

BUGMAR

A PHYSICAL BIOCONTROL

FOR BEDBUGS & OTHER CRAWLING HOUSE PESTS

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GOOD NIGHT, SLEEP TIGHT, BEDBUGS BITE



BED BUG TRIVIA

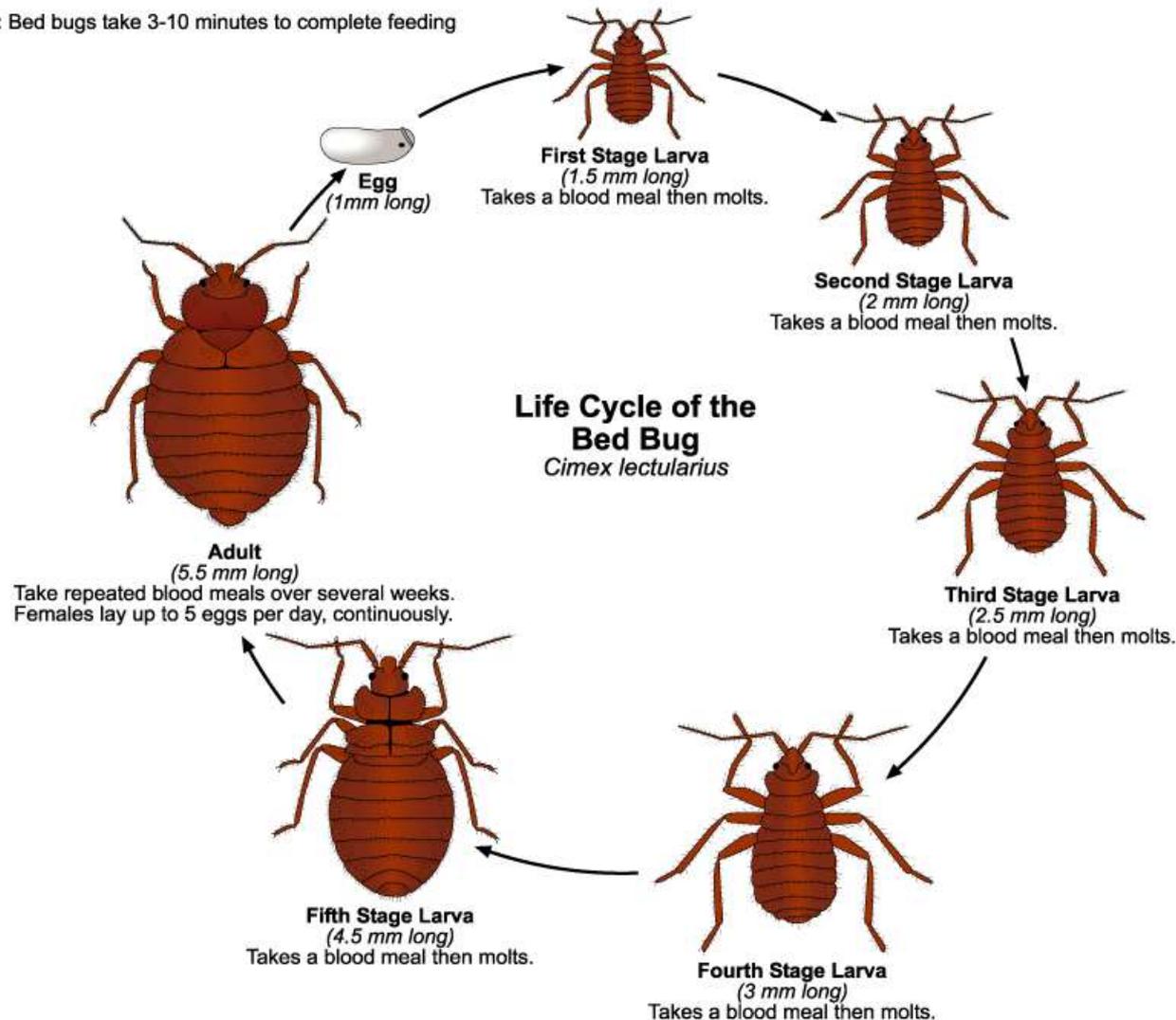
- Bed bugs are nest parasites (depends on other creatures to feed themselves)
- They feed mostly at night, by piercing the skin with a sharp "beak" and drink until full
- In most cases, bites are often the first sign of an infestation
- On most of us, the bite appears as a small welt, similar to a mosquito bite
- Can withstand a wide temperature range, from nearly freezing to 50°C
- Adults take large blood meals 3-10 min each; upto 7x Weight; 10 times of Mosquitos
- The host is completely unaware that he/she has been bitten.
- Secrete an anaesthetic through its bite into the skin & feeds without waking victim
- Multiply fast; each female lays upto 5 eggs a day and upto 500 eggs in her lifetime

