BMP's for Bee Diseases/Pests

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- **Honey Bee Parasites, Pests, Predators and Diseases**
  Mid-**A**tlantic **A**piculture **R**esearch and **E**xtension **C**onsortium

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- The Penn State Honey Bee Research Lab: www.psu.edu/dept/beehive
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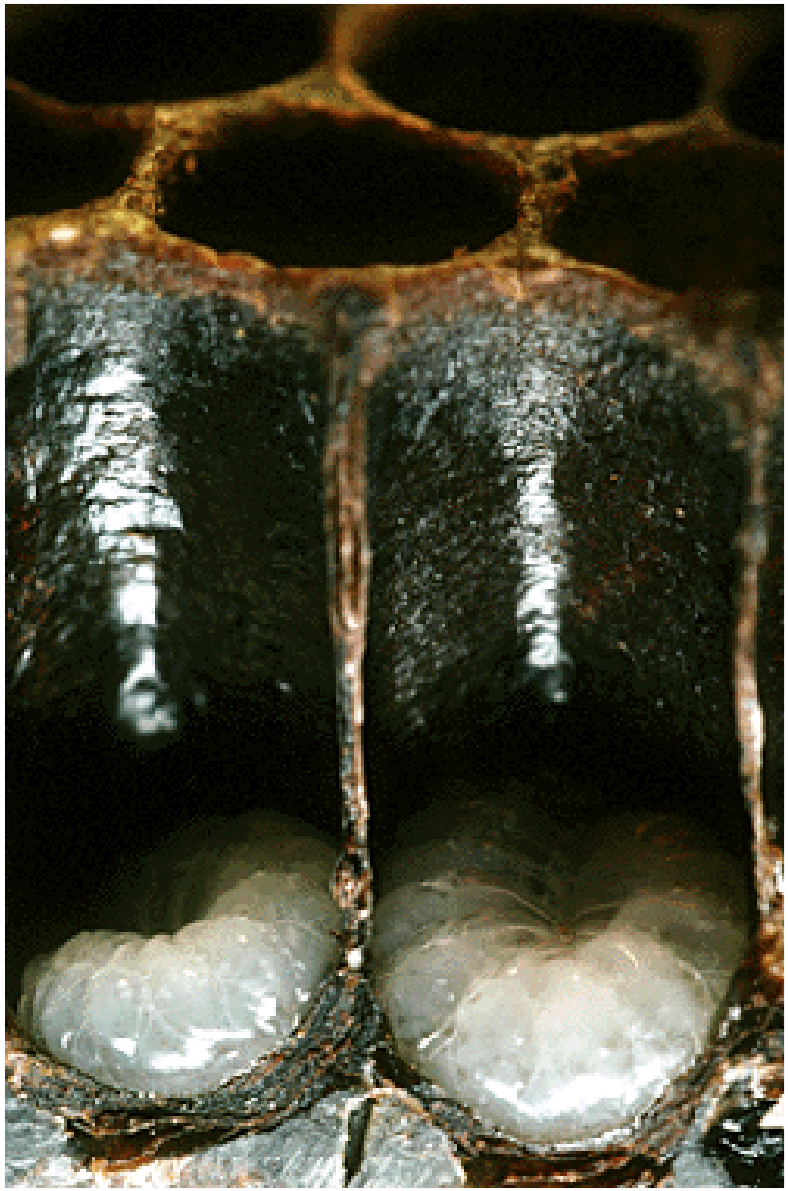
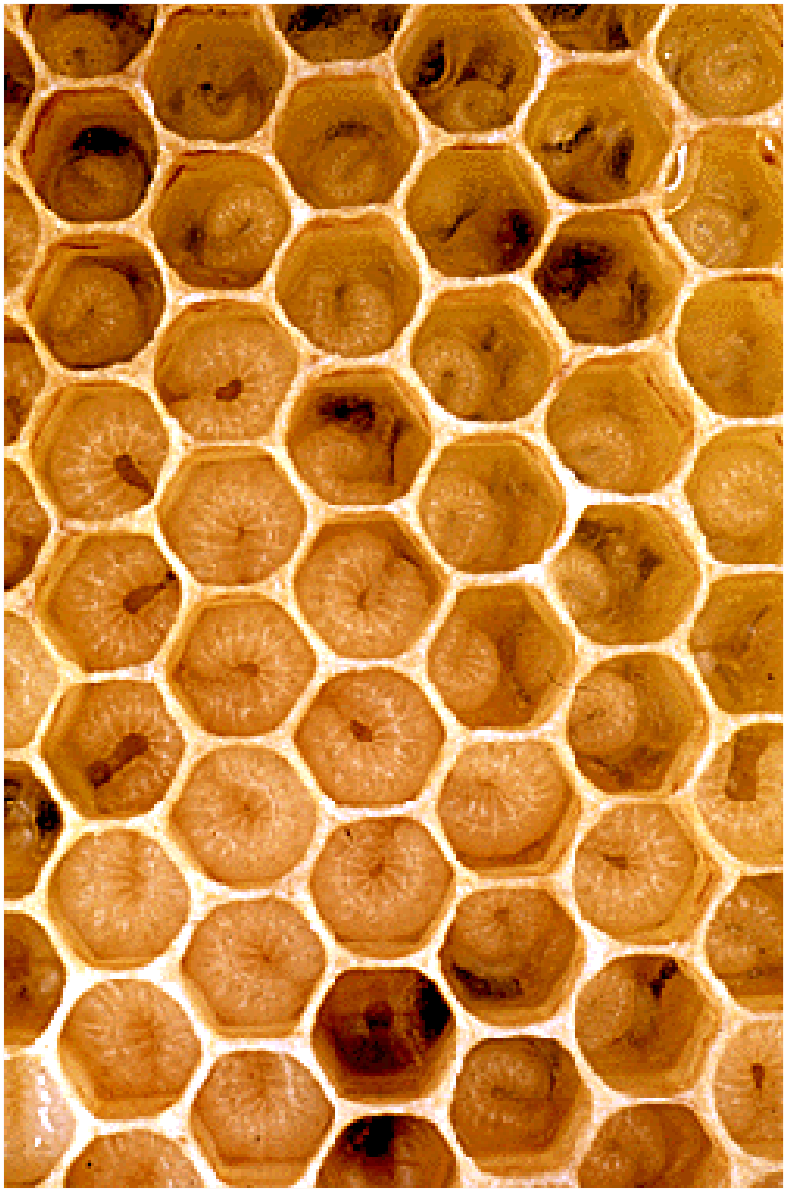
- To order the slide shows (shown combined on this Web site), "Honey Bee Diseases," or "Honey Bee Parasites, Pests and Predators," contact:

- Penn State University
  Department of Entomology
  501 ASI Building
  University Park, PA 16802
  814-865-1896

Healthy Adult Bees

Healthy “C”-shaped Larvae – notice they are pearly white and glisten





Healthy Bee Pupae

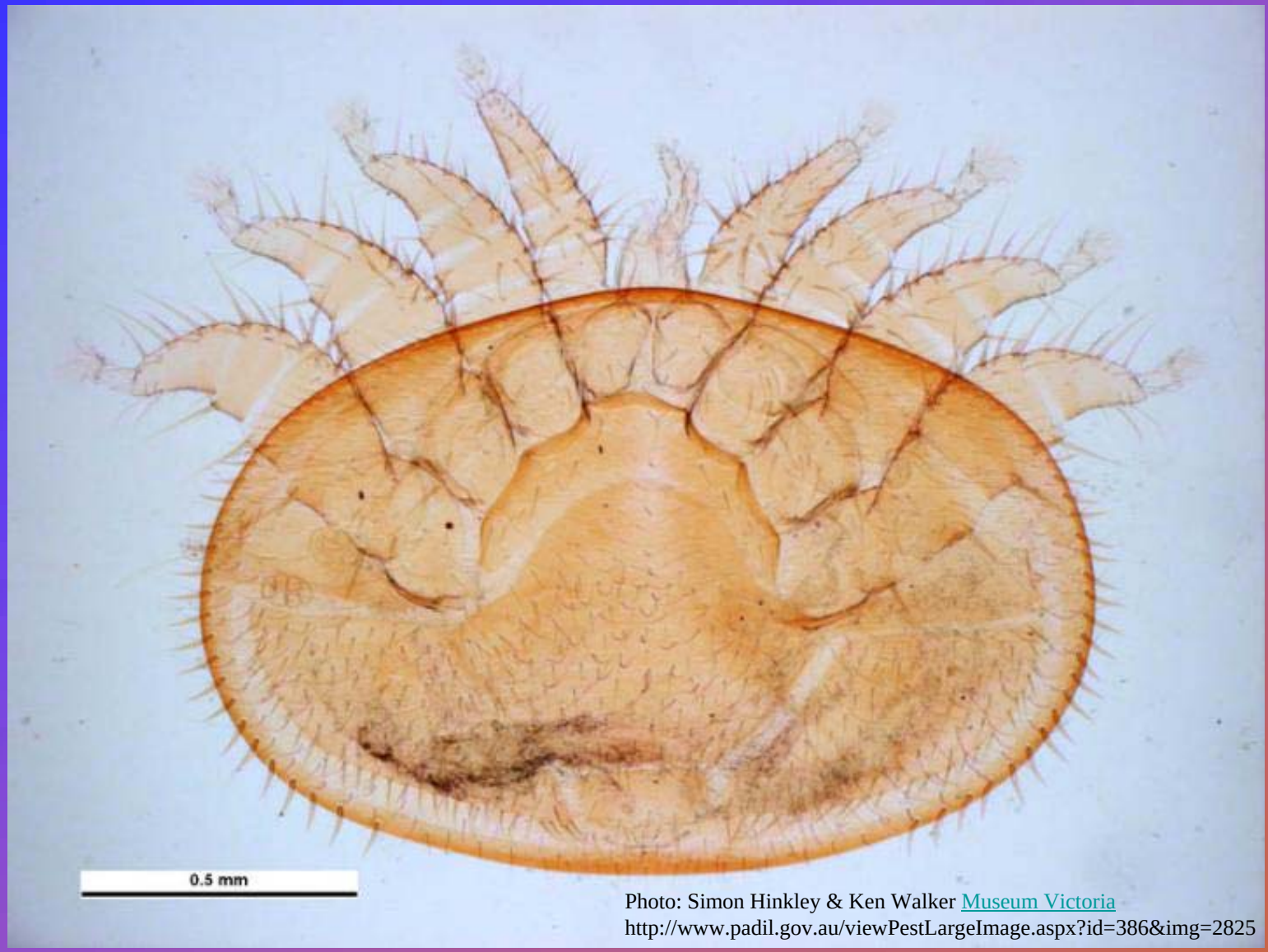
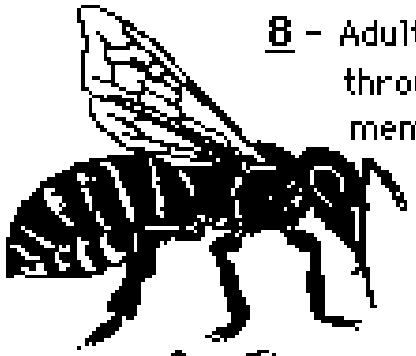


Photo: Simon Hinkley & Ken Walker Museum Victoria
http://www.padil.gov.au/viewPestLargeImage.aspx?id=386&img=2825

Varroa Mites

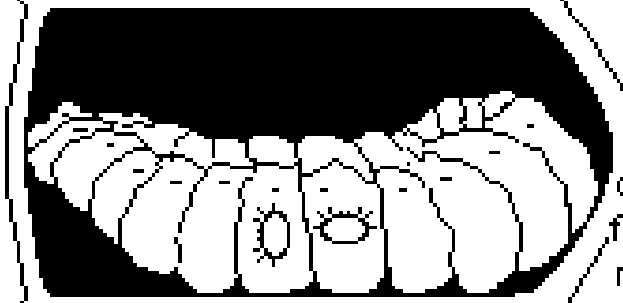
Life cycle of the Varroa Mite (*Varroa jacobsoni*)



8 – Adult female mites feed through innersegmental membrane on honeybee hemolymph.

1 – Female mites enter the cell of 5 day old larvae.

