Help – *terramycin (oxytetracycline)*

Presented By
EAS Master Beekeeper
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Autobiography - Background

Who am I and Why am I here ?

Four (4) years experience testing microbials
(bacteria, enzymes and yeast)
Genuinely passionate about honeybee microbials

I’m here to share my experience (The Incident), the (Action) specific action taken to solve the issue, and last show the surprise (Benefit) solution that the team found

I’m not here to prove anything !

Agenda

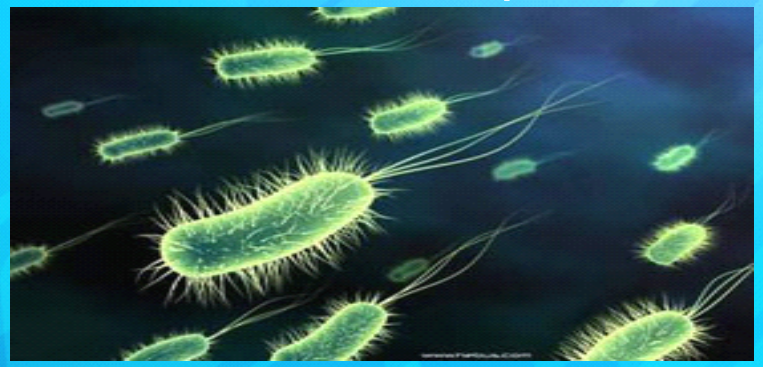
- First (1) we shall share with you what happened in Kouts, IN. last Summer.
- Second (2) we will explain the microbial work that was performed
- Third (3) we will talk about the surprise
- Fourth (4) finish with recommended action and talk about the benefit

BACKGROUND
Types Of Microbials

Microbes can be divided into six main types: Archaea, Bacteria, Fungi, Protista, Viruses, and Microbial Mergers.

Bacteria I

Bacteria (one of them is a **bacterium**) are very small organisms.