BED BUG TRIVIA

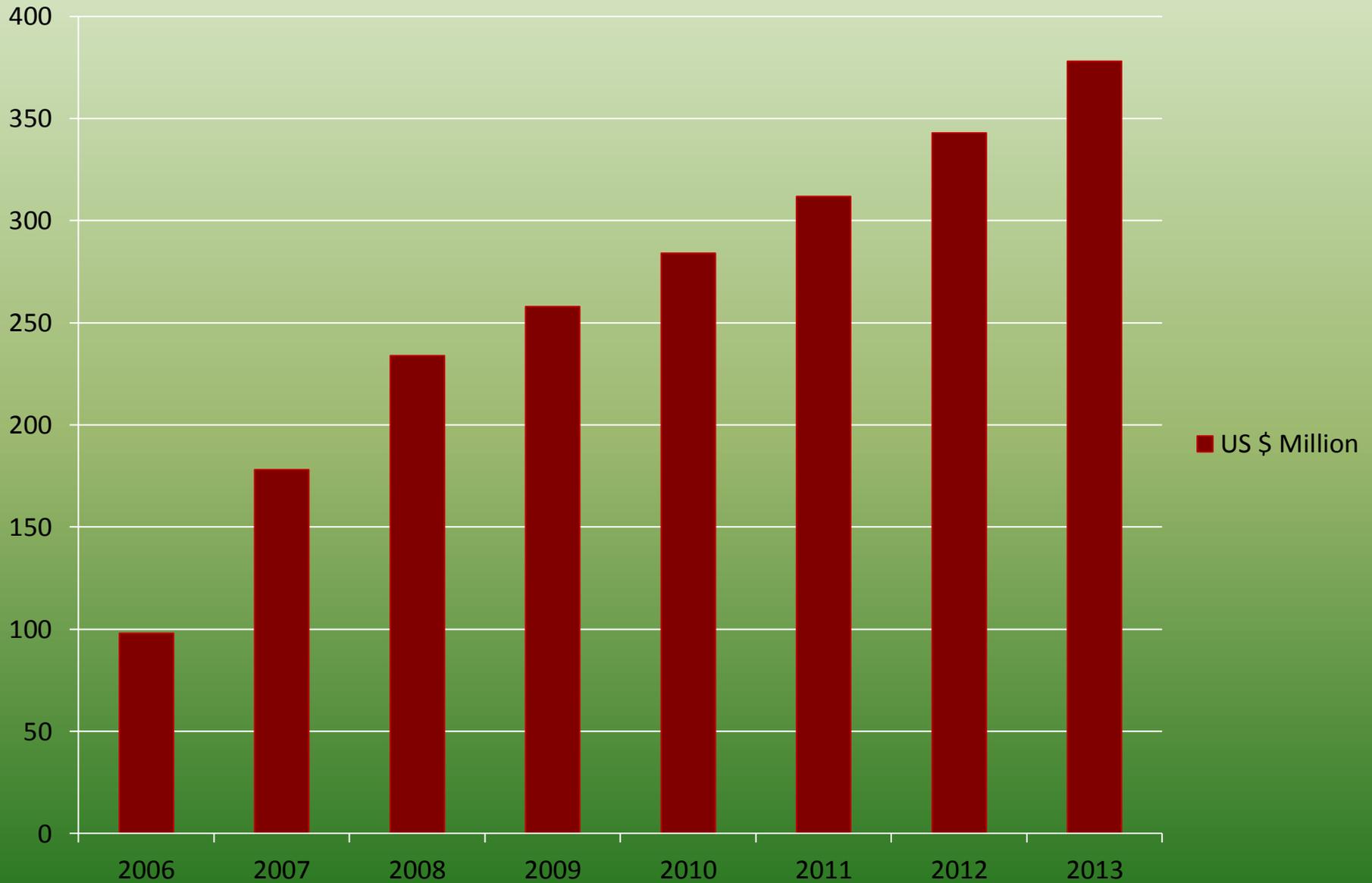
- Survive upto a year without food, we cannot starve them to death
- Great Hitch-Hikers, tag along home in our bags, clothes, etc., from infested areas.
- Being small, extremely difficult to detect, until they are beyond control
- They wander between adjoining apartments thru voids in walls, wiring & along pipes
- Repeated bites during several weeks causes us to become sensitized to their saliva; additional bites may then result in mild to intense allergic responses
- Some of us may experience more extreme reactions like, asthma, hives, & a life-threatening allergy (anaphylaxis) that requires emergency treatment with epinephrine.