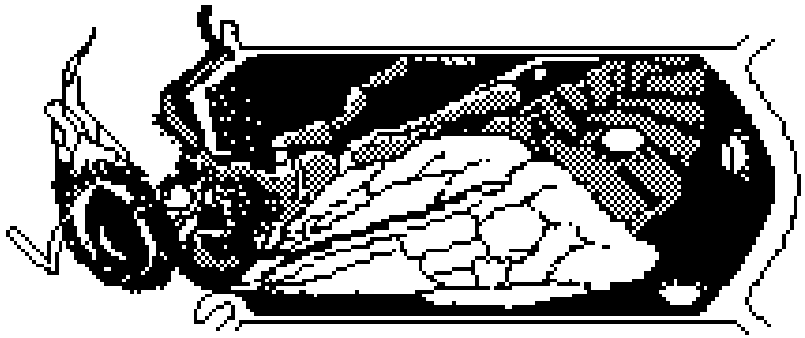
2 – Adult female mites immerse themselves in larval food.



3 – After the cell is capped, the female mite moves onto the prepupa and begins feeding.

7 – Mites transfer through close contact among bees.

4 – Females feed and lay their first eggs 60 hours after the cell is capped; subsequent eggs are layed at 30 hour intervals.



6 – Adult females leave cell with emerging bee; male and immature stages stay in cell.

5 – One-6 eggs are layed. Each passes through the following developmental stages: larva, protonymph, deutonymph and adult. They feed on bee blood. Both male and female are produced and mating takes place within the cell.

Drone hosting various stages of immature varroa

Worker bees with deformed wing virus – given to them by varroa

Economic threshold mite populations: 3172 – 4261 mites per colony

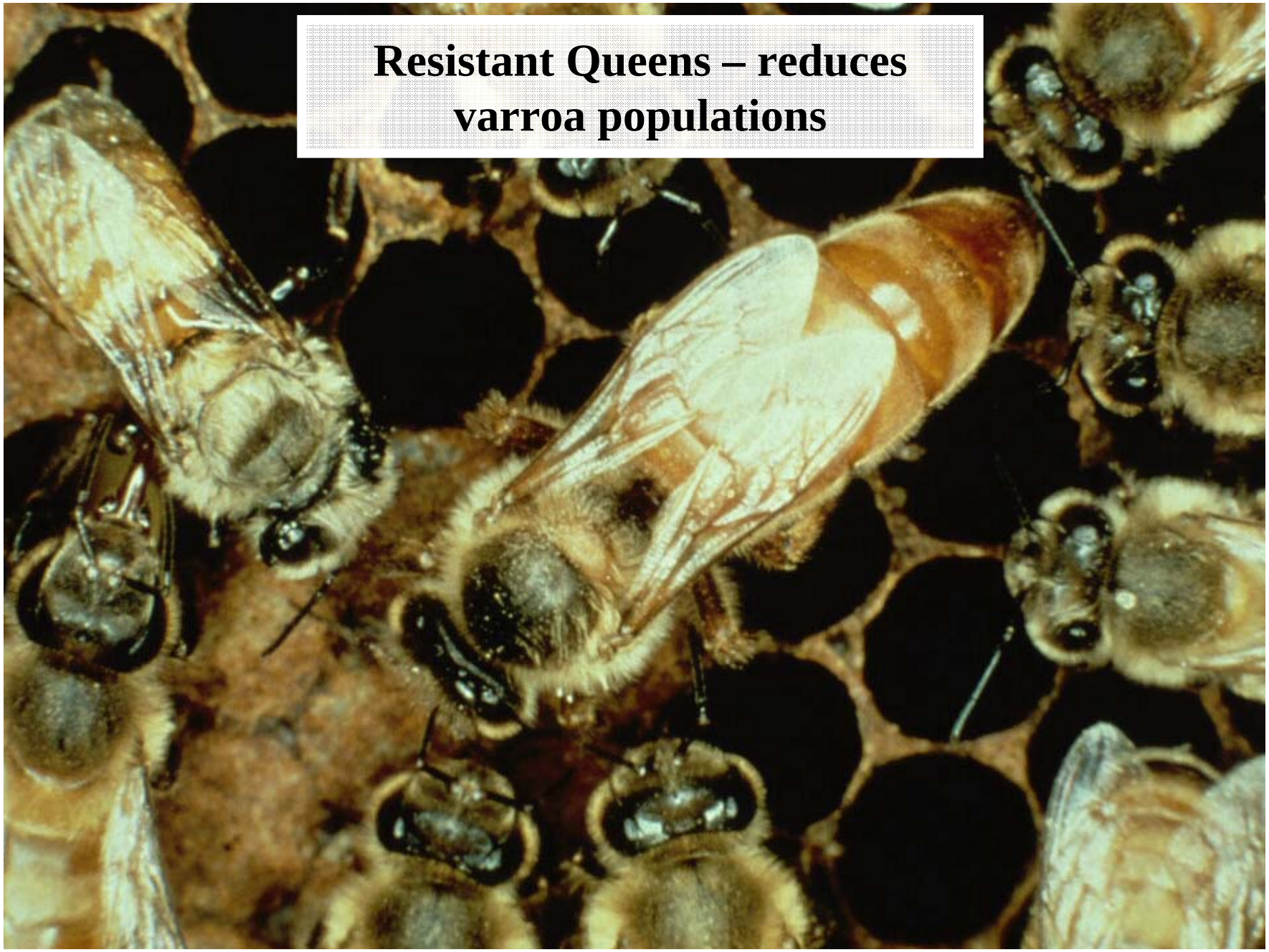
Ether rolls (or powdered sugar shake): 15 – 38 mites/jar = 3000+ mites/colony

Overnight sticky sheets: 59 – 187 mites/screen = 3000+ mites/colony

Treat when you exceed these numbers!!!

Drone Trapping – reduces varroa populations

Resistant Queens – reduces varroa populations



Screen Bottom Boards – reduces varroa populations

Tracheal Mites
(*Acarapis woodi*)

Photo: Simon Hinkley & Ken Walker Museum Victoria
http://www.padil.gov.au/viewPestLargeImage.aspx?id=386&img=2825

Tracheal mites in a bee's trachea

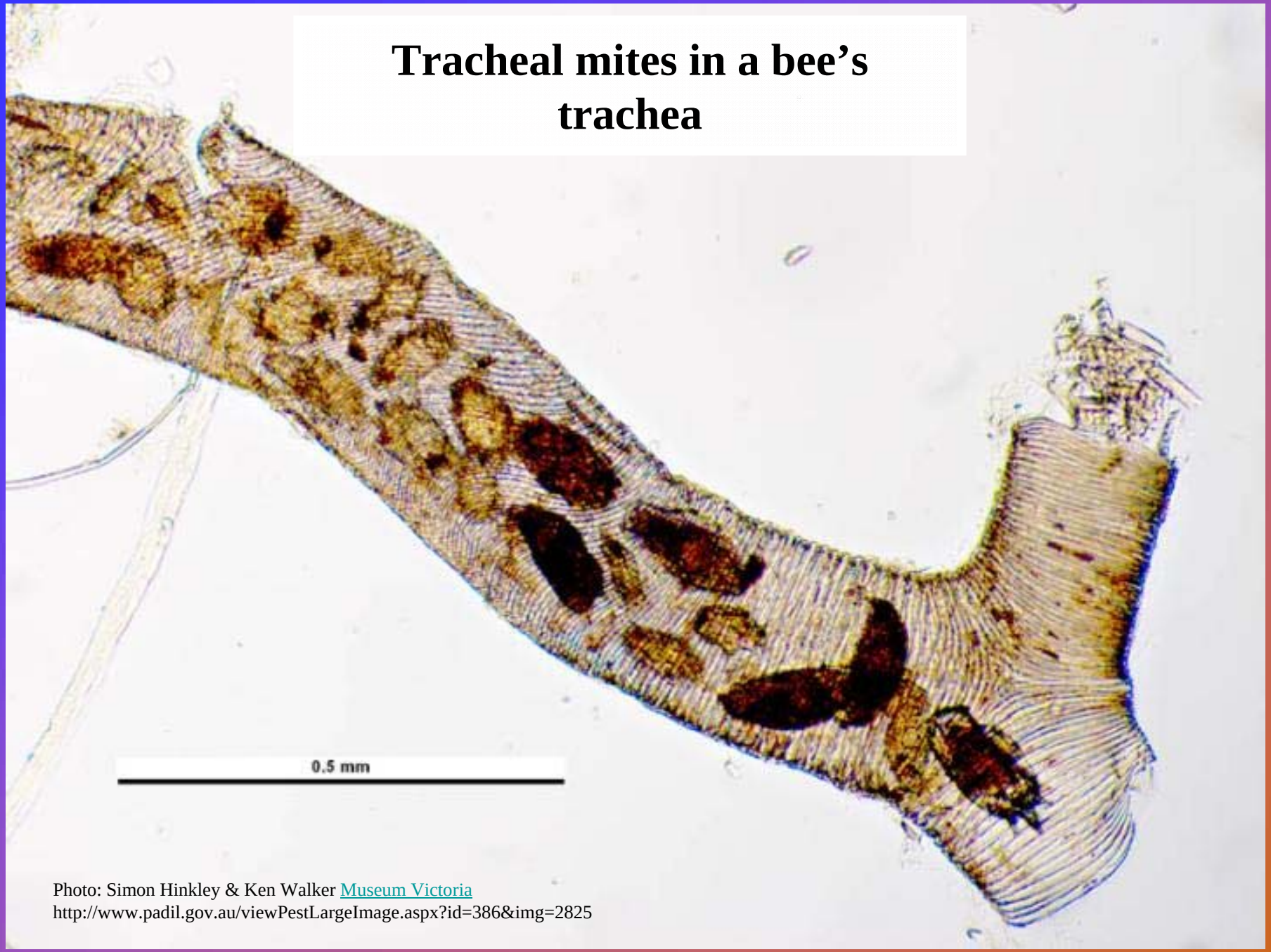


Photo: Simon Hinkley & Ken Walker Museum Victoria
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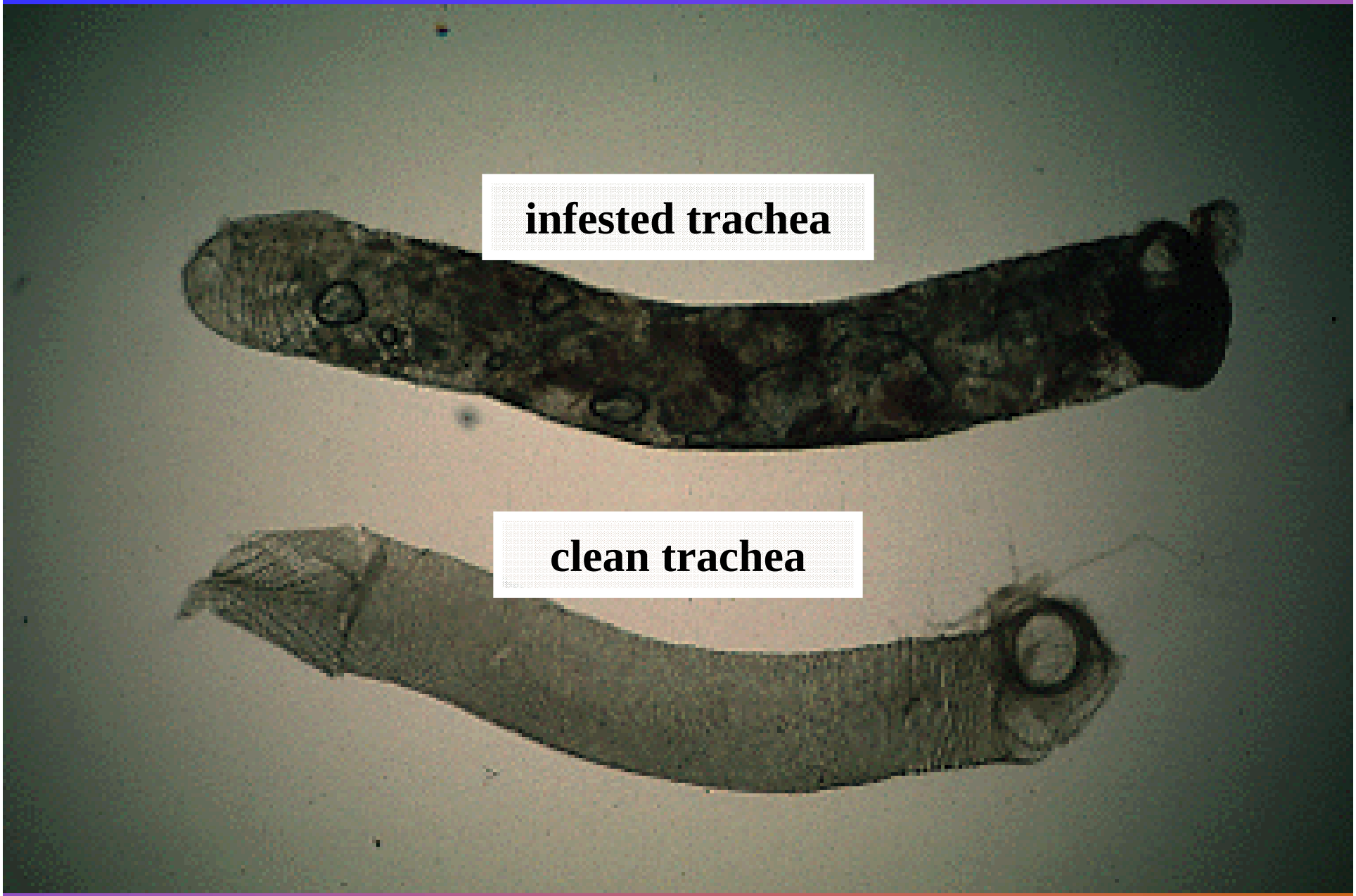

infested trachea
clean trachea

Tracheal mite symptoms:

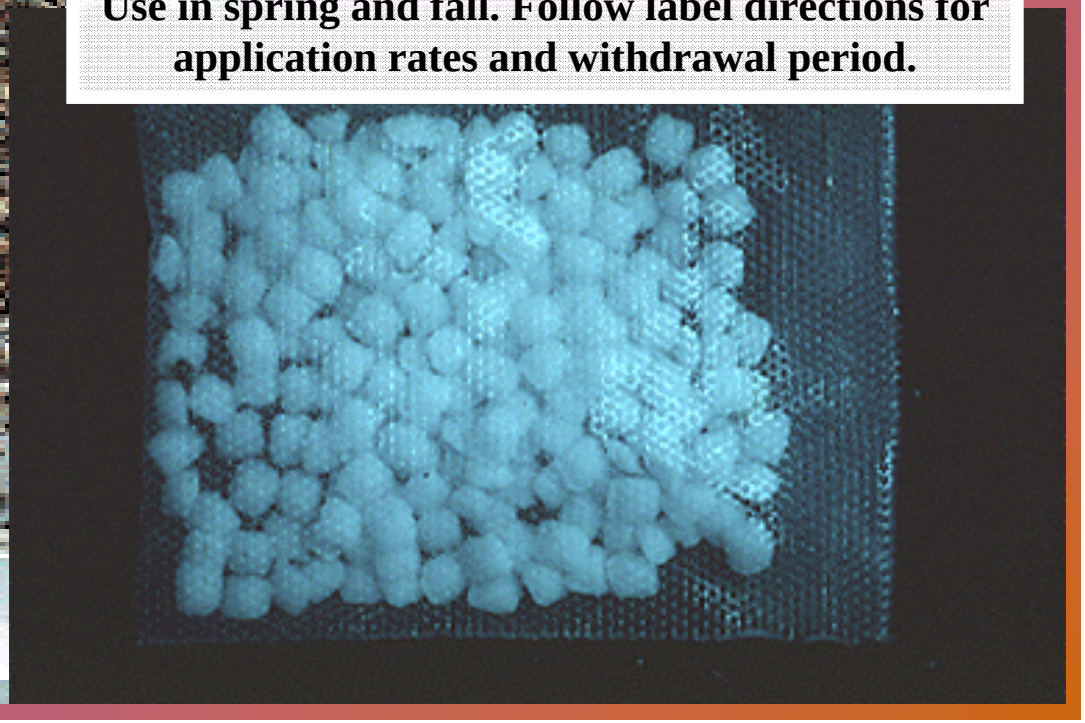
1) **Disorganized clusters of bees**
2) **Disjointed wings**
3) **Colony death in spring**

Grease Patties:

Mix vegetable oil with 10x powdered sugar – patty must be play-dough consistency (and not overly runny or sticky to the touch). Put a pancake-sized patty on top of the brood chamber in spring (March) and fall (October)

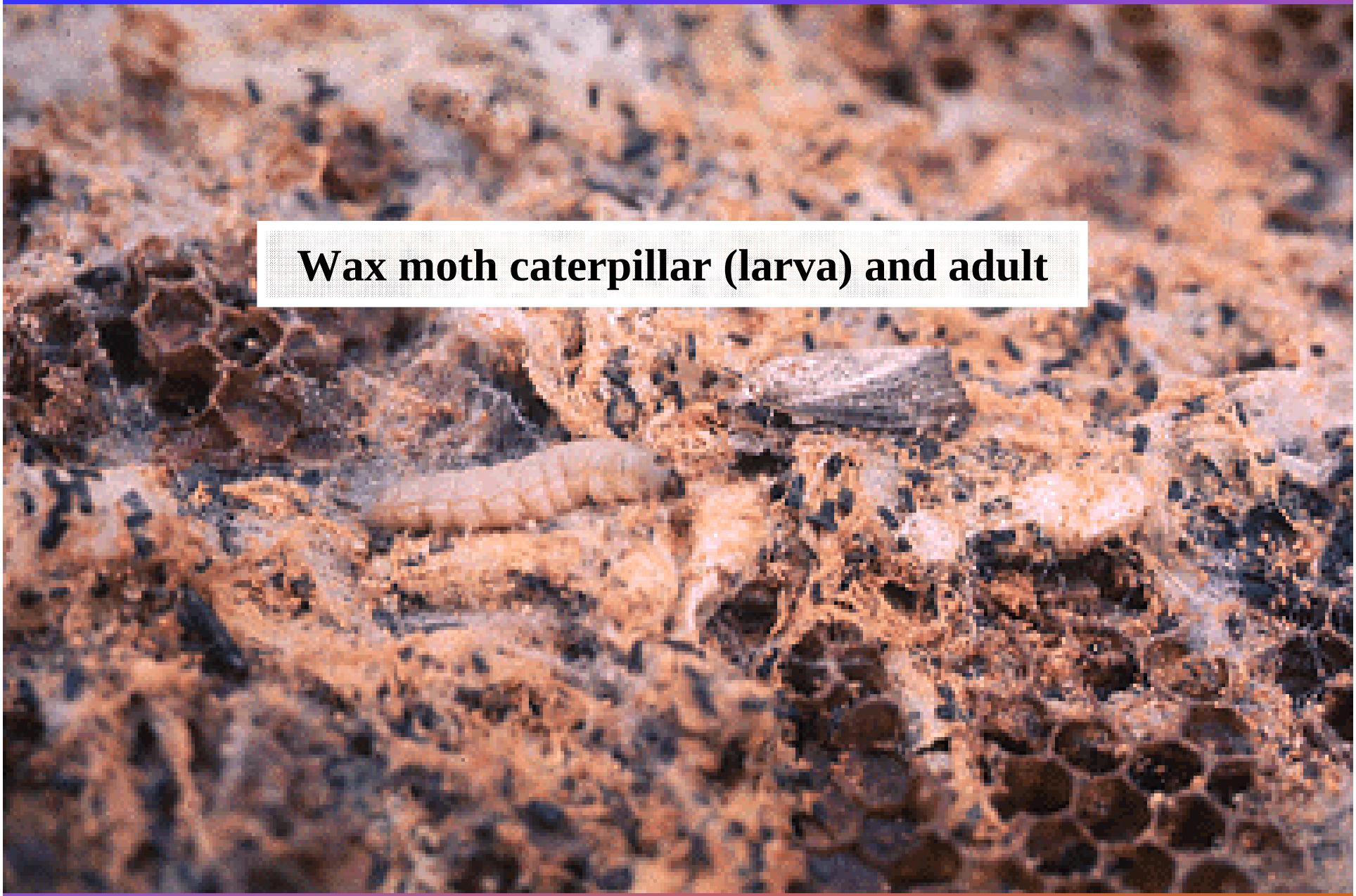
Menthol:

Can be purchased from equipment suppliers. Use in spring and fall. Follow label directions for application rates and withdrawal period.




Wax Moth
(Galleria melonella)


Adult Wax Moth


Wax moth caterpillar (larva) and adult

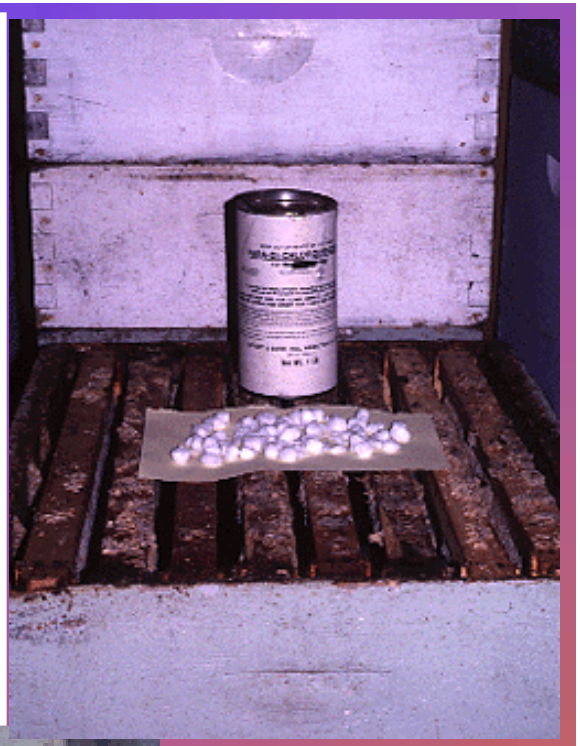
Wax moth cocoons – pupating wax moths can destroy woodenware

Remedies Include:

(1) Storing supers in criss-cross pattern (left), in open shed (so light and air can penetrate)

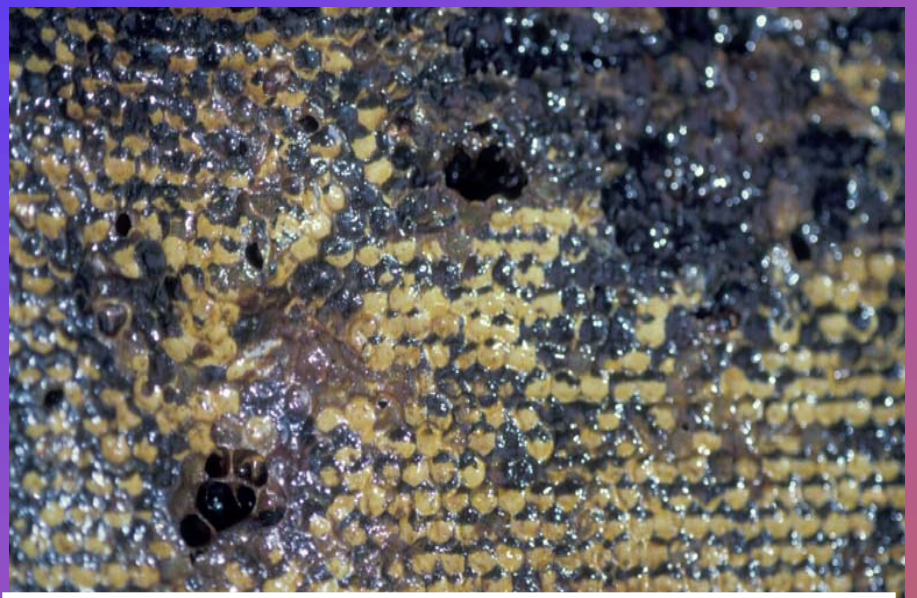
(2) Wax moth crystals (NOT moth balls) for stored supers (right). Can be purchased at retail stores in clothes hanger sections. Follow label directions.

(3) In living colonies (below), the best defense is a strong and healthy colony!



