Management strategies of honeybee pests in Hawaii

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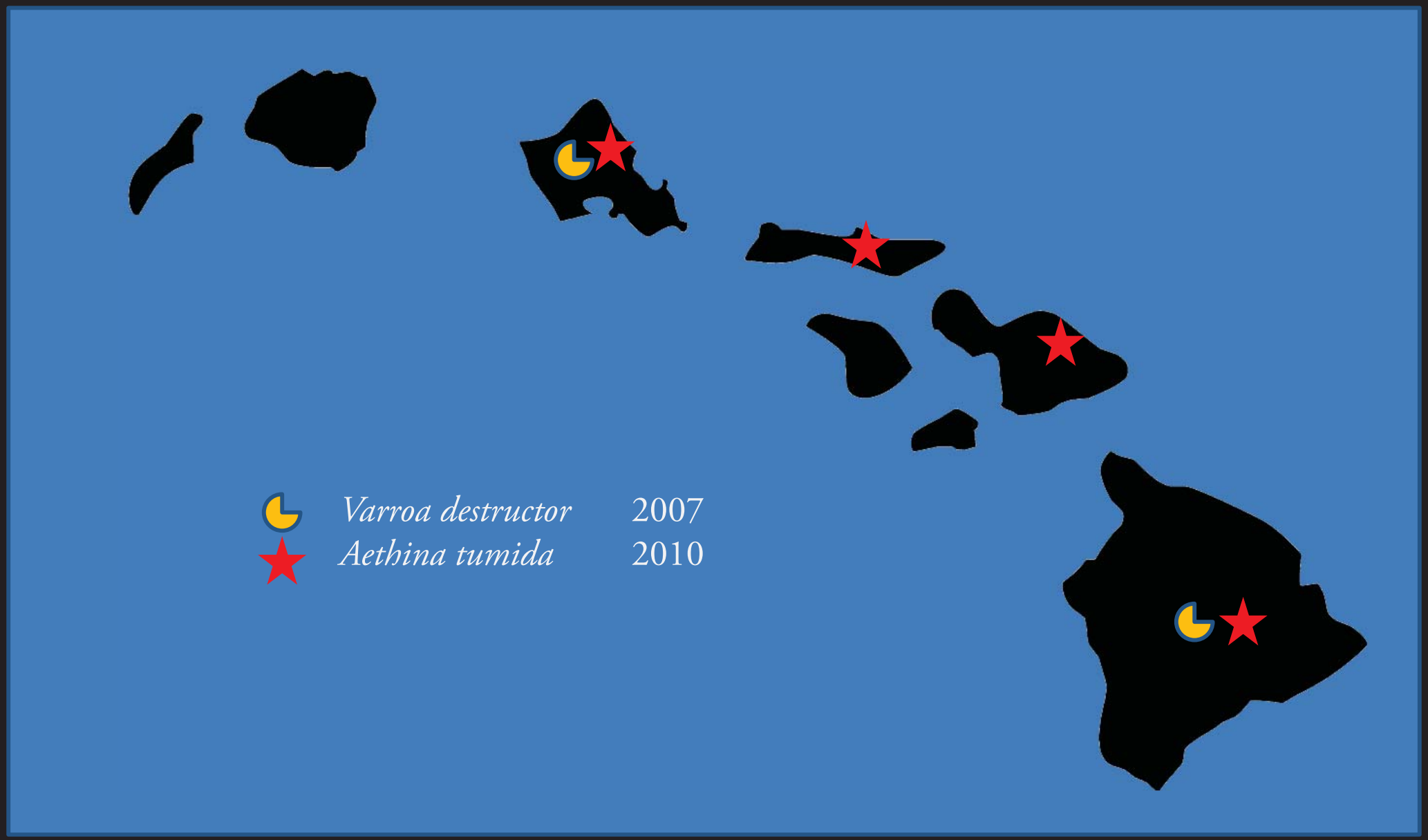
Honeybee Health