BED BUG (*Climex lectularis*) LIFE-CYCLE

Note: Bed bugs take 3-10 minutes to complete feeding



GOOD DOLLARS SPENT ON BAD BUGS IN USA (USD Mill.)



BEDBUG CONTROL IN USA

- 1940 – 50 = Bedbugs almost eradicated in USA (DDT)
- 1972 = USEPA Bans DDT
- 1970 – 2006 = Bedbugs controlled in USA (Propoxur)
- 2007 = USEPA Bans Propoxur
- 2008 – 2014 = Bedbug Menace and Outbreak in USA

- Pest Control Operators lack effective control mechanism/ chemicals
- Bedbugs aren't attracted to baits or traps, making it difficult to find and control.
- Bedbug control is now meticulous, time-consuming, repeat visits & sniffer dogs.

- In 2010, 3 infestations, control costs \$1,800.
- In 2011, 23 infestations, control costs \$10,000.
- In 2012, 40 infestations, control costs > \$30,000.
- In 2013, 62 infestations, control costs > \$125,000.
- In 1st half of 2014, 8 % of USA low-income homes were bedbug infested.
- Avg. cost to State Housing Authorities= USD 1.5 Mill./year, for bedbug control.

TOP – 20 BEDBUG CITIES IN USA (2013)

1. Chicago
2. Los Angeles (+1)
3. Columbus, Ohio (+3)
4. Detroit (-2)
5. Cincinnati
6. Cleveland/Akron/Canton (+2)
7. Dayton (+4)
8. Washington D.C. (-1)
9. Denver (-5)
10. Indianapolis (+6)
11. Richmond/Petersburg, Va. (+1)
12. Raleigh/Durham/Fayetteville, N.C. (+3)
13. Dallas/Ft. Worth (-4)
14. Syracuse, N.Y. (+7)
15. Atlanta (+14)
16. Houston (+2)
17. New York (-7)
18. Seattle/Tacoma (-5)
19. San Francisco/Oakland/San Jose (-5)
20. Boston (+2)



THANK YOU FOR YOUR SUPPORT

WHAT IS DIATOMITE/ KIESELGUHR

Diatomaceous Earth, also known as **D.E.**, **Diatomite**, or **Kieselguhr**, occurs naturally as a soft, siliceous sedimentary rock that crumbles easily into fine whitish powder.

Its particle size range is 3μ to more than 1 mm, but typically 10μ to 200μ .

Some powders can be as abrasive as pumice powder and very bulky due to porous nature.

