

Ideal for:

Pets, livestock and poultry
Crops
Food processing areas
Grain storage
Home use
Lawns and gardens

What is diatomite?

(also known as Diatomaceous earth)

How does it work?

It is a non-toxic, safe substance composed of crushed fossils of freshwater organisms and marine life called Diatoms.

It is 100% natural and mined from the remains of dried fresh water lake beds. The diatoms have a hard shell made of non-crystalline silica, which does not decompose. Crushed to a fine powder and observed through a microscope, the particles are porous, hard and with sharp edges. Deadly to insects but completely harmless to animals, fish, fowl or food.

Most insects have a waxy outer shell covering their bodies. Diatomite adheres to the insect body and damages the protective waxy layer of the insect cuticle by sorption and abrasion. The result is the insect dehydrates,

leading to eventual death. Therefore, it controls insects by physical means rather than chemical, and thus has no chemical toxicity.

Diatomite also repels insects.

What is Diatomite effective against?

Diatomite has been shown effective in use against the following pests:

Ants, Aphids, Bollworm, Red Mite, Ticks, Fleas, Cockroaches, Clothes Moth, Corn Worm, Earwig, House Fly, Fruit Fly, Lead Perforator, Greenfly, Leaf Hopper, Lygus Bug, Mite, Black Fly, Pink Boll Weevil, Red Spider Mite, Box Elder Bugs, Carpet Beetles, Centipedes, Millipedes, Silverfish, Slugs, Snails and other insects.

It can be expected that most insects will die from contact with Diatomite within a few days.

Diatomite can also have a very good long term residual effect, i.e. when applied to cracks and crevices. This long term protection and control of insects can be achieved due to DiateGuard controlling pests by physical means, not chemical, and therefore denying them the ability to build up a resistance to it in future generations.

* Effectiveness will be reduced if the diatomite is exposed to a high relative humidity of 75% (or above) as the diatom shells will take in moisture



How long does DiateGuard take to kill insects?

The amount of time that it takes diatomite to kill insects varies greatly depending on factors such as particle size, temperature, relative humidity, the type of insect as well as the extent of the infestation.

DiateGuard may need to be left down anywhere from 1 day to a week or more in order to be effective against an infestation.

Although each situation will be different, in many cases results have been seen with

Bedbugs within 24 hours of properly applying the diatomite, with more substantial results after 5 days (120 hours).

Beetles such as Merchant grain beetles and Darkling beetles within 7-21 days.

Silverfish within 7-14 days. Note: the removal of clutter prior to treatment is recommended in order to improve effectiveness.

Black ants within 24 hours, Red ants within 16 hours

Be sure to monitor the infestation. Once you have reached the desired result, simply vacuum up the used food grade DiateGuard.

Note: it is important that you re-apply the Diatomite if any area that you have applied it becomes wet.

Most susceptible are hairy insects or those with large surface to volume ratios. Hairy insects pick up larger concentrations of the desiccant; a large surface to volume ratio can mean a higher rate of water loss. Insects with large water needs such as the Argentine ant and the German cockroach are also particularly vulnerable (Quarles and Winn 2006).

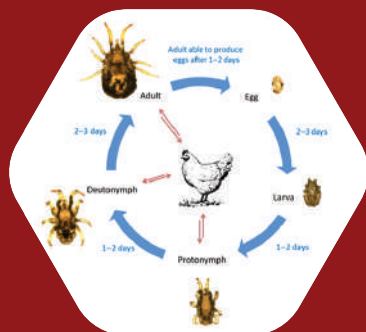
An infestation of **red mites** (also called chicken mites, roost mites or poultry mites) will cause skin irritation, stress and a reduction in egg numbers. Red Mites live during the day in the cracks and only come out at night to feed & suck blood from chickens, causing skin irritation, stress and a reduction in egg numbers. In extreme cases, birds will become anaemic and can even die. You won't see them on your poultry during the day. They can be transported to new locations on the bird.