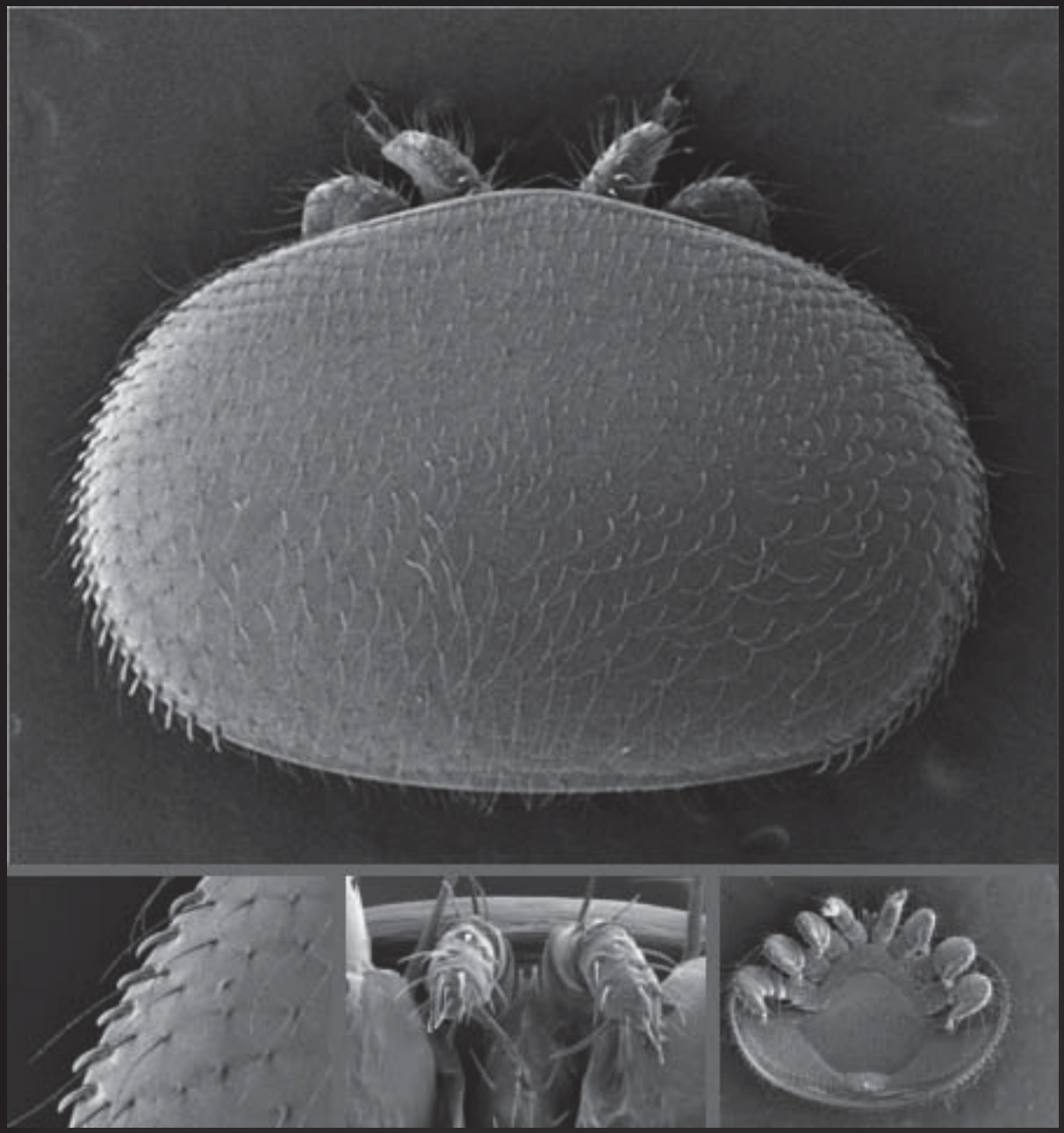
- Main Threats
  - Pests
    - Varroa mite
    - Small Hive Beetle
    - *Nosema ceranae* (fungus)
  - Pesticides
    - In-hive
    - Agricultural Insecticides and Herbicides
  - Forage diversity