Typical oven-dried Composition of diatomaceous earth: Silica 80-90%, Alumina 9-16% (clay), Iron Oxide 0.5 - 2%, Trace Oxides of Ca, Mg, K, Na, Ti, etc.

Diatomaceous earth consists of fossilized remains of diatoms, a type of hard-shelled algae.

USES :

Filtration aid, mild abrasive in creams, facepacks, toothpaste, mechanical insecticide, absorbent for liquids, matting agent for coatings, reinforcing filler in plastics and rubber, anti-block in plastic films, porous support for chemical catalysts, cat litter, activator in blood clotting studies, a stabilizing component of dynamite, and a thermal insulator.

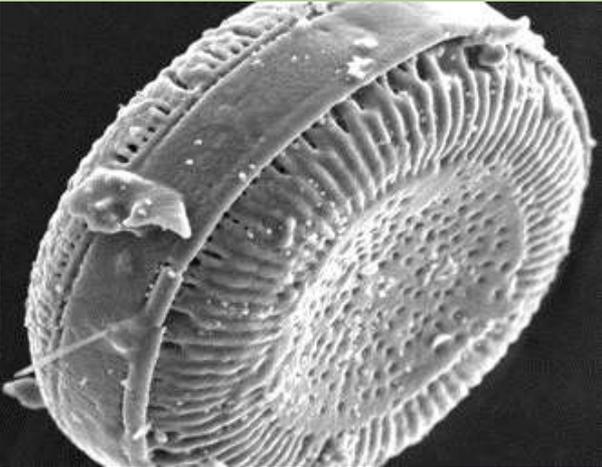
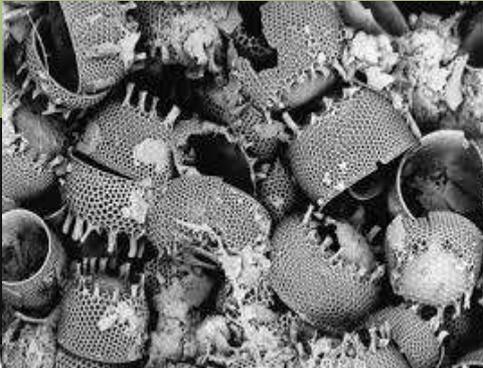
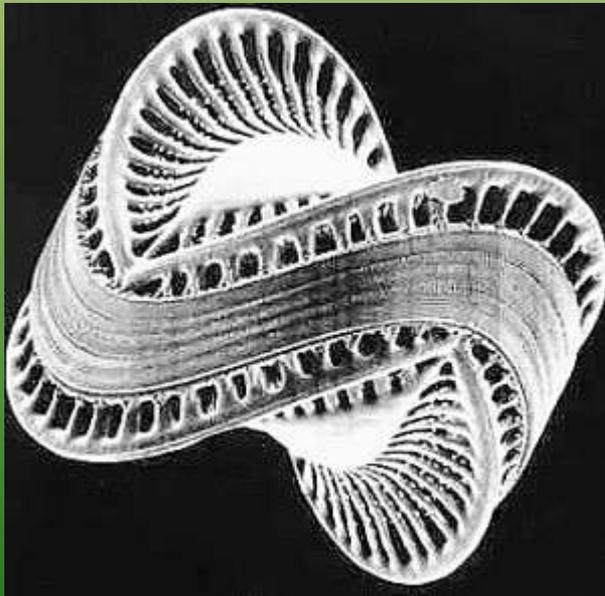
DIATOMACEOUS EARTH MINE (W. India)