Small Hive Beetles

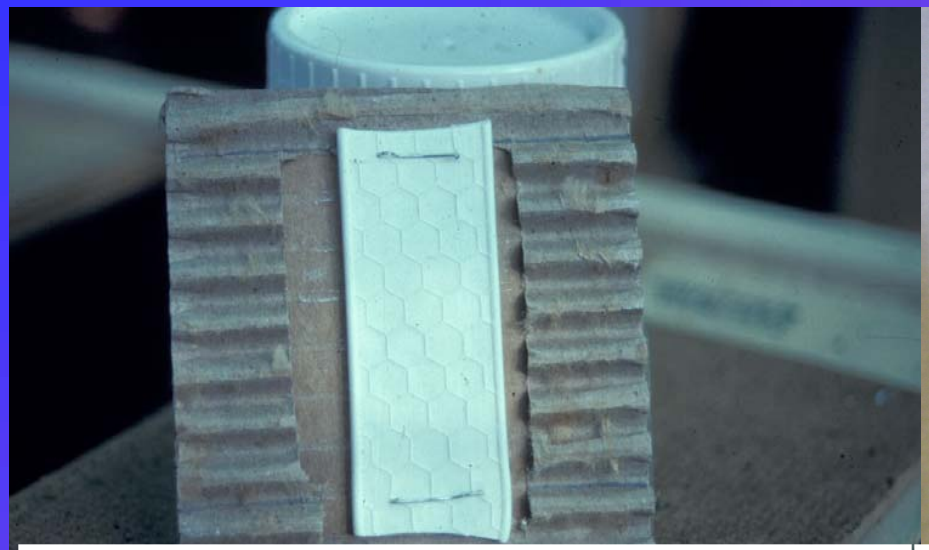
Beetle larvae eating bee brood



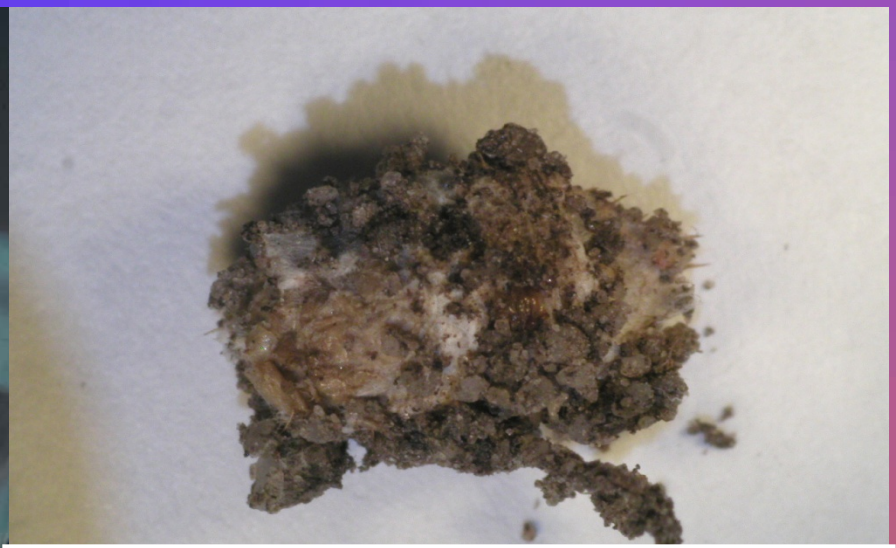
Slimed honey – normal beetle damage

Fermenting honey “bleeding” from beetle-infested colony

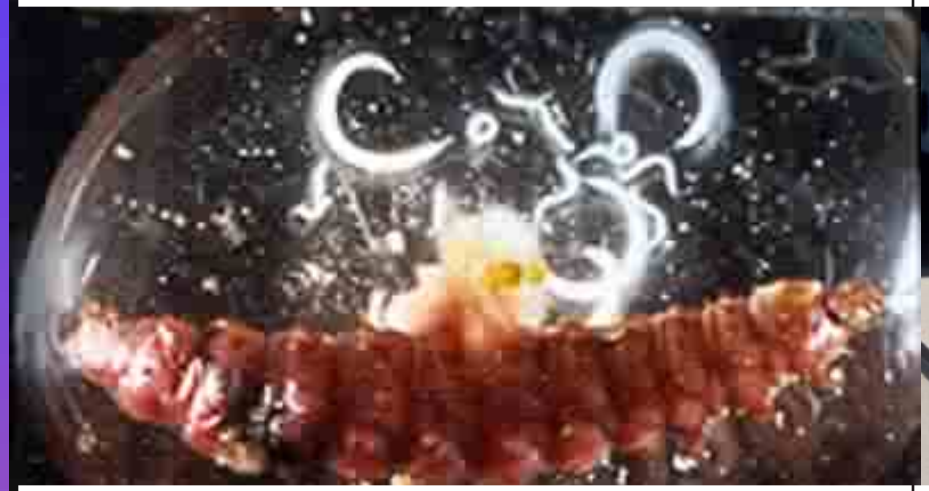
Small hive beetle adults



Checkmite+ strips – treat when you see 100+ beetles

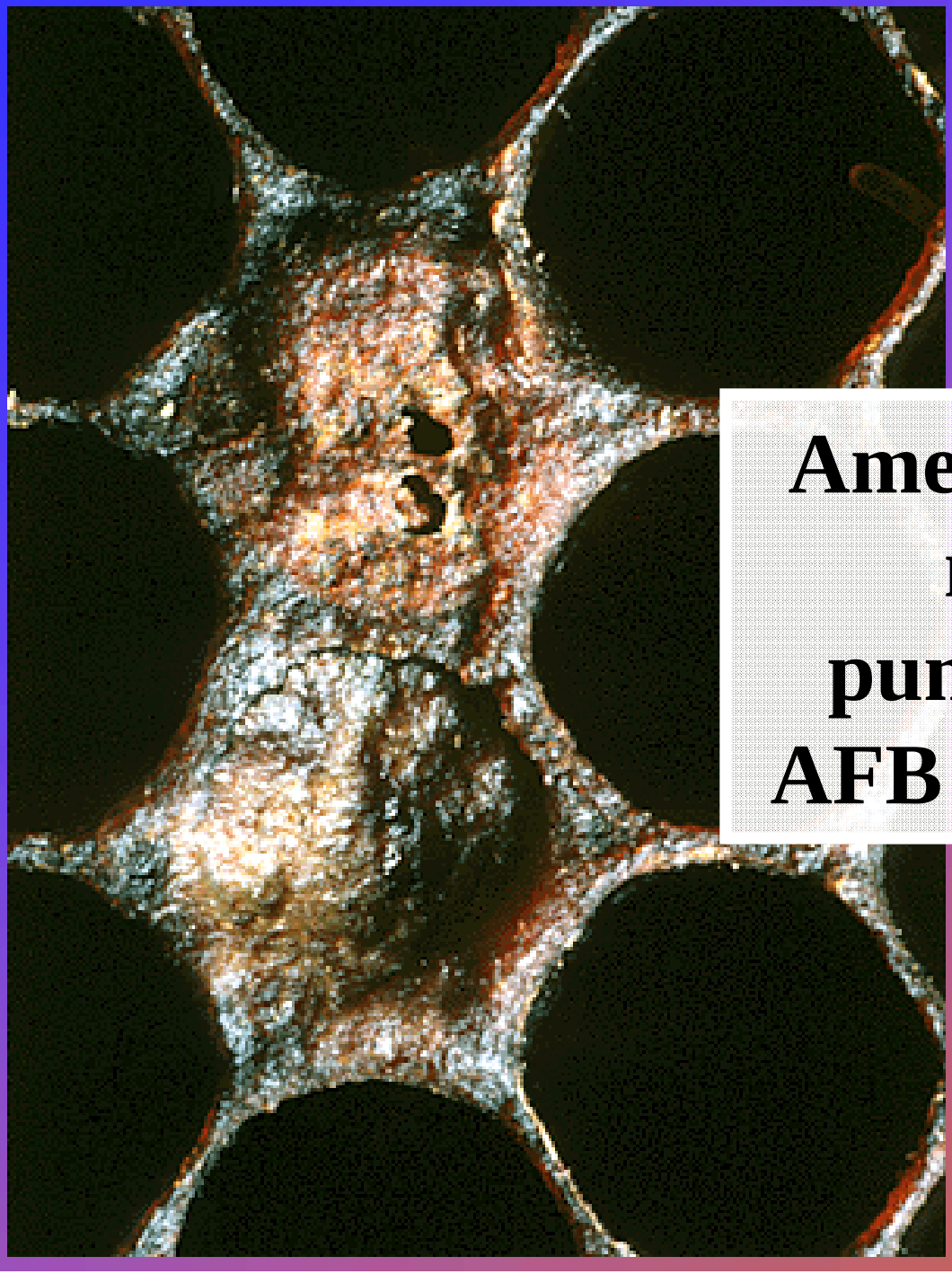