Recent Invasions



Sociality

A formidable honeybee pest

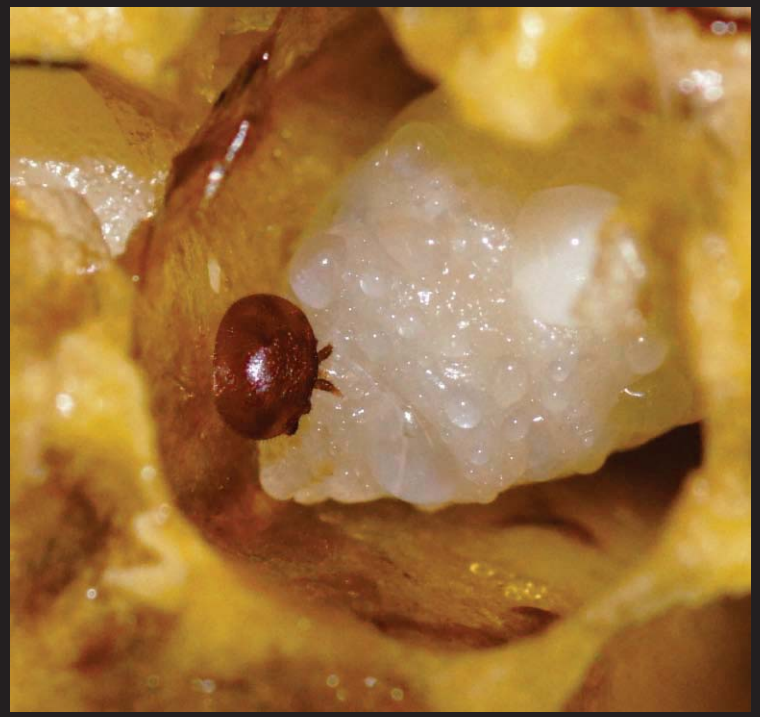


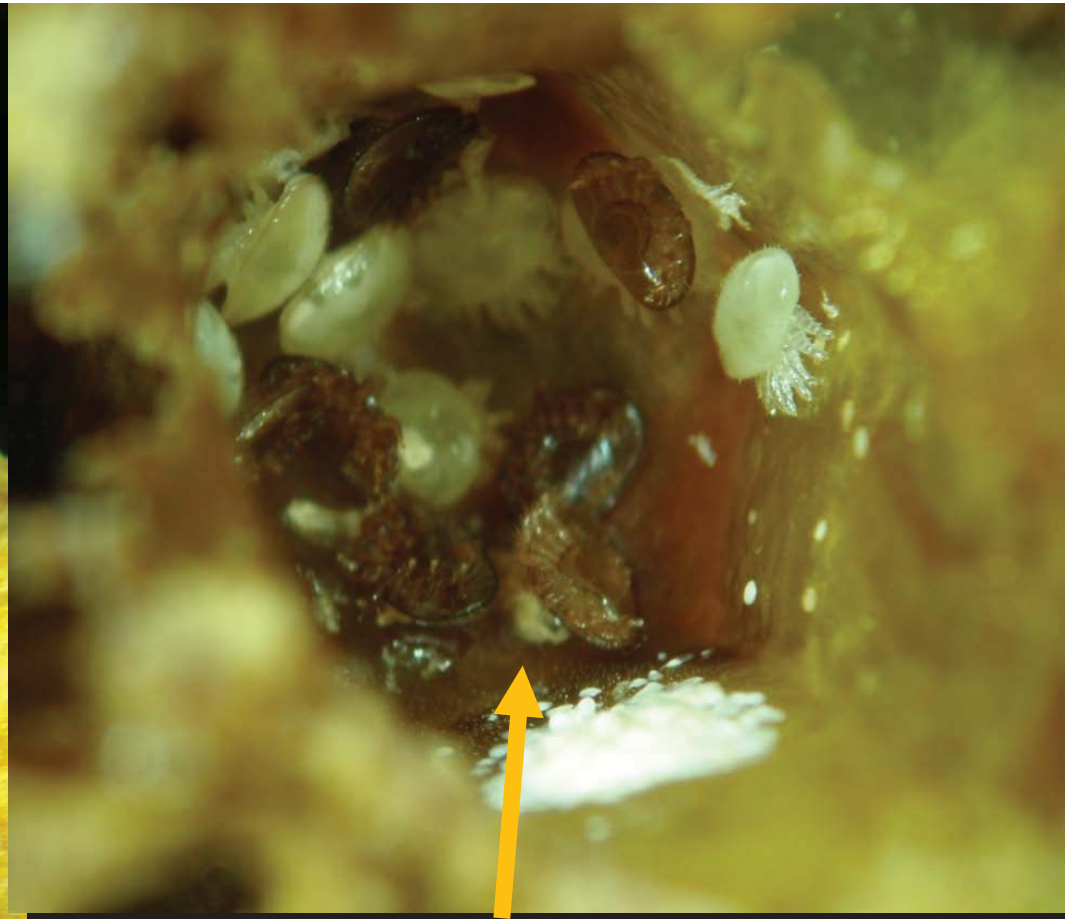
Detected in 2007 on Oahu

Spread to the Big Island on 2008

Varroa in Hawaii: a unique situation

European Honeybees and Subtropical Climate





Mites in larval cell

Reproduce in developing honeybee cells

Deformed Wing Virus transmitted by the varroa mite

Unique trends in Hawaii

Products for Varroa Control

Strong interest in organic beekeeping (formic can be found on nectars and honey naturally)