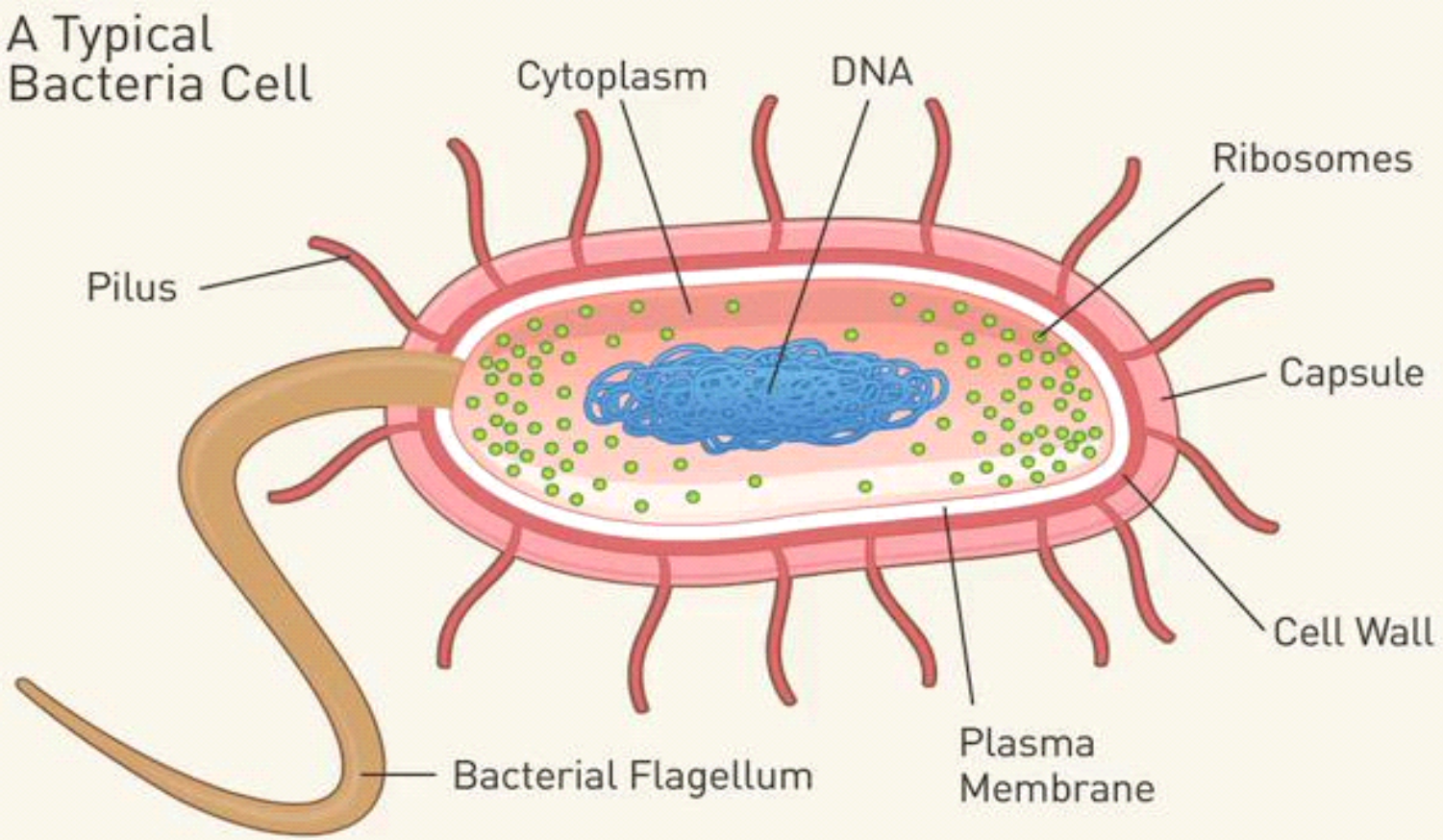


Bacterial cells do not have a nucleus, and most have no organelles (small parts) with membranes around them. However, they do have DNA, and their biochemistry is the same as other living things.

Bacteria II

- There are probably more individual bacteria than any other type of organism on the planet
- Most bacteria live in the ground or in water, but many live inside or on the skin of other organisms, including Honeybees
- Some bacteria can cause diseases, but others help us in everyday activities like digesting food (gut flora)

Bacteria III



Bacteria IV

- Bacteria enters into the hive from forager bees
- Both good and bad bacteria are found in collected nectar, pollen and water
- Other sources of bacteria are robber bees visiting bee hives that are full of pathogens
- Bacteria dormant spores are very resilient

American foulbrood I

- American foulbrood - AFB caused by the spore- forming *Paenibacillus larvae ssp. larvae* (formerly classified as *Bacillus larvae*), is the most widespread and destructive of the bee brood diseases.

- Foulbrood also has a characteristic odor, experienced beekeepers with a good sense of smell can often detect the disease upon opening a hive or even entering the bee yard!

American foulbrood II

- American foulbrood spores are extremely resistant to desiccation and can remain viable for more than 40 years in honey and beekeeping equipment
- Chemical treatment is sometimes used prophylactically, this is a source of considerable controversy because certain strains of the bacterium seem to be rapidly developing antibiotic resistance

American foulbrood III

American foulbrood IV

- Hives that are contaminated with millions of American foulbrood spores have to be prophylactically treated indefinitely

- Once the treatment is suspended the American foulbrood spores germinate successfully again leading to a disease outbreak
- Terramycin (oxytetracycline) is not working

American foulbrood V

The Incident I – Kouts, IN.

- New Commercial Bee Keeper In Indiana (Mr. Doug Anderson) Purchased 400 plus NUC's that had previously been treated with *terramycin (oxytetracycline)*
- *At the end of the honey flow the hives were crashing*
- *Reapplied terramycin (oxytetracycline) after the honey supers were removed.*
- *The hives did not recover after treatment*

The Incident II – Kouts, IN.

- The Bee Keeper was unable to secure Tylosin, because of the FDA regulation changes and the shortage that was created by the new regulations
- We were contacted to inspect the hives and suggest treatment alternatives
- We contacted Strong Microbials Inc. from Milwaukee WI and reviewed White Papers on AFB.
- A Candidate was identified for evaluation.