Other beetle control experiments are underway

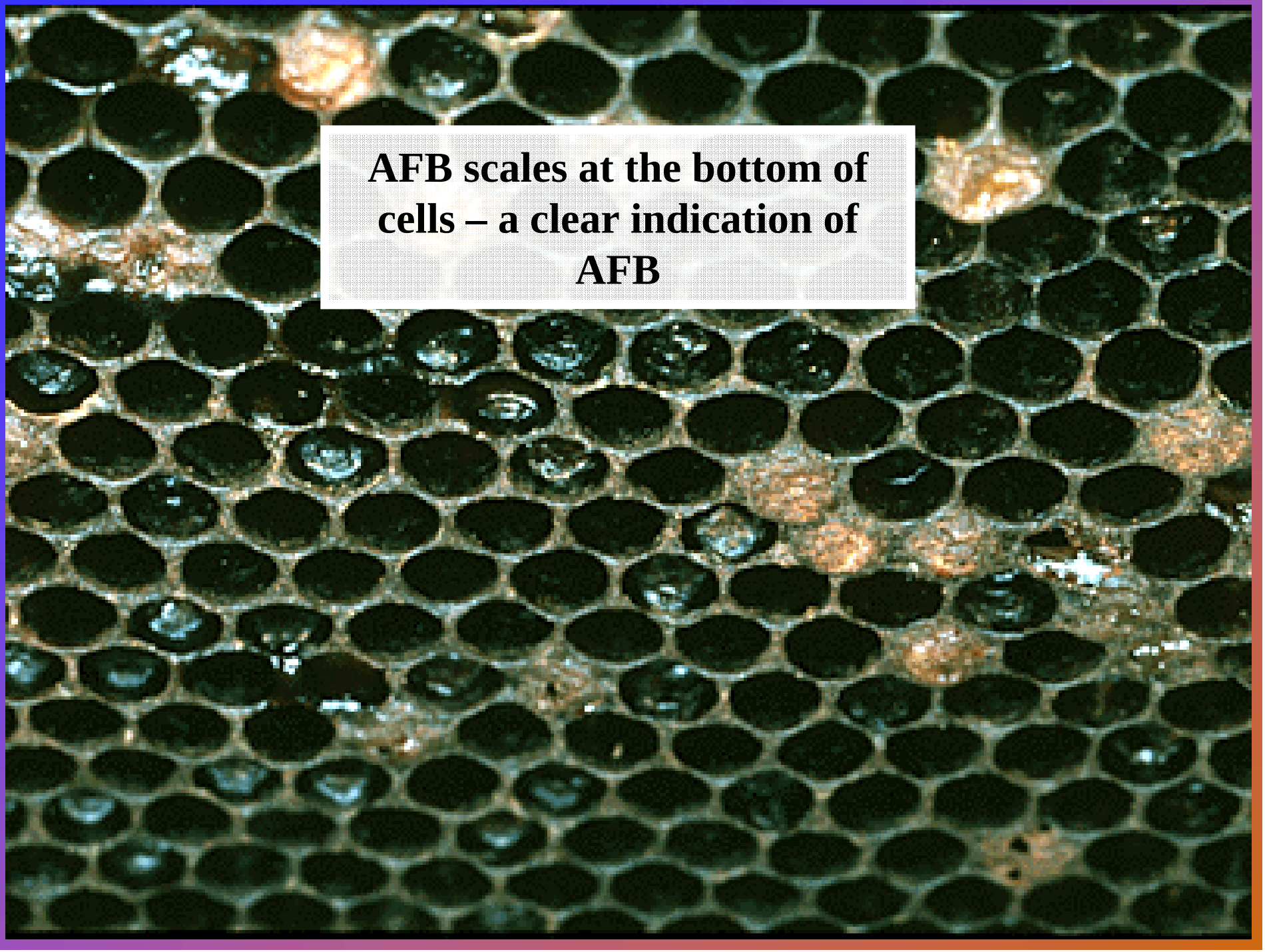


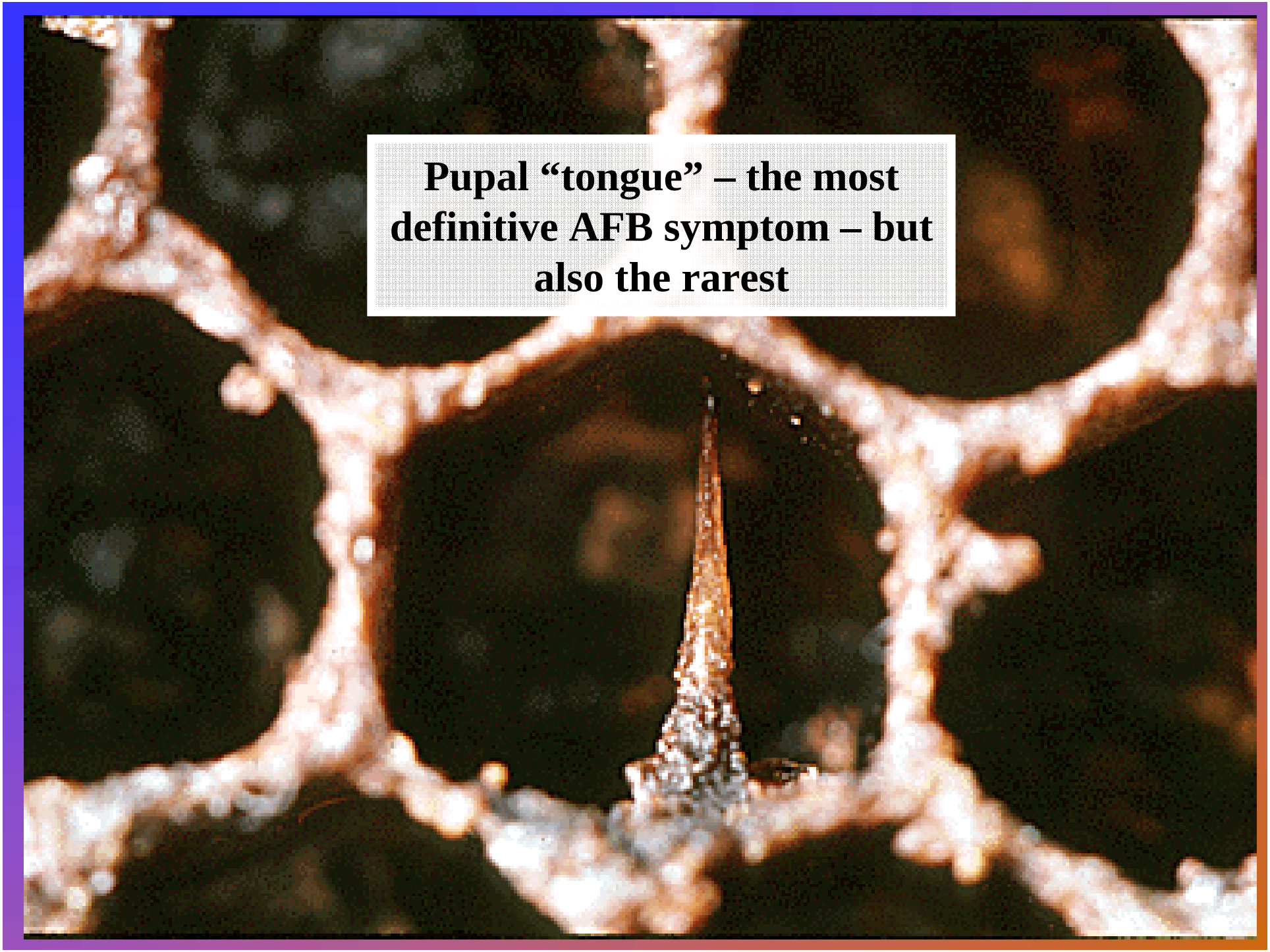
Nematodes are available

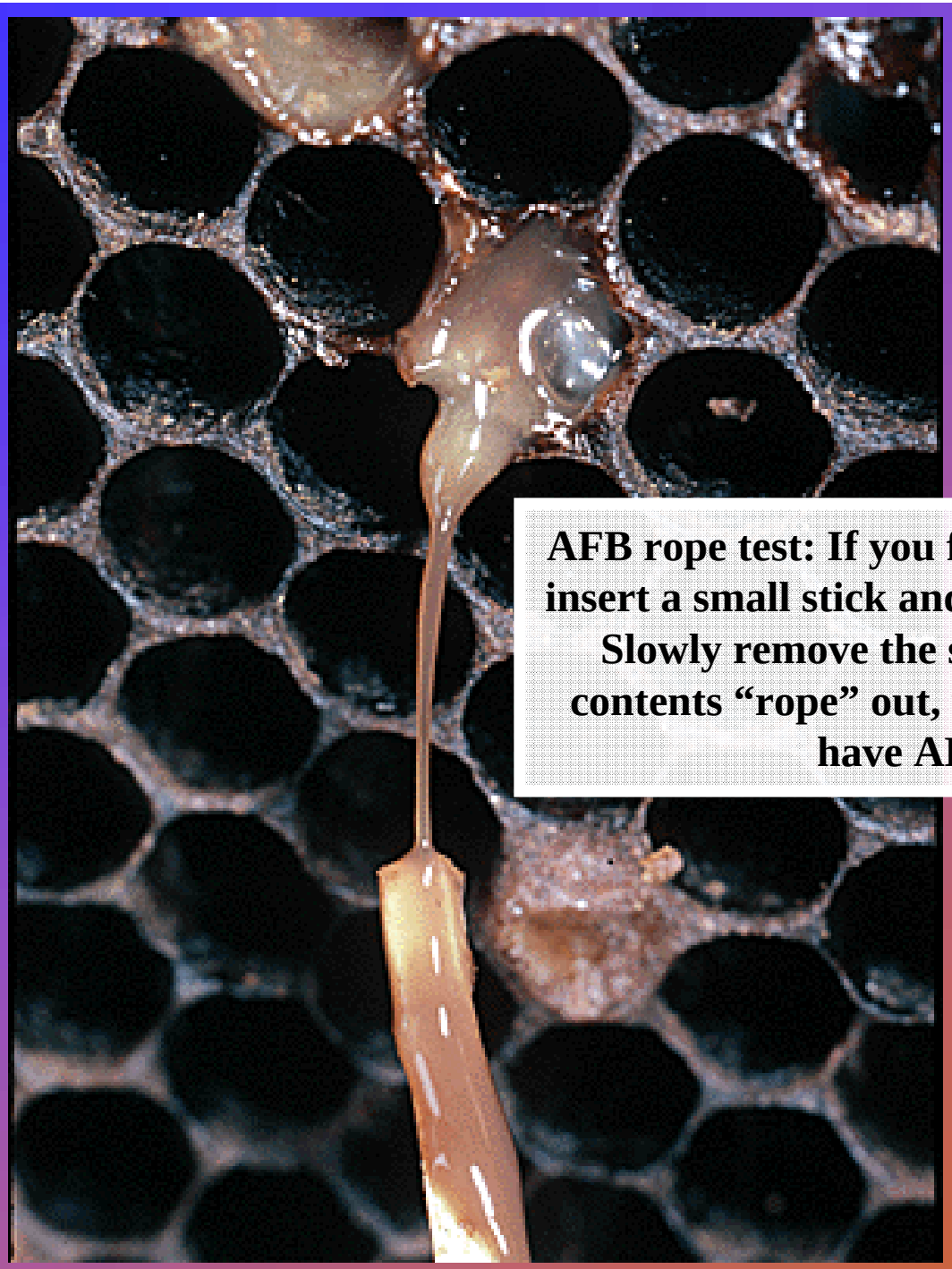
GardStar – a ground drench used to kill pupae



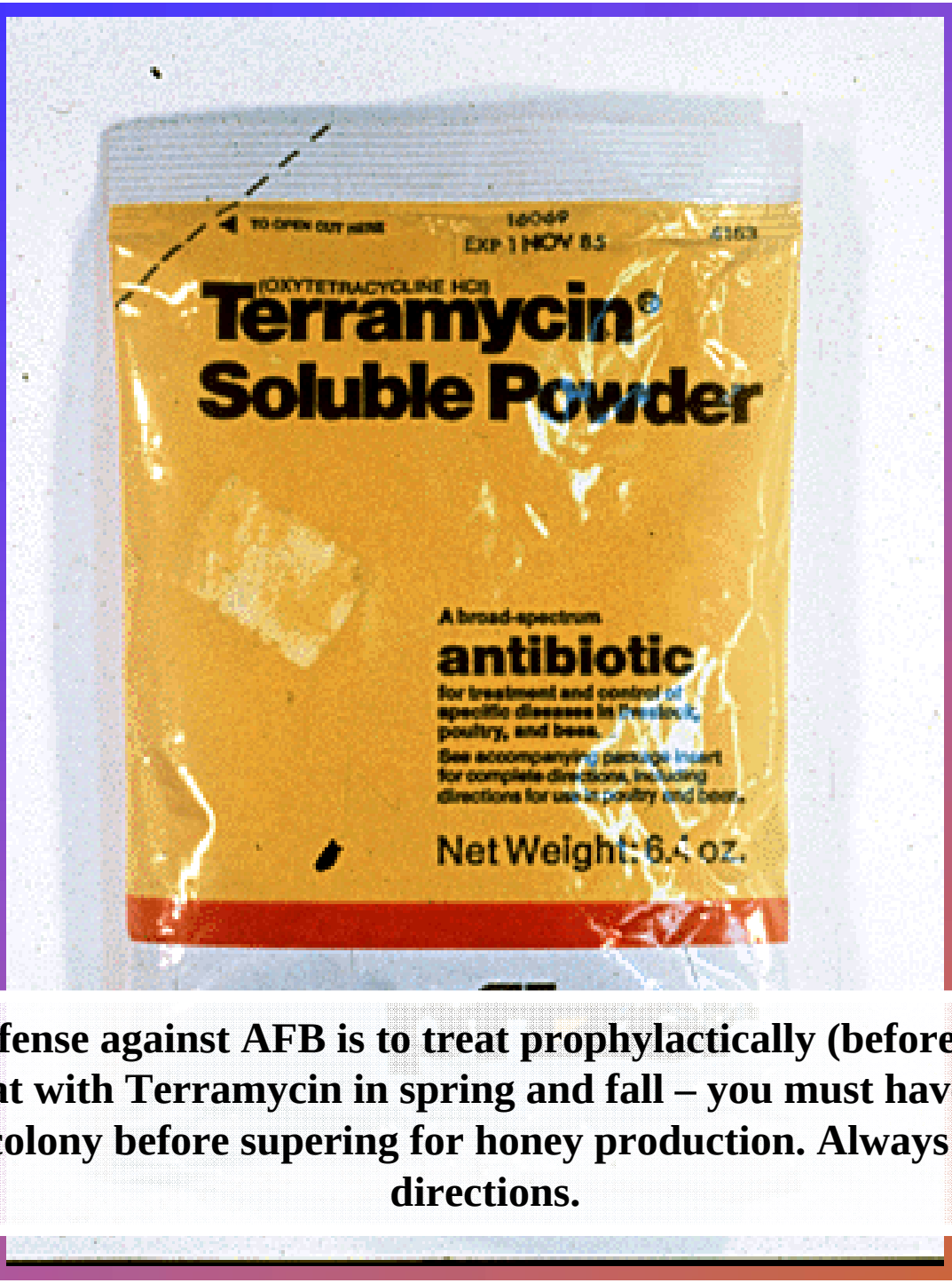
American Foulbrood – notice sunken, punctured cappings: AFB kills capped brood