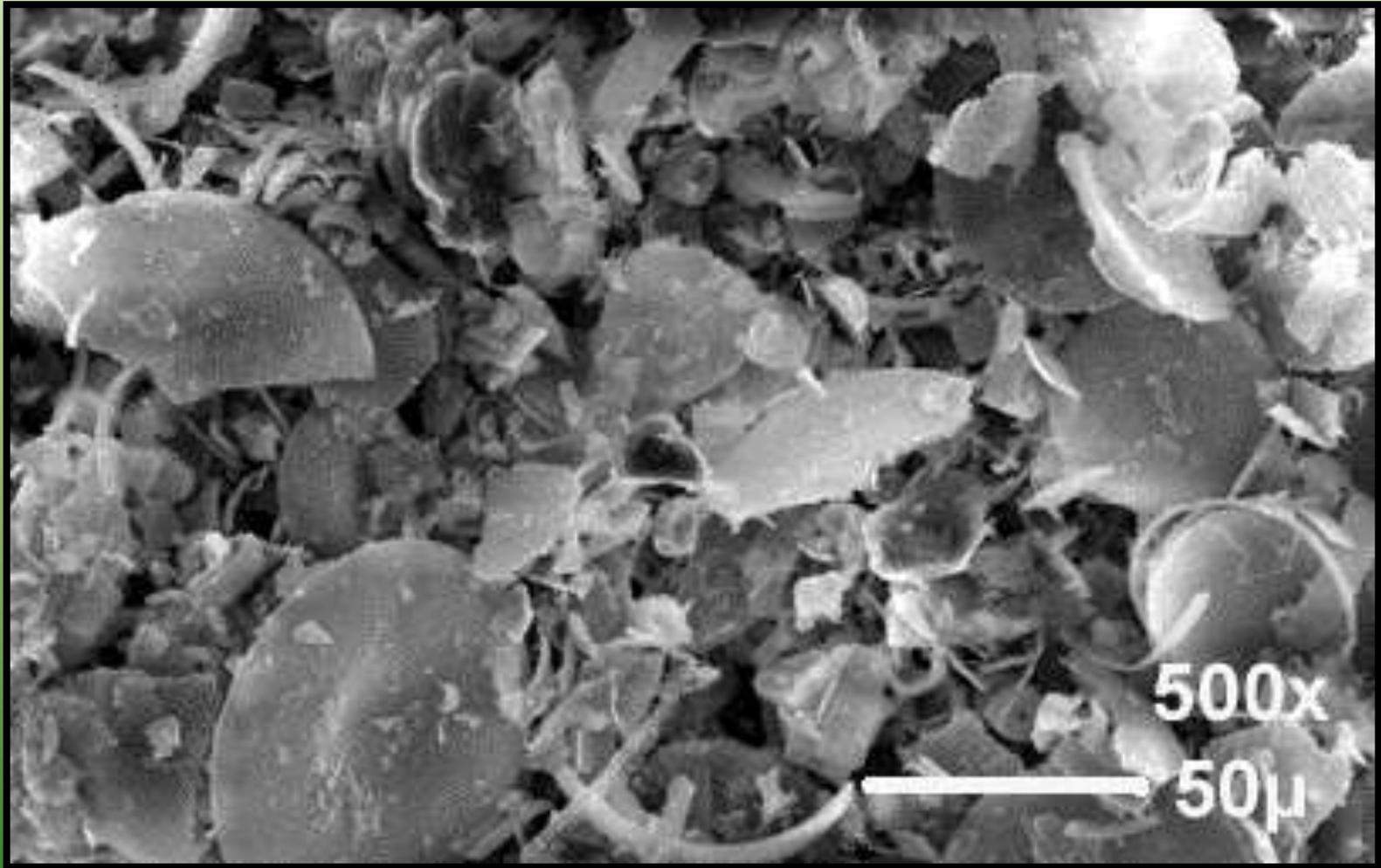
WHAT IS DIATOMITE/ KIESELGUHR

Formation

Diatomite is formed due to accumulation of amorphous silica (Opal, $\text{SiO}_2 \cdot n\text{H}_2\text{O}$) remains of dead/fossilised diatoms (microscopic single-celled algae) in marines and/or lacustrine(lake) sediments. The fossil remains are basically a pair of symmetrical shells or frustules.