It's important to note that only the fed mites are red. The unfed mites are light brown and very difficult to see since they are no bigger than a speck of dust. You will need to check at night with a bright torch to find them crawling around on and underneath perches.

Red Mite Control in Poultry



Photos Dr. Amy Murillo, MSD Veterinary Manual



Life cycle of red mite

A typical cycle is only 7-10 days long. A blood feed takes 1 to 2 hours and usually takes place at night when birds are roosting.

- Eggs hatch into 6 legged Larvae in 2-3 days. They do not feed.
- Larvae moult into 8 legged Protonymphs in 1-2 days and start to feed.
- Protonymphs will have a blood feed and turn into Deutonymphs in another 1-2 days
- Deutonymphs turn into adult red mites in 2-3 days and continue to take blood feeds
- After feeding a female red mite will mate and within 1-2 days is laying eggs.
- Females will routinely take a blood feed. Males feed less frequently.
- The cycle is of course repeated and numbers increase



Source: poultrykeeper.com

The white/grey ash residue is their excreta and can often be seen outside of cracks where mites are hiding.

Treatments:

DiateGuard Powder can control red mite in poultry houses when thoroughly applied to walls, floors, ceilings, perches, nest boxes etc. The most effective way to control red mite is to use the two pronged attack; firstly wash away the red mites habitat with a detergent product to clean the area and then use DiateGhistouard Powder for residual red mite control. Liquid detergents will run into the cracks and crevices. They can also be sprayed into difficult to reach areas. Once the coop is dry, you can use a DiateGuard powder (concentrated on the perch ends and nest boxes) to catch mites that you missed and as they come out at night to feed and try to get to birds.

DiateGuard -apply to walls, floors, ceilings, perches, nest boxes and cages at 10-15g per square metre. 1 kg of DiateGuard powder treats 80 sq metres

A dust bath can really help the birds with mites and lice and is their natural way of getting rid of external parasites. DiateGuard powder is added to dust baths so the birds get it into the places you have missed. When mites hop onto your birds at night, they will rub against the diatom.

Darkling beetles

For poultry growers, darkling beetle infestations in litter are a frequent problem. Darkling beetles come from invasive species of insects that feed on grains and prefer to gather in places with high temperature and moisture. A poultry barn is an ideal habitat for the pests. Larva, also called mealworms, gather under feed and waterlines. Pupa burrow into housing insulation and other hard surfaces. As adults, these beetles are active and can fly more than a kilometre. Darkling beetles are also vectors for viruses such as Infectious Bursal Disease (IBDV), Mareks Disease (MDV) and Reovirus as well as bacterial such as E.Coli and Salmonella spp. and protozoa, such as *Histomonas meleagridis*.



The diseases can be spread by darkling beetles through direct contact, recontamination of the disinfected environment by the reuse of litter or by being ingested by the bird directly.

In a poultry barn a single pair of beetles can turn into a population of more than 5 million in as little as four months if uncontrolled. Beetles consume feed, create a biosecurity risk by spreading disease, destroy houses by boring into the house's walls, harm feed conversion rates and disturb the chickens in the house.

Control

Controlling or eliminating the darkling beetle can be difficult – they thrive in house conditions of between 21–35°C with a littler moisture of at least 10%.

The beetles can be located in a range of places:

- The litter
- Beside pillars
- In curtains
- In nests
- On slats, feeders, drinkers of other equipment
- In gaps, holes or cracks in the wall
- In storage rooms and egg collection areas