Few options that work with our climatic conditions coupled with year round brood production

Few options that allow for the beekeeper to leave the honey supers on

- Thymol
- Drone brood removal
- Sucrocide
- Hopguard

Mite-Away Quick Strip trials
Summer 2009

Application of MAQS

Two formic acid strips over the brood box

Placed strips under the queen excluder
Some colonies with honey supers on during treatment

Do not use entrance reducers or top feeders during treatment period (1 week)

Mite mortality under the cap

Foundress Male Daughter Mite Young Daughter Egg

No residues in honey

Development of a treatment threshold and management recommendations

Small Hive Beetle: *Aethina tumida*

SHB in Hawaii
Is it the same old problem ?

- Impact minimal on native South Africa

- Impact on the mainland US is variable
  - Southern eastern states more seriously affected
  - Beetle pressure is seasonal

- Impact in Hawaii much more intense
  - Beetle levels are generally high

Small hive beetle life cycle

Large losses – happen quickly

Kona 2010

Control methods

Traps

Chemical

Soil Drench

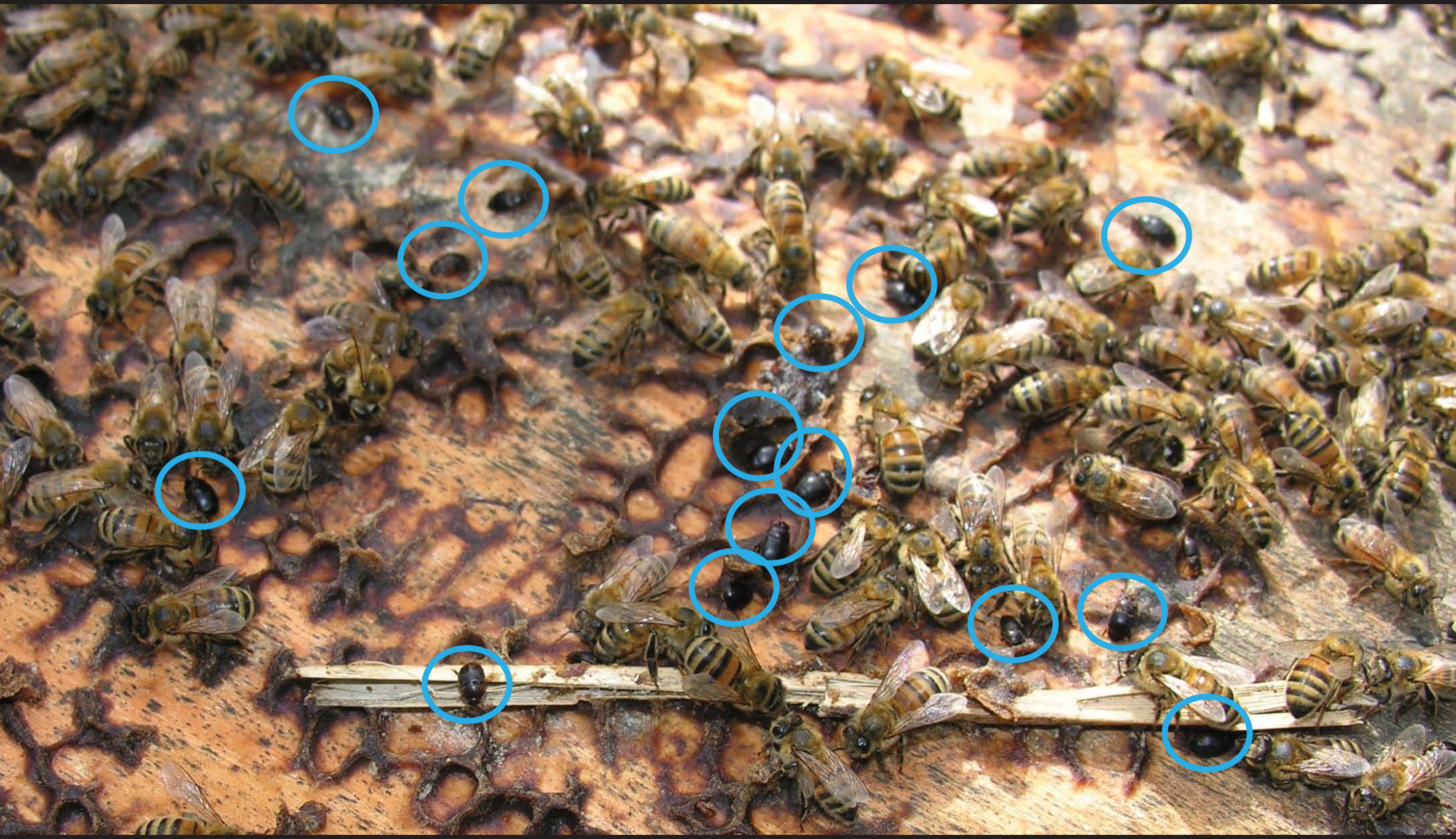
Colony losses still high

UH team is interested in

- Key elements that produce high population levels
- Methods that should be employed for control

To develop effective management strategies

Need to understand trigger(s) for explosive population levels



Factors trigger invasion

Factors trigger collapse

Factors that may promote explosive SHB populations

- Climatic conditions
- Soils
- Colony characteristics
- Proximity to agricultural sites
- Alternative fruit hosts
- Abundance of feral hives