DIATOMITE STRUCTURE (MICROSTRUCTURE)



MODE OF ACTION – OIL ABSORPTION & ABRASION

D.E. is picked up onto the body of the bed bug and absorbs dries the oils, waxy fats and lipids from the epi-cuticle on the exoskeleton of the insect body, leading to desiccation/ dehydration of the body and eventual death.

D.E.'s micro-structure has sharp edges acting as abrasives, speeding up the process of desiccation/ dehydration.

Normal D.E. absorbs oil @ about 1-2 times its mass.

Calcined D.E. (~900 °C) absorbs oil @ about 4-5 times its mass, (Inhalation toxicity).

Activated D.E. (~300 °C) absorbs oil @ about 2-3 times its mass.

Diatomite is used as an insecticide, due to its abrasive and physico-sorptive properties.

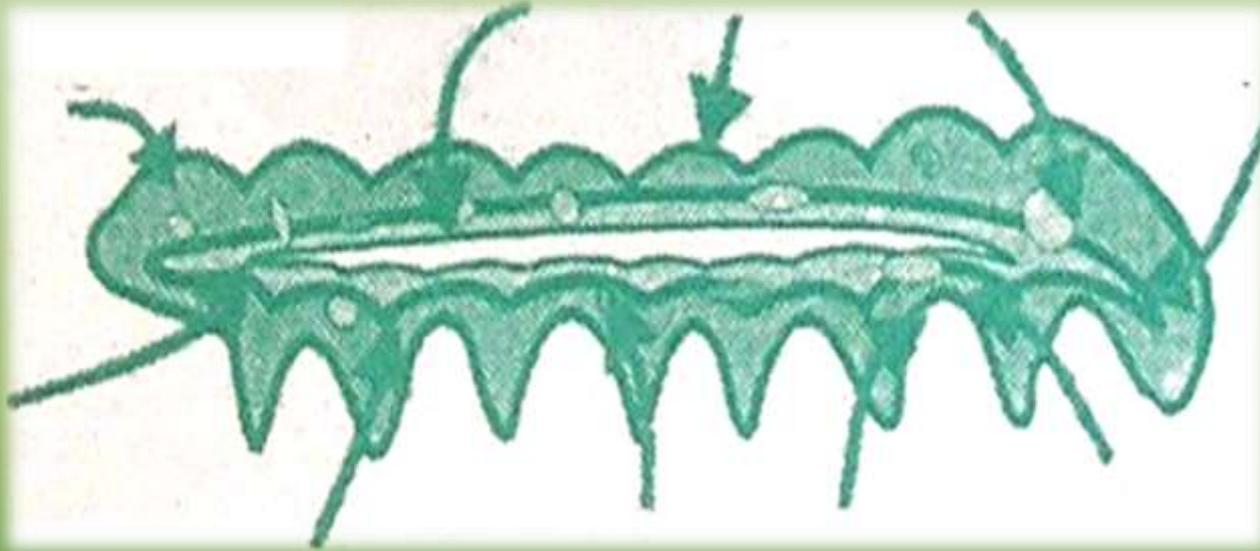
Arthropods die as a result of water pressure deficiency, based on Fick's law of diffusion.

It is sometimes mixed with an attractant or other additives to increase its effectiveness.

Diagrammatic Representation of BUGMAR affecting Insects

Dries Cuticle/ Waxy layer

Ruptures Exoskeleton



Insect Dies

Loss of Moisture/ Dehydration/ Desiccation

Method of Application of BUGMAR

- ▶ DRY SPRAY : Spray BUGMAR on beds, furniture, etc.
- ▶ BROADCASTING : Broadcast BUGMAR on furniture, beds, floor, etc.

INSECT PESTS CONTROLLED BY BUGMAR

BEDBUGS

COCKROACHES

ANTS

DUST MITES

TICKS

FLEAS

SPIDERS

STORE-GRAIN PESTS

PRECAUTION :

Asthmatics, people with COPD and other lung ailments should not be exposed to DE

Thank You



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