BRAZIL – WHITE PAPER
Bacillus amyloliquefaciens

Arch Microbiol (2012) 194:177–185
DOI 10.1007/s00203-011-0743-4

ORIGINAL PAPER

Antimicrobial factor from *Bacillus amyloliquefaciens* inhibits *Paenibacillus larvae*, the causative agent of American foulbrood

Lisianne Brittes Benitez · Renata Voltolini Velho · Amanda de Souza da Motta · Jéferson Segalin · Adriano Brandelli

Anti-AFB DFM 100 g

Beneficial Microbial Supplement for Honey Bees

1 package treats 10 hives

Guaranteed Analysis: Total bacteria count (minimum) 1 x 107 CFU/g (*B. amyloliquifaciens*)

Use **Anti-AFB DFM** when American Foul Brood is detected

Ingredients: *Dried Bacillus amyloliquifaciens fermentation product, Dried Bacillus subtilis fermentation extract, Sucrose*

Directions for Use: Apply 10g (1 Tbsp) of **Anti-AFB DFM** per hive. Mix 10g (1 Tbsp) of **Anti-AFB DFM** with 1 cup of powdered sugar. Spread over top bars of the fames in each section of the infected hive.

If any conventional treatments are used, **Anti-AFB DFM** is applied two (2) weeks after any treatments for nosema, foulbrood, varroa and two (2) weeks after any essential oil treatment.

Stable for 2 years at Room Temperature when Sealed
Stable for 5 years at Cold Storage

icrobials

Manufacture Date:
Lot Number:
Expiration Date:

0 19962 64065 0

Net weight 3.52 oz (100g)

American foulbrood - inspection time

American foulbrood - we found it!

Actions Taken – Microbial Work

- Help coach Mr. Anderson what AFB was and how to identify it.
- Set up Sanitary requirements
- Set up and ran a blind study to apply different Direct Fed Microbials.
- For Six Weekends, Six hours per day, worked two containment yards with 49 hives that showed AFB symptoms

THE SURPRISE – WHAT HAPPENED

- Bacillus amyloliquefaciens at first application appeared to show efficacy
- By the Third application of DFM, the “LAB” group hives in the Blind Study showed significant improvement after we