AFB scales at the bottom of cells – a clear indication of AFB

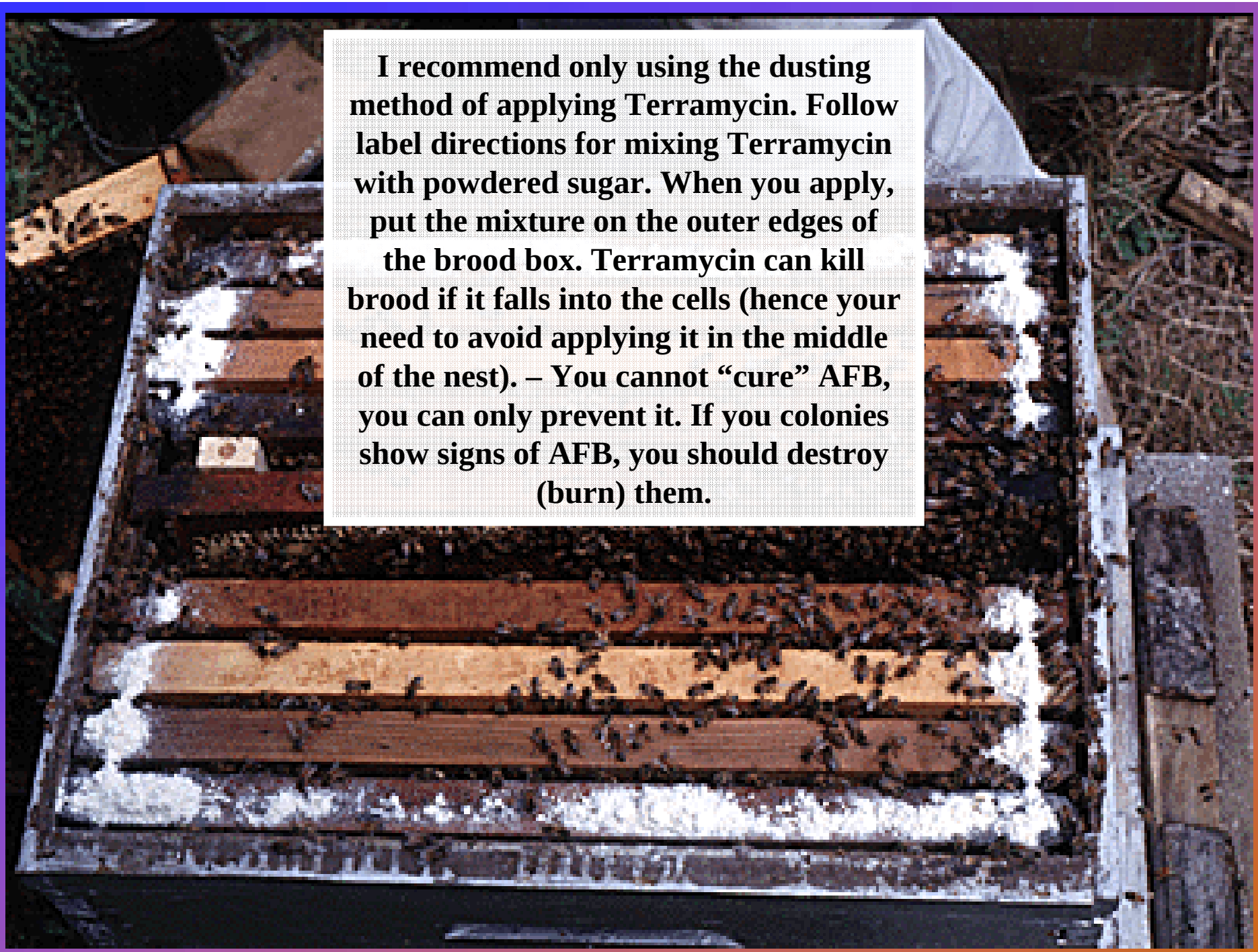

Pupal “tongue” – the most definitive AFB symptom – but also the rarest



AFB rope test: If you find a suspect cell, insert a small stick and stir the contents. Slowly remove the stick. If the cell contents “rope” out, your colony may have AFB.

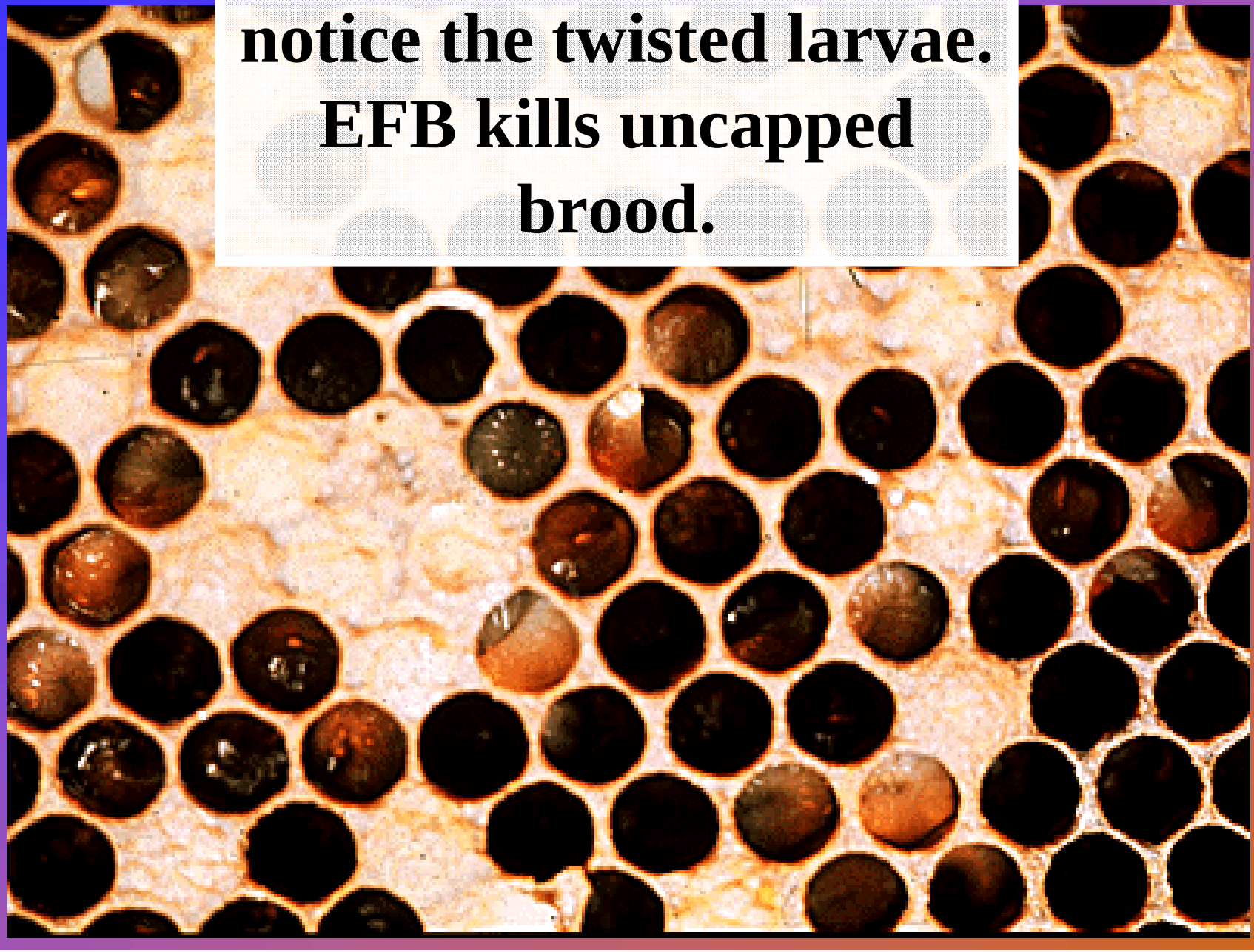


The best defense against AFB is to treat prophylactically (before your colony gets it). Treat with Terramycin in spring and fall – you must have the product out of the colony before supering for honey production. Always follow label directions.

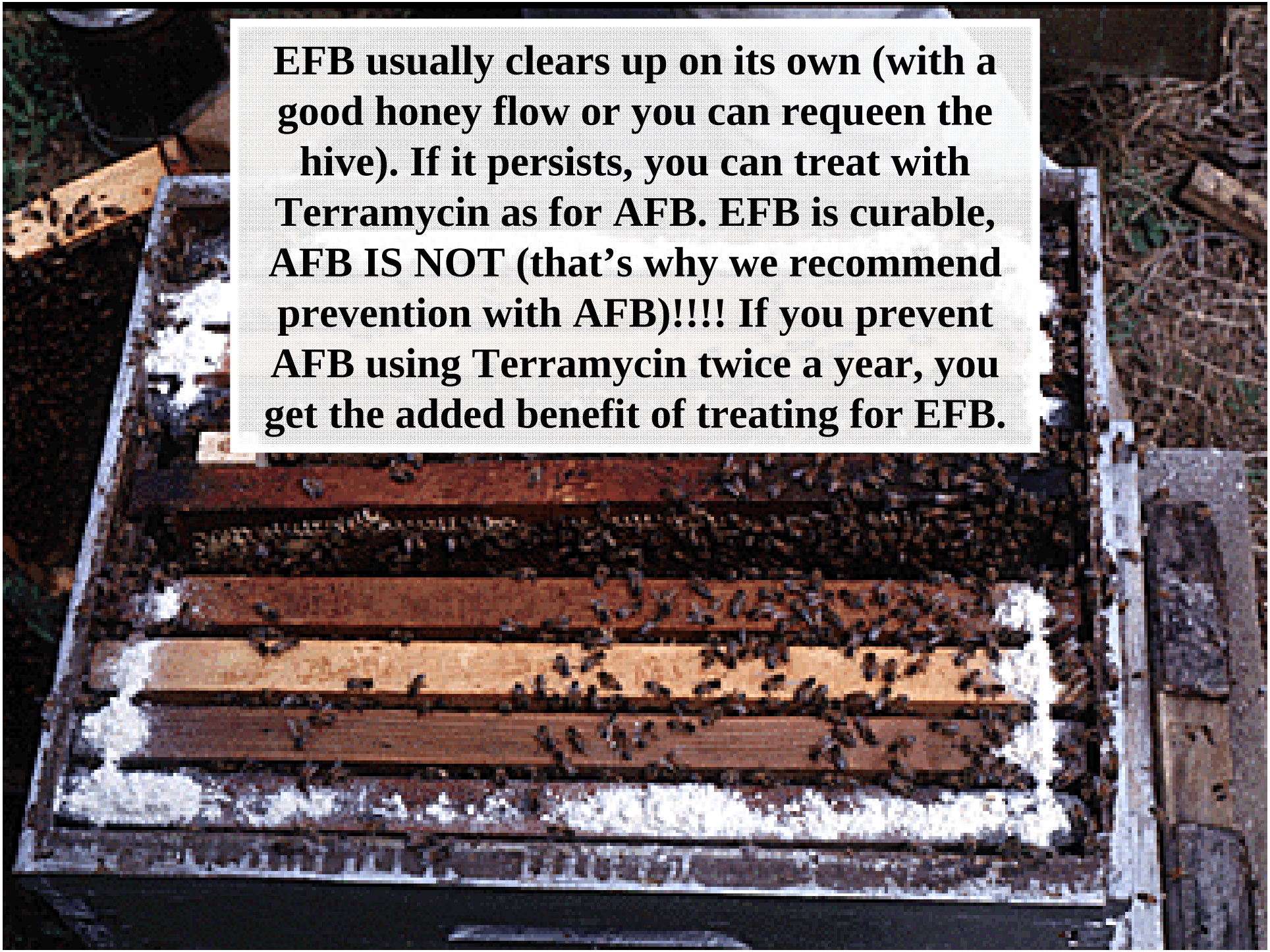


I recommend only using the dusting method of applying Terramycin. Follow label directions for mixing Terramycin with powdered sugar. When you apply, put the mixture on the outer edges of the brood box. Terramycin can kill brood if it falls into the cells (hence your need to avoid applying it in the middle of the nest). – You cannot "cure" AFB, you can only prevent it. If you colonies show signs of AFB, you should destroy (burn) them.

European Foulbrood – notice the twisted larvae. EFB kills uncapped brood.

