useful.

The detection range of food odors is limited to perhaps 15–20 feet. Sanitation within

the warehouse is an important factor as the spilled foods or crevices with food product will compete with pheromone traps on the floor reducing their trapping ability. These spilled foods can be a source of infestations for other products in the warehouse.

Flour beetle traps should be 'targeted' toward these potential patches of available food. A grid system of flour beetle traps is an expensive and inefficient use of this type of device due to the short range of attraction. **The percentage of the population that is actually in the adult form is about 10% at any given time.** Repeated lab tests show that traps placed within 2 feet of a food and harborage site typically attract 10-25 % of the adult beetles present. At best a trapping system in a facility is sampling about 2% of the total population so this can give you an estimate of the infestation level for that area.



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