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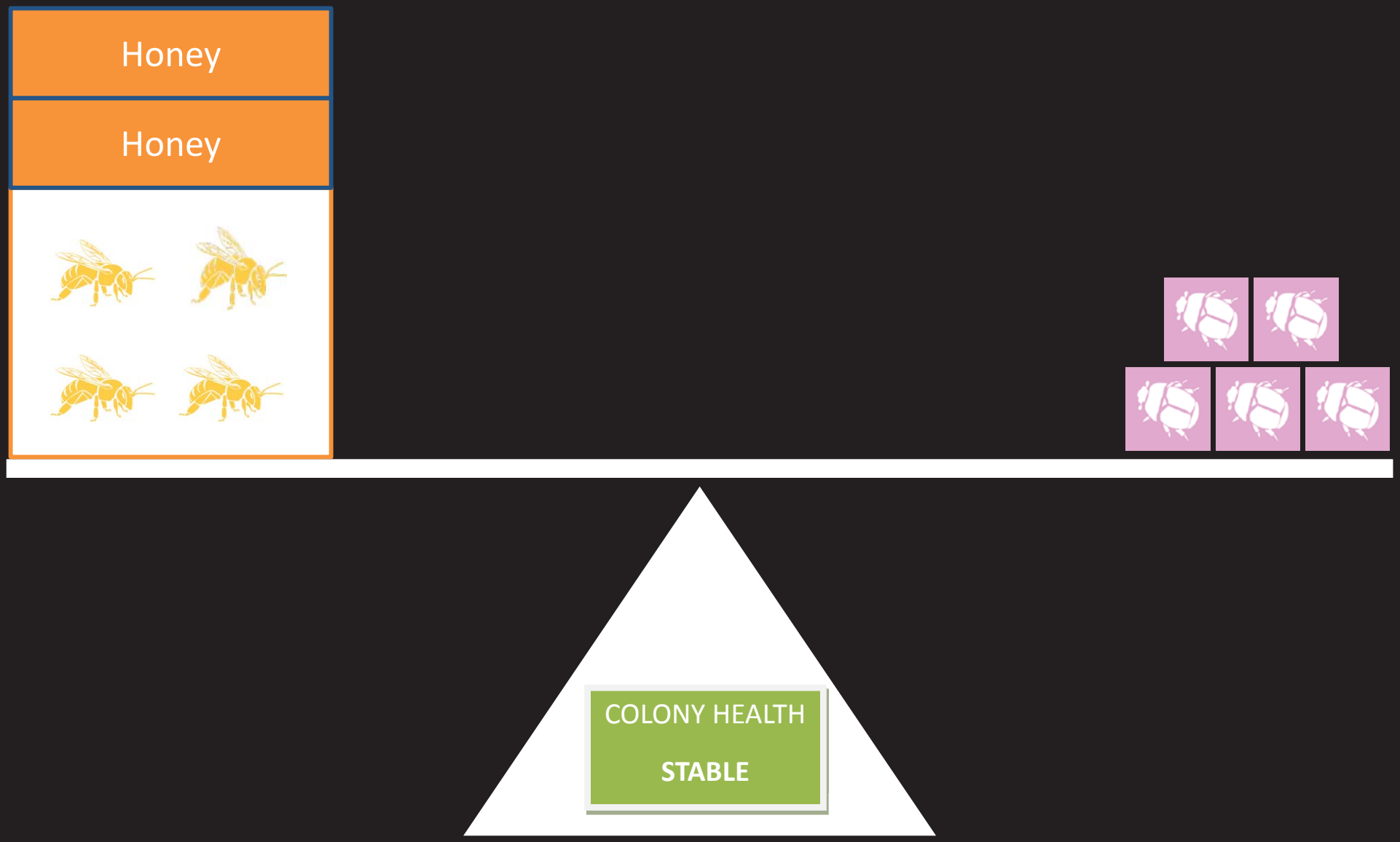
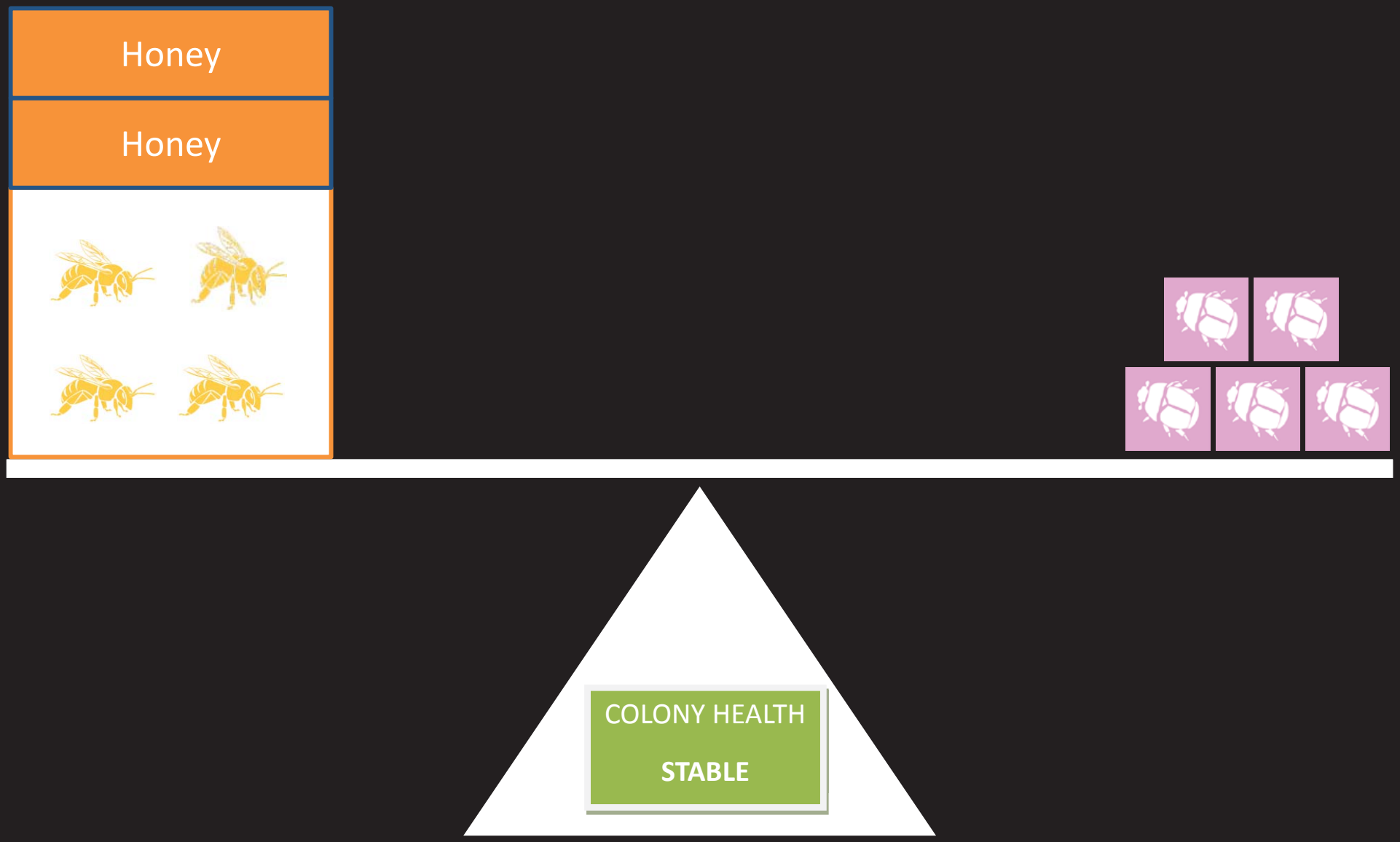