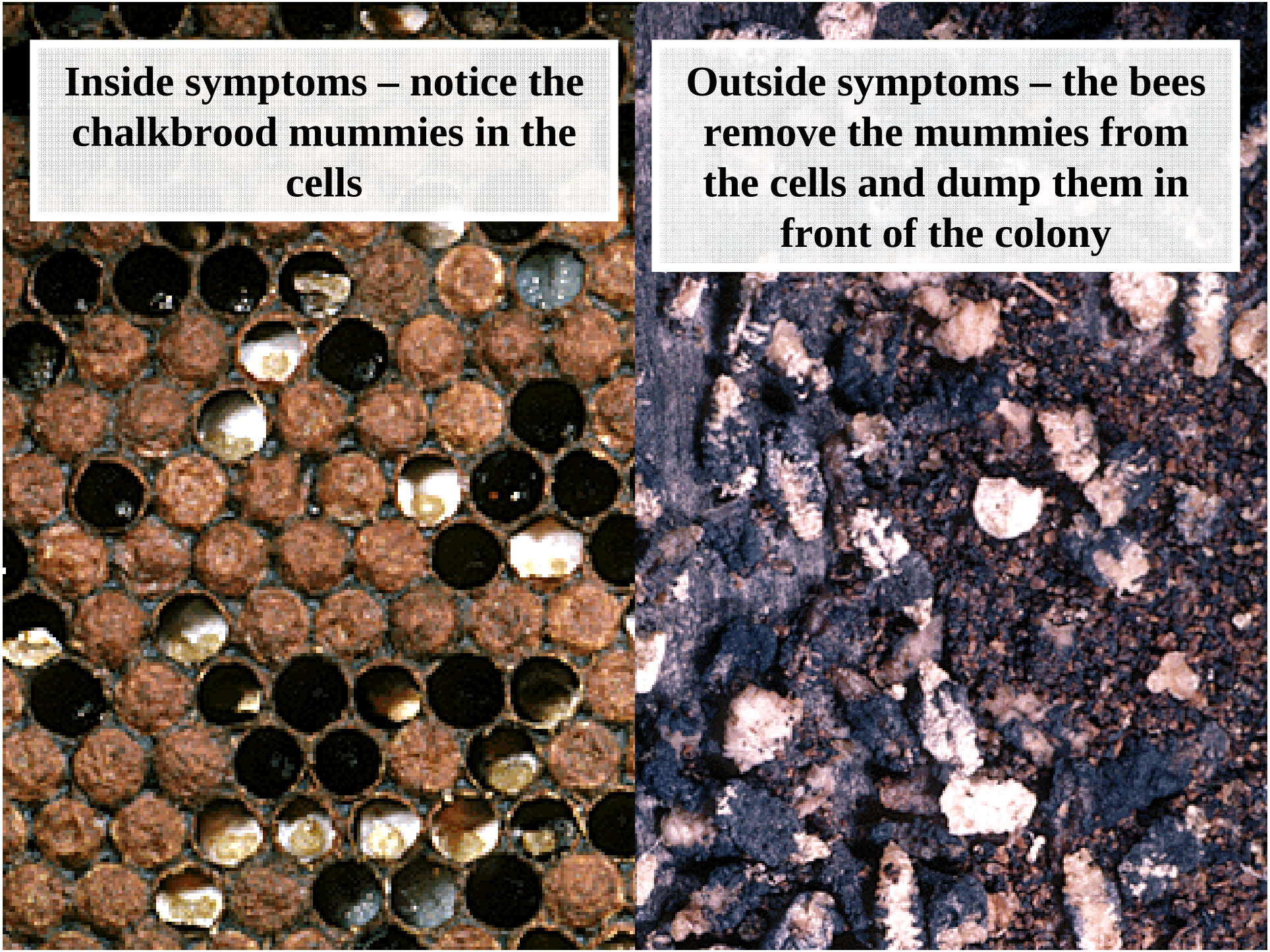


Notice the discolored, twisted larvae in both pictures – both are signs of EFB.



EFB usually clears up on its own (with a good honey flow or you can requeen the hive). If it persists, you can treat with Terramycin as for AFB. EFB is curable, AFB IS NOT (that's why we recommend prevention with AFB)!!!! If you prevent AFB using Terramycin twice a year, you get the added benefit of treating for EFB.

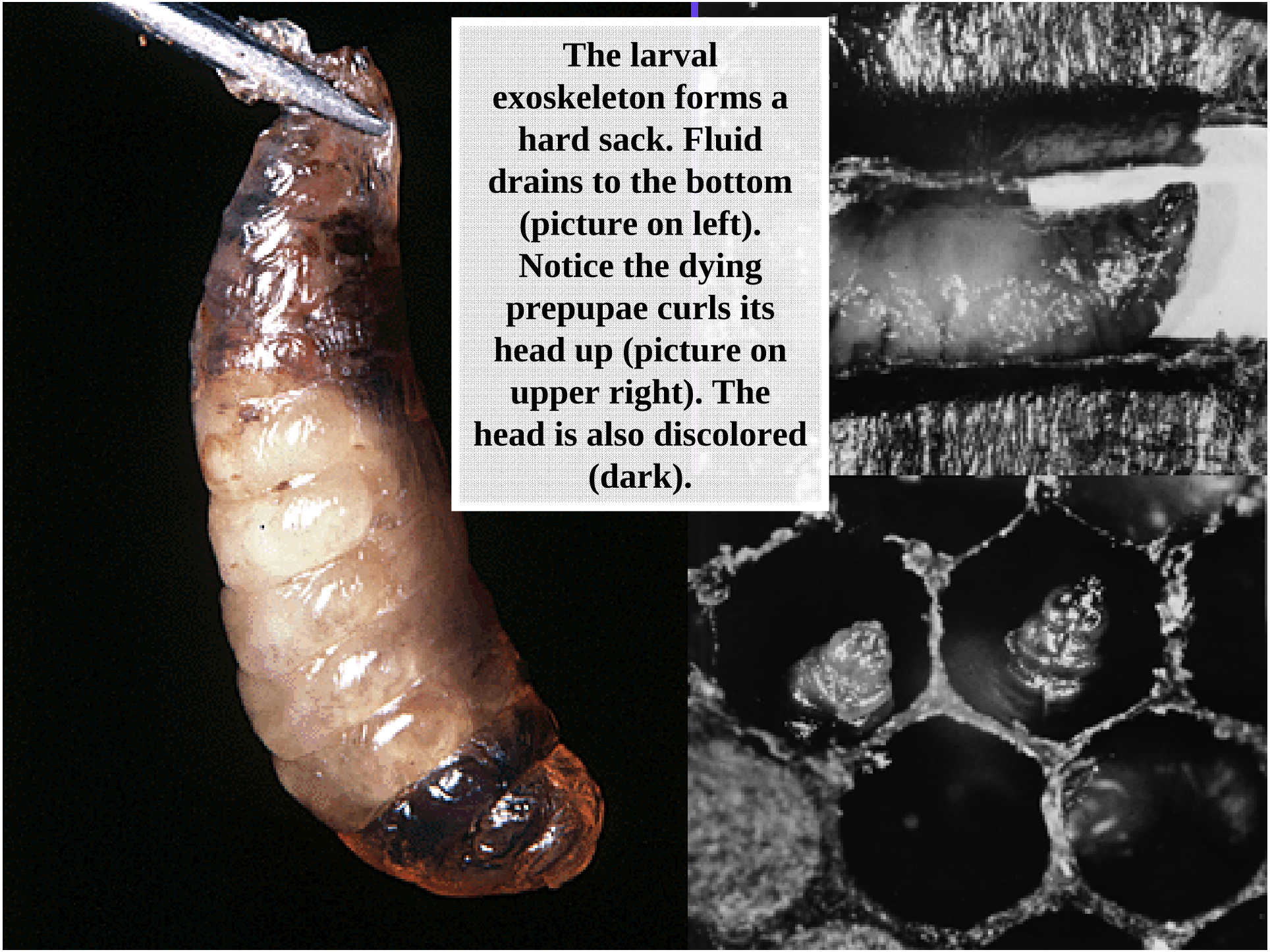
Chalkbrood – a fungal disease that usually clears up if you requeen your colony (always use a queen bred for hygienic behavior)


Inside symptoms – notice the chalkbrood mummies in the cells
Outside symptoms – the bees remove the mummies from the cells and dump them in front of the colony

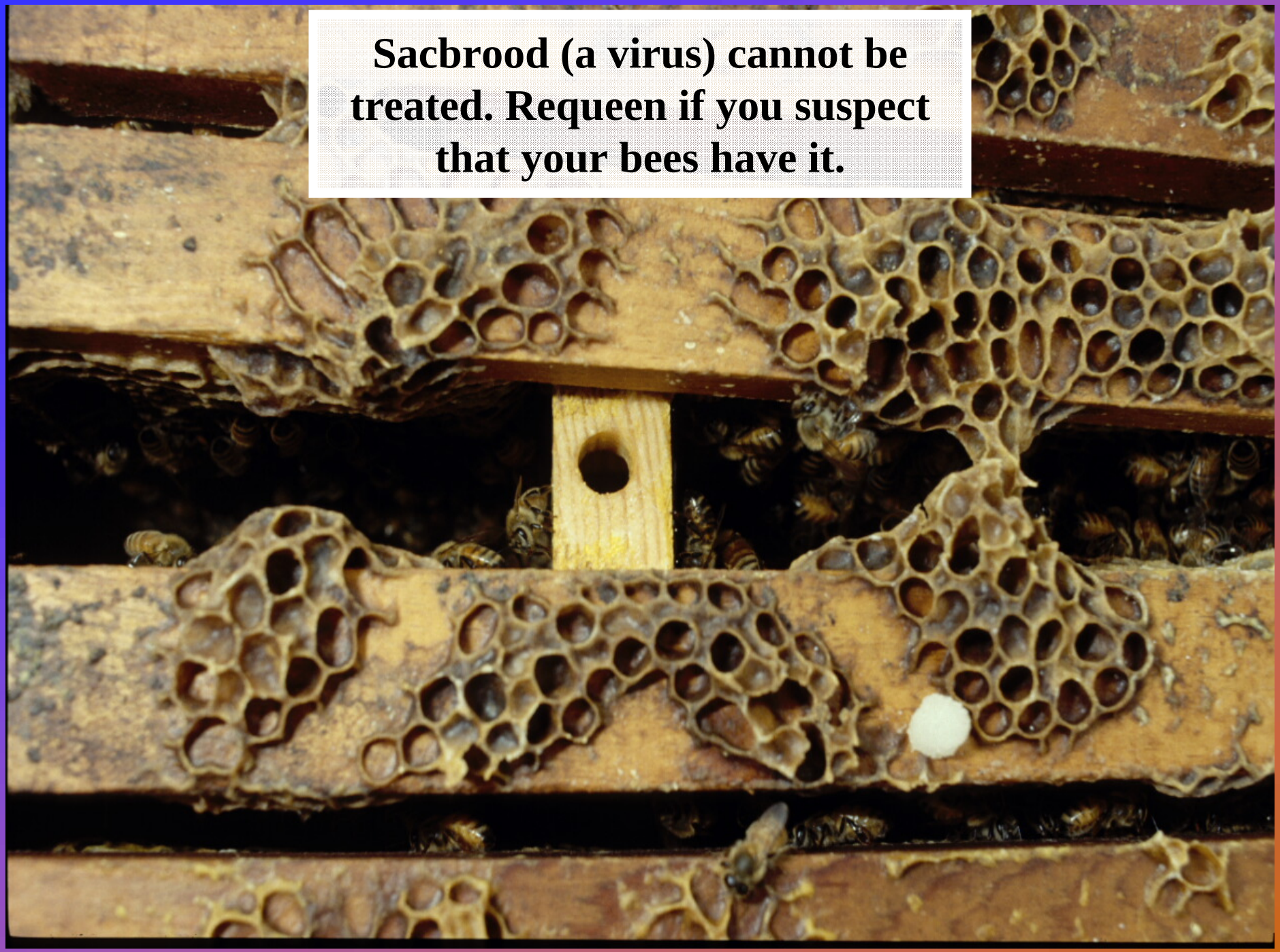
Because chalkbrood is a fungal disease, be sure that your colony has adequate ventilation (fungi like cool, damp environments)

Colonies led by hygienic queens rarely (if ever) have chalkbrood problems. Consider requeening your chalkbrood colonies.