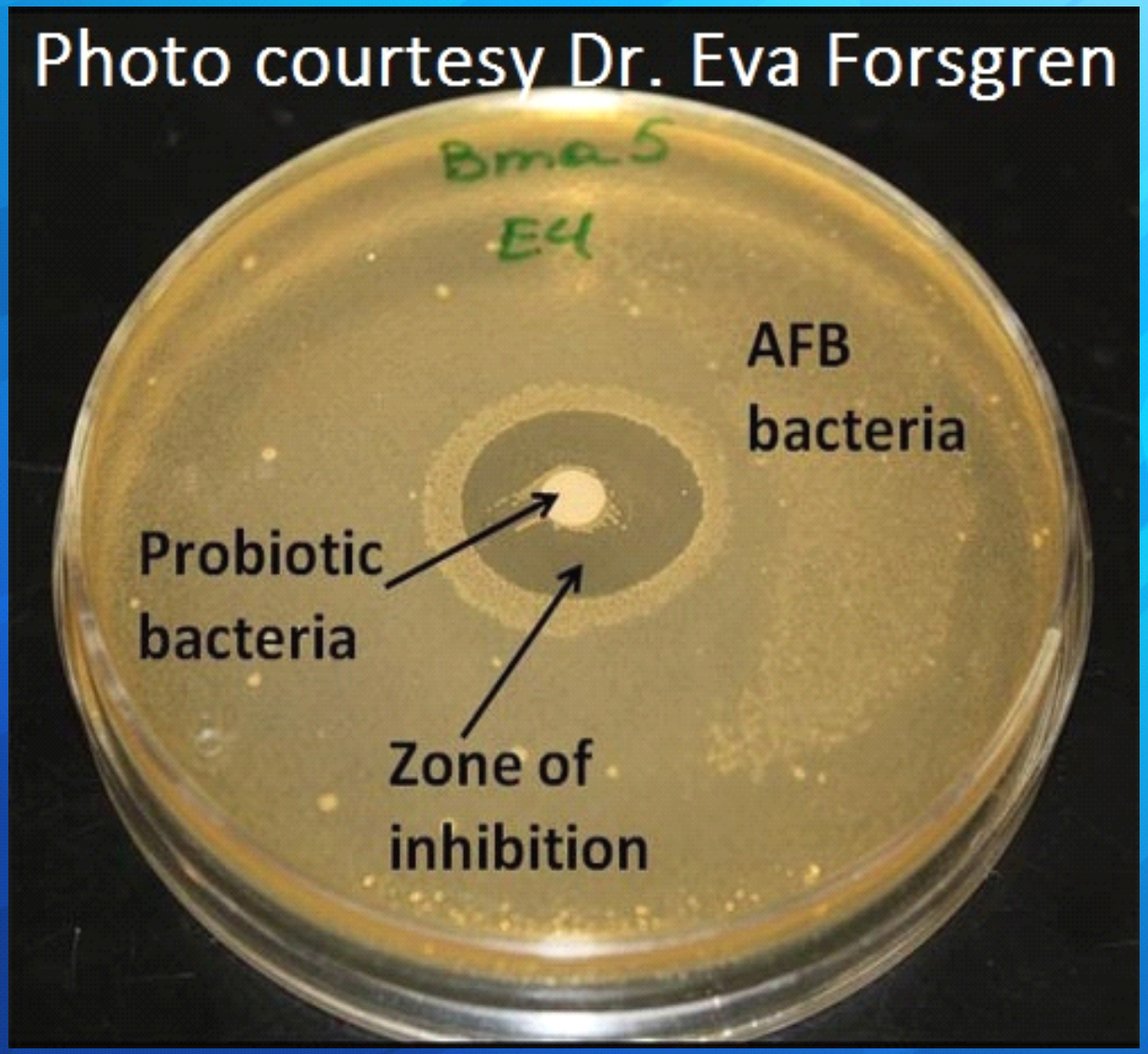
  stopped directly applying the bacteria to the face of the combs.
- At the end of Six weeks all of the hives fed

  Lactobacillus spp recovered

American foulbrood - microbial battle

- We removed infected combs
- We applied *Lactobacillus* spp Bacteria to the hives every week for six (6) weeks
- We did not apply antibiotics
- The bacteria abated the AFB

American foulbrood - and Probiotic



Beneficial (GOOD) Bacteria I

Lactic Acid Bacteria – LAB

- *Lactobacillus* spp

Bifidobacterium spp

Alpha 2.2 (Acetobacteraceae)

4 antimicrobial peptides in bees:

Defensin

Apidaecin

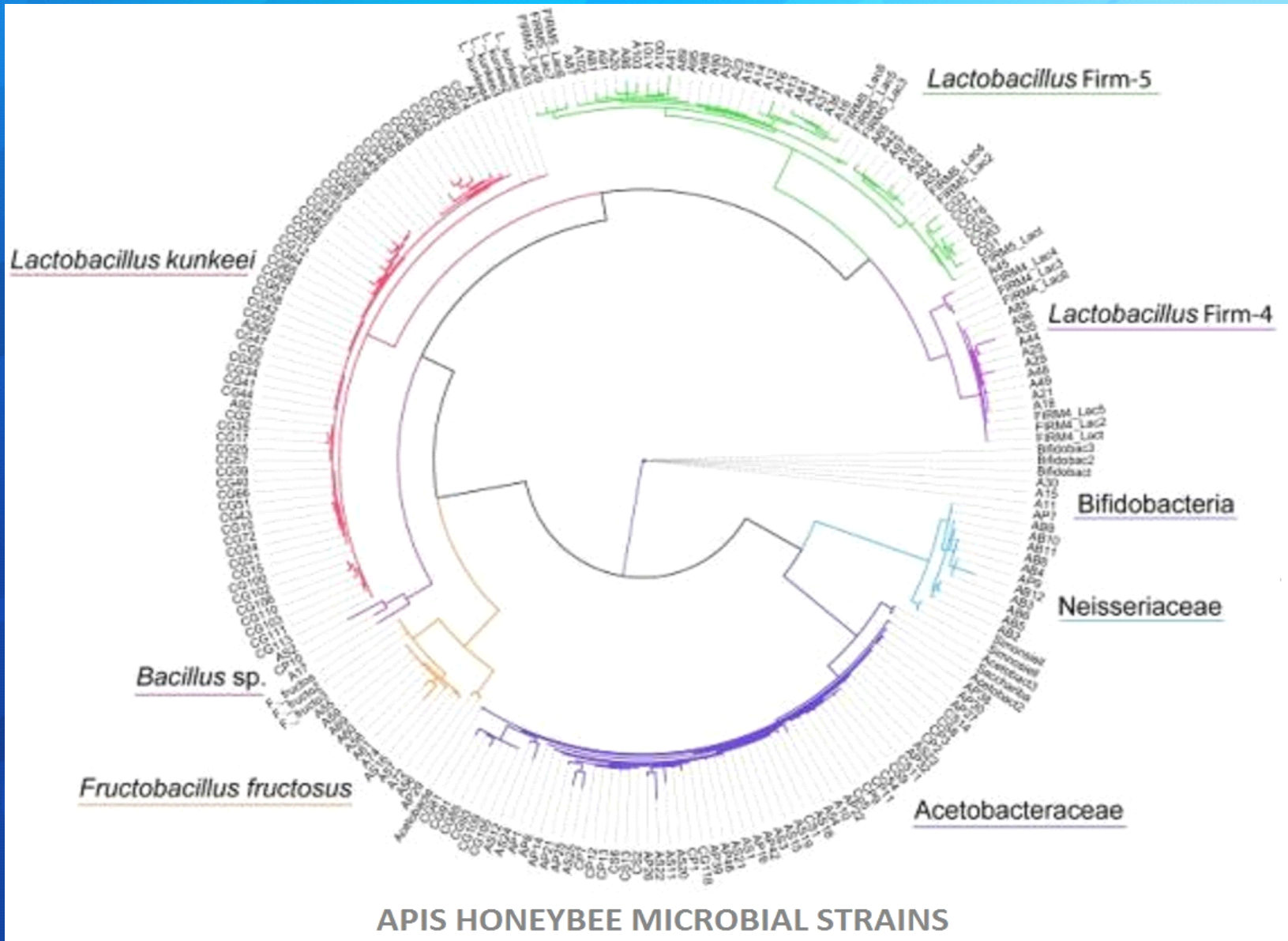
Hymenoptaecin

Abaecin

Lactobacillus + *Bifidobacterium* increase abaecin 28-fold in 48 hours

Reference: Evans JD, Lopez DI, *Journal of Economic Entomology,* 2004

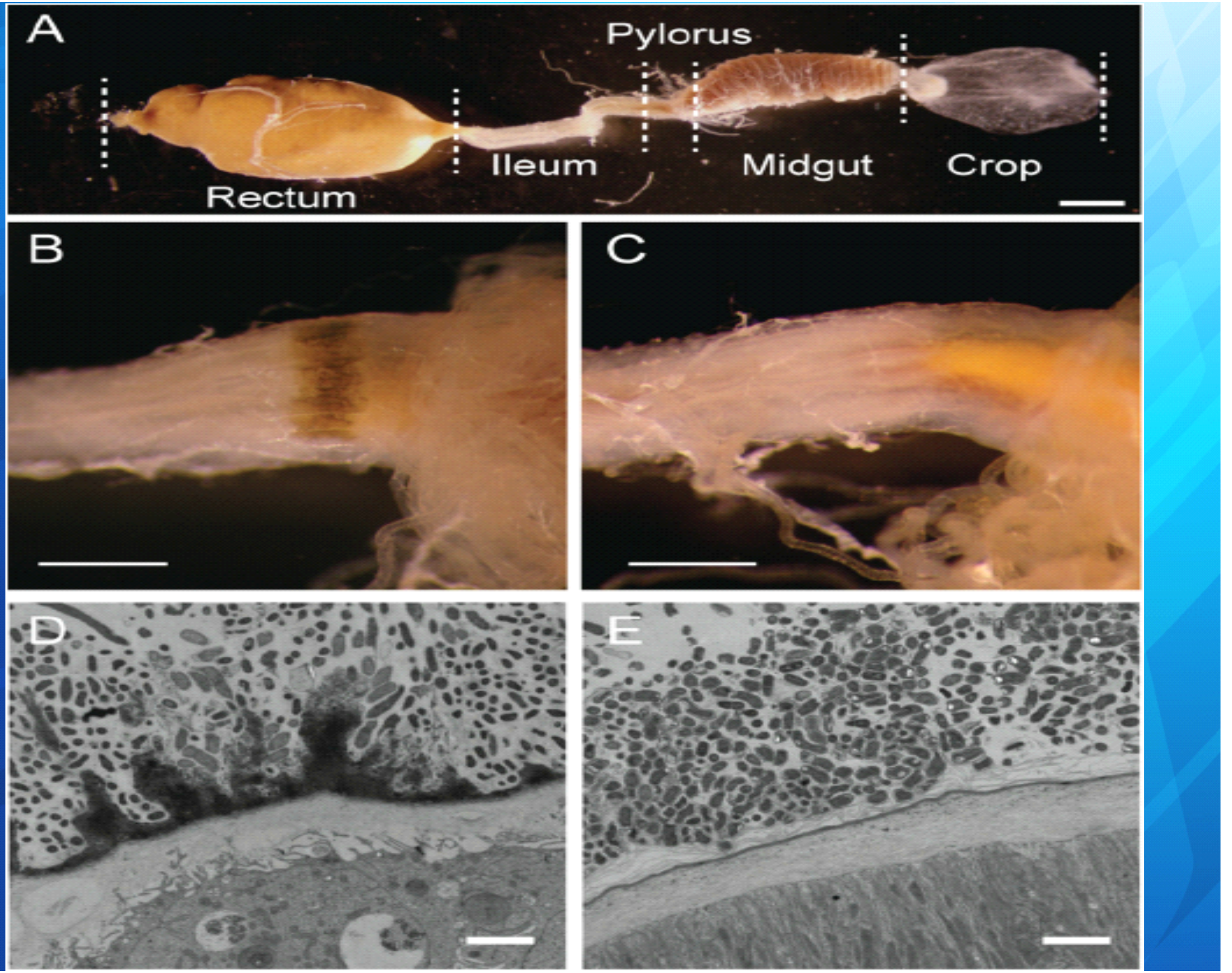
Beneficial (GOOD) Bacteria II

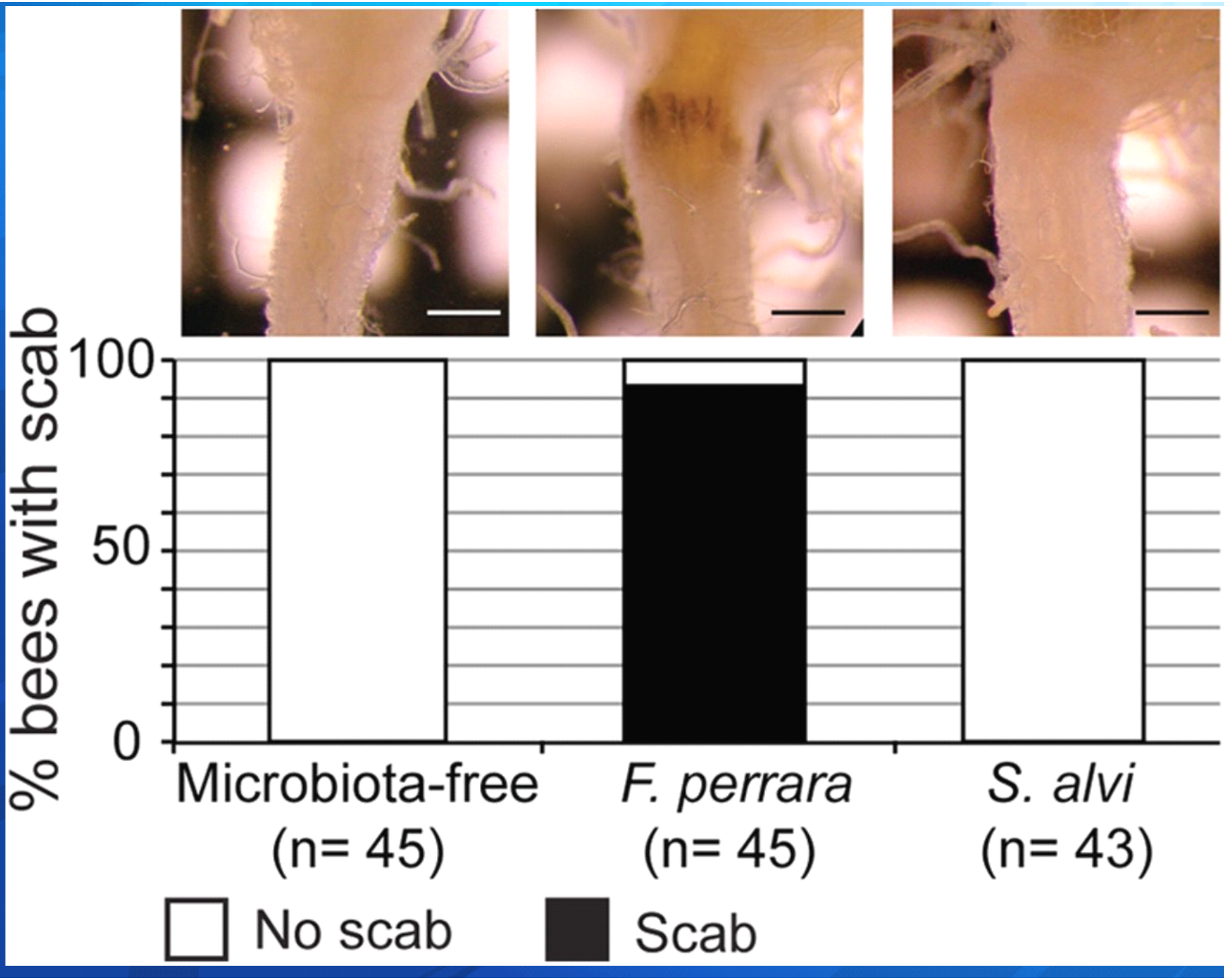


NEW PATHOGEN DISCOVERED

- TEXAS RESEARCH TEAM
- DR. NANCY MORAN
- Latin - FRISCHELLA PARRARA
- CORRELATION WITH OTHER PATHOGENS

- NO KNOWN CHEMICAL TREATMENT
- EXCITING DATA FROM MILWAUKEE WI


A
Pylorus
Ileum
Midgut
Crop
Rectum
B
C
D
E


% bees with scab
100
50
0
Microbiota-free
(n= 45)
F. perrara
(n= 45)
S. alvi
(n= 43)
No scab
Scab

Recommended - ACTION

- Benefit is evident that Direct Fed Microbials have a significant advantage over pharmaceutical drugs like *terramycin (oxytetracycline)*
- Using Microbials to combat other microbial pathogens is a natural solution
- Tylosin is not the solution, because of increased regulation and honey contamination concerns
- Antibiotics should not be used in the hive

SCORE CARD – END RESULTS

- Indiana State bee inspector reviewed the hives in the containment yards, prior to moving hives to Florida for the Winter
- Only hives that were treated with Bacillus amyloliquefaciens showed symptoms.
- Hives treated with *Lactobacillus* spp did not express AFB symptoms and were successfully moved to Florida.
- No further AFB symptoms are visible in the hives over wintered in Florida

What Questions do you have ?

Thank you for your time!

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