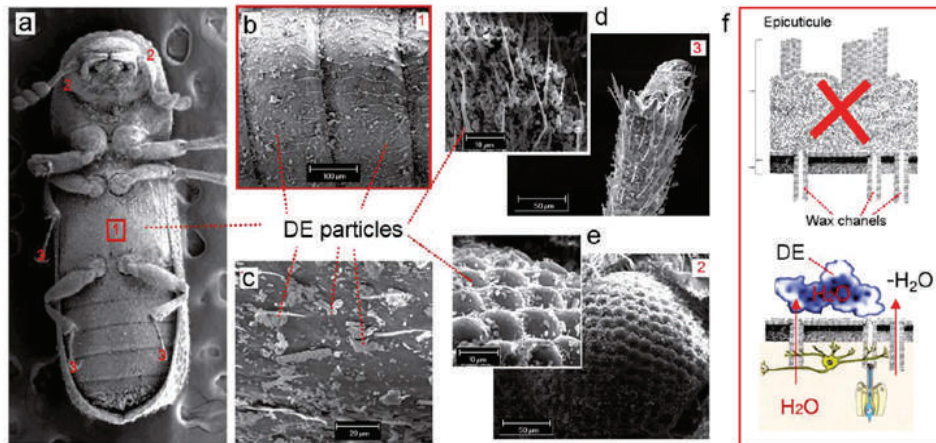
Apply DiateGuard starting at one end of the barn or poultry house and apply extending 1.2m out from the wall around the entire perimeter.

Apply a thick layer of DiateGuard in the first 600cm out from the wall and a thinner layer for the following 600cm. (one 20kg bag will take you 8–10m)

Note: for darkling beetles it is best to apply DiateGuard soon after manure removal in poultry facilities when mobility among the beetles is highest. This will ensure that the beetles come in contact with the Diateguard.

Grain storage

Diatomite has long been known as a useful grain protectant because it is safe to use, does not affect grain end-use quality, provides long term protection and combats insect chemical resistance. Its use can reduce grain bulk density.



The insecticidal mode of action of diatomite particles. (a-c) SEM images showing the covering of an insect's body with a high density of diatomite particles (500 ppm dosage) causing the death of the insect. (d-e) SEM images showing diatomite particles covering the insect's eyes and legs, having an impact on the sensory system and movement. (f) A schematic showing the physical mode of action of diatomite particles causing the loss of water from the insect's body through a desiccation process by water adsorption of diatomite particles and also by abrasion and partial removal of the wax layer on the insect's skin to enhance this process

Source: Grain Development Organisation, GRDC Australia) – Diatomaceous Earth a Natural Insecticide for Stored Grain Protection

DiateGuard can be used to control insects in stored grain and animal feed without adding toxic chemicals. It has no taste or smell, and it does not need to be removed or require any waiting time before processing and consumption. It can be used with feed grains, seed, stored grains, and other raw agricultural products and grains. Diatomite has been shown effective for killing exposed insects such as Rice Weevils, Granary Weevils, Angoumois Grain Moths, Mediterranean Flour Moths, Indian Meal Moths, Red Flour Beetles, and Tribolium in empty bins, warehouses, boxcars, containers, ships, and silos.

Moisture content of grain should be regulated to less than 12% for effective insect control. DiateGuard can be applied at a rate of 3kg per ton and can be mixed throughout the entire grain mass, or used as a top and/or bottom dressing at the rate of 2kg per 100 square metres over the grain bed. For empty grain storage areas DiateGuard should be dusted lightly at an approximate rate of 2 kg per 100 square metres on all interior wall and floor surfaces of empty storage areas. Pay special attention to cracks and crevices. It is most effective when grain is treated directly after harvest by coating the outside surface of the grain.

Part of an IPM PLAN.

DiateGuard is best when used as part of an IPM plan. Application in cracks and crevices will deny cockroach harborage and drive thirsty cockroaches on a quest for water. For instance, thirsty German roaches exposed to diatomite spend 40 percent of their time at water sources, compared to 0.9 percent for controls (Snetsinger 1988). Roaches driven from harborage are more likely to find cockroach baits and sticky traps that will remove them from a structure.