Sacbrood – this virus kills prepupal and pupal bees. It can be confused with AFB (notice punctured capping). But, sacbrood victims do not “rope”.

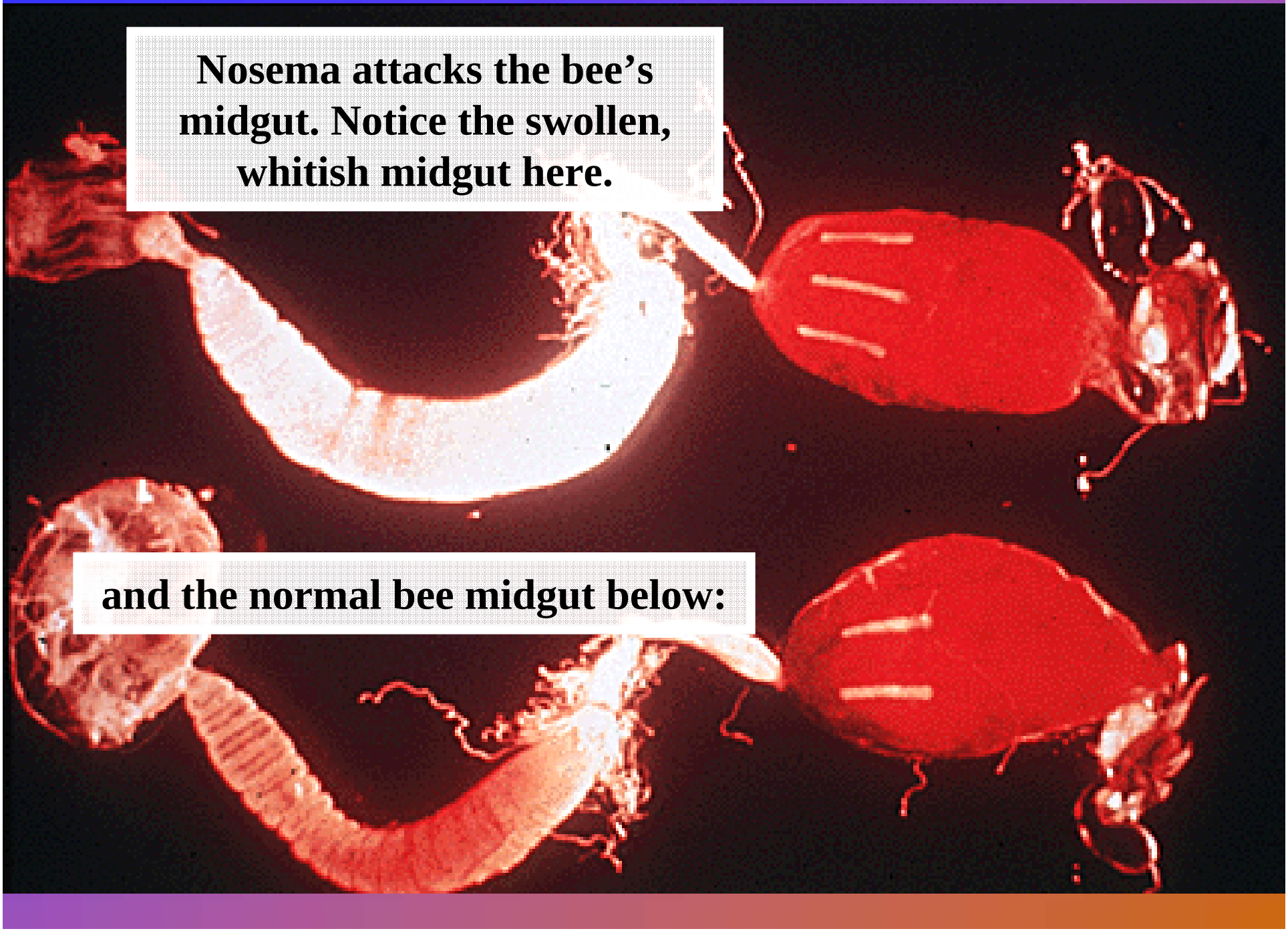


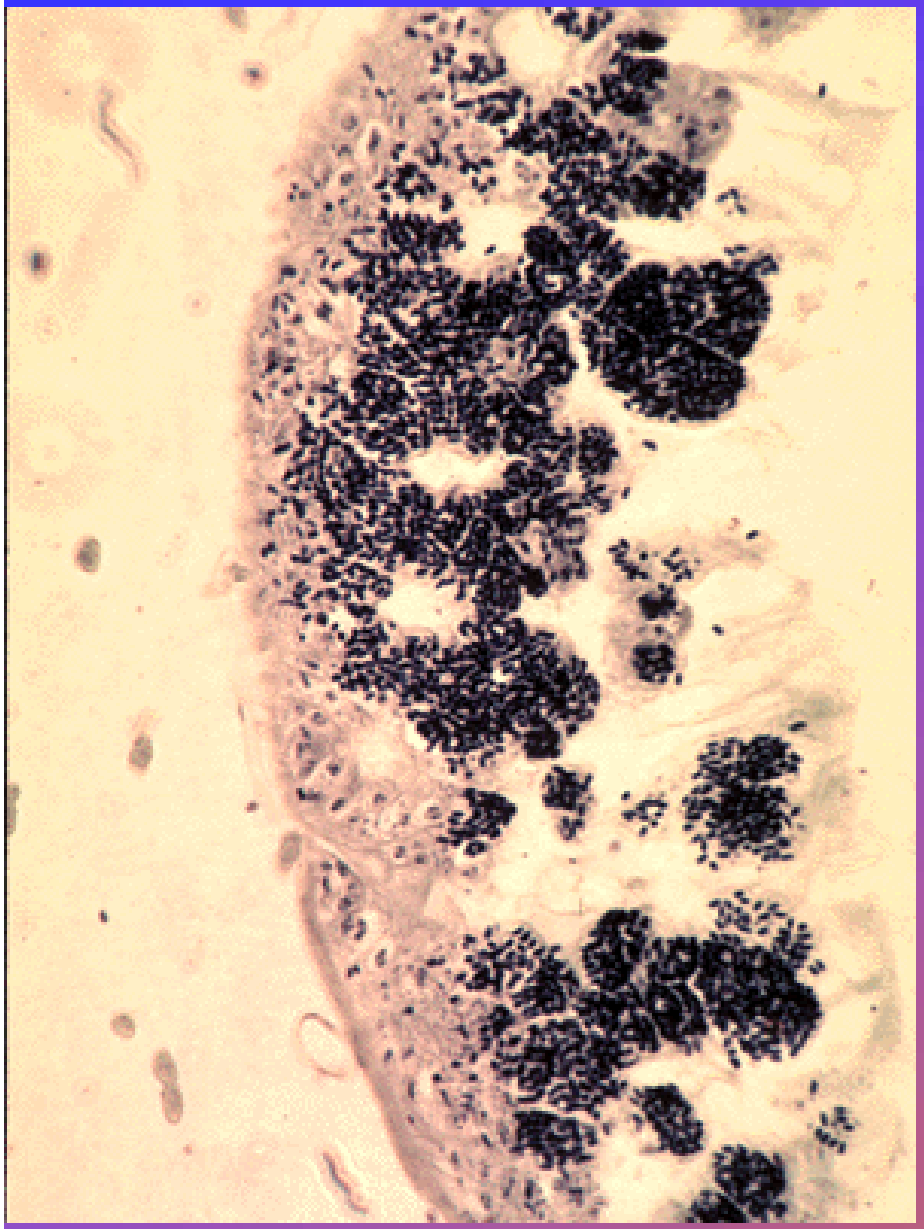
The larval exoskeleton forms a hard sack. Fluid drains to the bottom (picture on left). Notice the dying prepupae curls its head up (picture on upper right). The head is also discolored (dark).

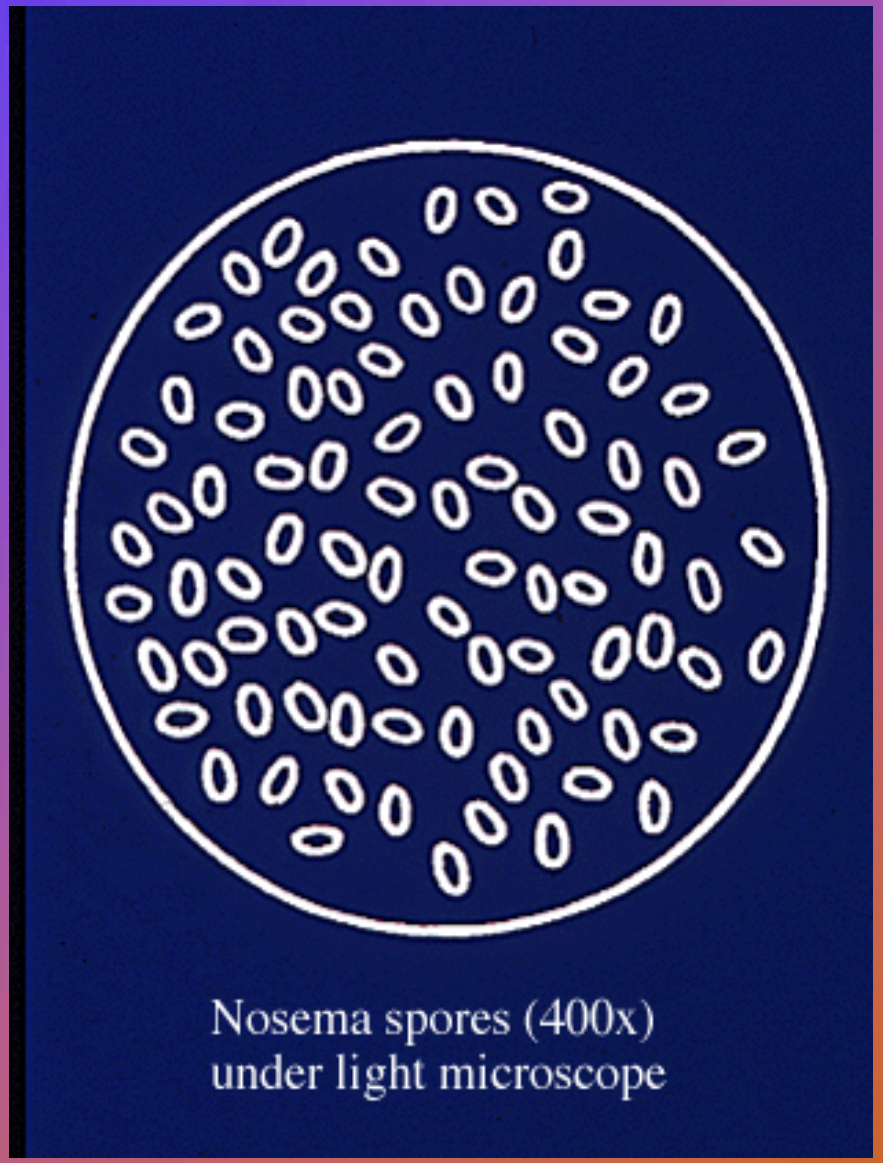

Sacbrood (a virus) cannot be treated. Requeen if you suspect that your bees have it.

Nosema

Nosema is caused by a microsporidian. It lives in the bee's gut. One symptom (although not definitive) is fecal streaking on the front of the colony, like that seen in this photograph. It is typically a problem in early spring. A fall treatment of Fumagillin should prevent nosema.


Nosema attacks the bee's midgut. Notice the swollen, whitish midgut here.
and the normal bee midgut below:





Nosema spores (400x)
under light microscope


MID-CON
FUMIDIL® B
(Bicyclohexylammonium Fumagillin)
2.0 grams
Anti-Parasitic
FOR PREVENTION OF NOSEMA IN HONEY BEES
Contents of this package are sufficient to medicate 20 to 24 gallons of sugar syrup for feeding 20 to 24 package colonies or fall-feeding 10 to 12 wintering colonies. See package insert for directions.
Contents represent:
FUMAGILLIN ..... 2.0 grams
(as bicyclohexylammonium fumagillin) combined with suitable buffers and excipients.