Ants and other Hymenoptera are very sensitive to the effects of dust. Applications to wall voids and attics can prevent nesting of carpenter ants, Argentine ants and other ant species. DiateGuard can be applied to confined spaces underneath kitchen cabinets to deny harborage to roaches and to discourage foraging ants. DiateGuard is a useful professional tool that can lead to reductions in conventional pesticide applications and more effective pest control.

For pets & livestock

Effective control of red mite, ticks, fleas, ants, aphids, cockroaches, clothes moths, earwigs, house flies, fruit flies, greenflies, carpet beetles, centipedes, millipedes, silverfish, slugs, snails and many other insects.

DiateGuard is effective against fleas, mites, ticks, lice, and other pests for use on pets, poultry, and other livestock.

Dust the animals liberally and lightly work the material into the hair of the animal, or provide a box or loose bag of it for animals to roll in or rub against to dust themselves. Dust the ears of the animal with care. Dust the animal's bedding and areas where the animal sleeps, as well as carpets, cracks and crevices adjacent to them. This can be done manually or with a power dust blower. Repeat once a month or as necessary. Individual ticks observed on the animal should be dusted thoroughly. For confined animals infested with fleas and ticks, dust the entire area with DiateGuard.

For Fleas – Thoroughly dust carpets, pet's bedding and sleeping areas, as well as cracks and skirting boards. Rub into your pets fur. To control fleas in rugs and carpets, apply a thin layer of DiateGuard all over the area. Rake the DiateGuard into the fibers and leave overnight. When cleaning, do not make a special effort to remove the dust in the rug. It will continue to kill live fleas, repel others, and will help deodorize the carpet.

For Flies – Thoroughly dust areas where flies frequent (walls, straw bedding, livestock pens).

For Carpet Beetles – Thoroughly dust along skirting boards, carpet edges, under furniture, carpet and rugs and in closets and shelving.



Photo: King Photography

Crops, gardens and outdoor use

Slugs and Snails – To use, simply sprinkle around flowers and vegetable gardens. The best time to apply is when slugs are present and rain is not expected for at least 24 hours

Ants – sprinkle on ant paths

*DiateGuard Powder is not harmful to Earthworms since they are structurally different from insects.

Trees – Sprinkle liberally on the ground and around tree trunks. Tree trunks can also be painted with a mixture of DiateGuard Powder, water, linseed soap or a wetting agent. This will inhibit the migration of various fruit flies (maggot stage), worms beetles (grub stage).

Plants and crops – DiateGuard can be applied wet or dry to your garden plants. Dust onto plants or dilute in water and spray on plants like a foliar fertilizer. Ensure coverage over the entire plant (especially under the leaves) or around it's base.

Suggested dosage rates

5 litre 'pump up' type sprayer	20gms or 60mls
15 litre Backpack sprayer	60gms or 180mls
200 litre automatic sprayer	800 - 900 grams
Crops application	2.5 to 6 kg per ha or 0.4 to 1 kg per rai
10 litre bucket 'brush on'	2 cups or 500ml
10 litre watering can	40gms

Safety and precautions

DiateGuard poses no local threat to the environment, as approximately 50% of the Earth's crust is silica (e.g. sand) or a silicate (e.g. soil). DiateGuard residues do not degrade on stored grain, but can be readily removed by processing.

Consumption is safe as silica does not accumulate in mammals but is excreted as silicate in urine. Many sites promote the consumption of diatomite for control of parasites and utilisation of active silica.

Caution should be taken to avoid inhalation because dusts can cause respiratory problems. It is recommended to avoid inhalation of dust and wear a mask.

Benefits

- Easy to use
- Non toxic
- Controls pests by physical means, not chemical; therefore denying them the ability to build up a resistance to it in future generations
- Chemical Free
- Non-Staining
- Odorless
- Environmentally Friendly
- Can be safely used in organic production
- Can be used in food areas
- Is chemically stable and does not dissipate over time. As long as it is dry, its effectiveness does not diminish.
- Economic compared to other insecticides, which must be repeatedly applied to achieve long-term protection.



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