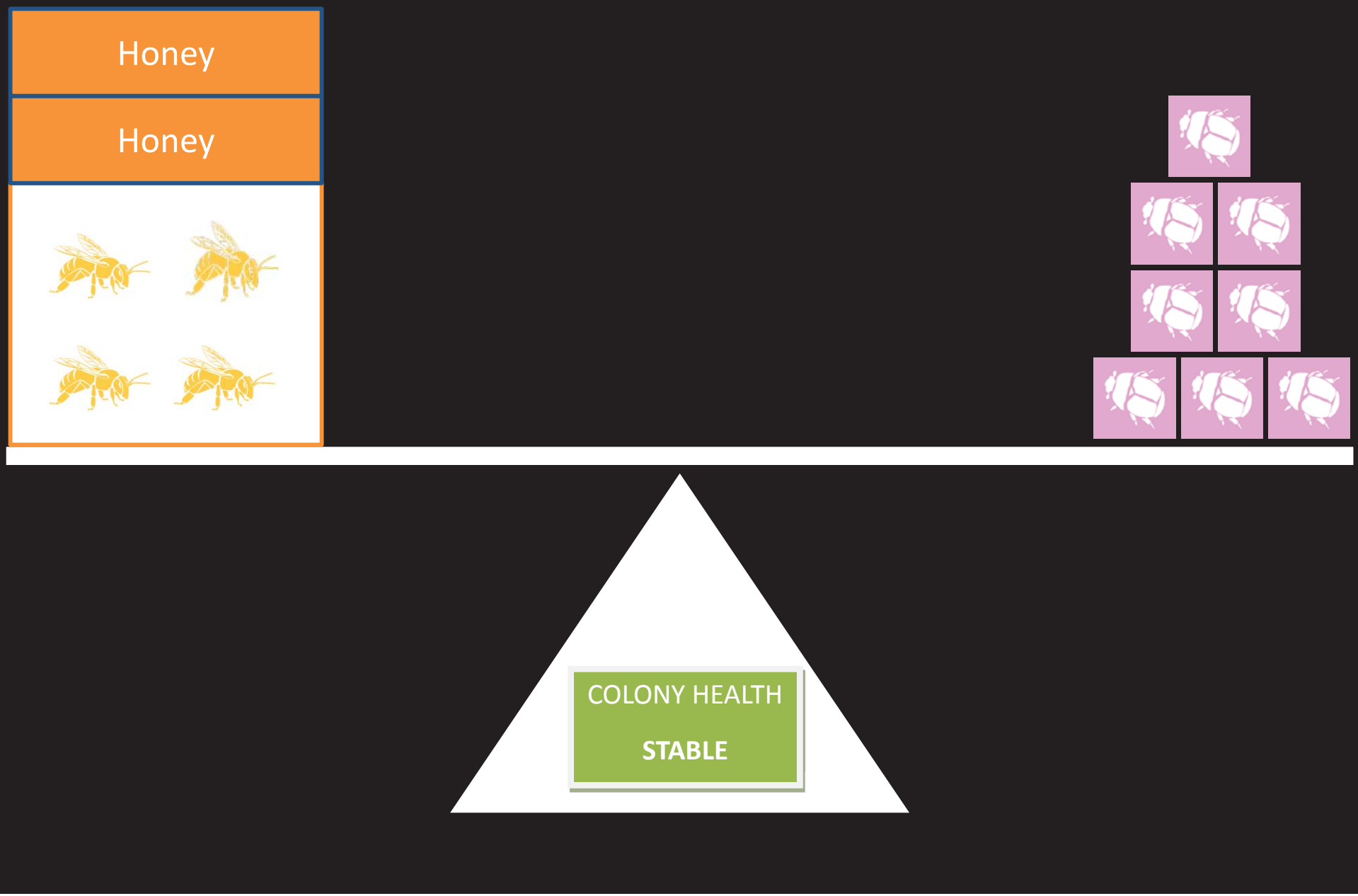
Balance of bees, space, and beetles

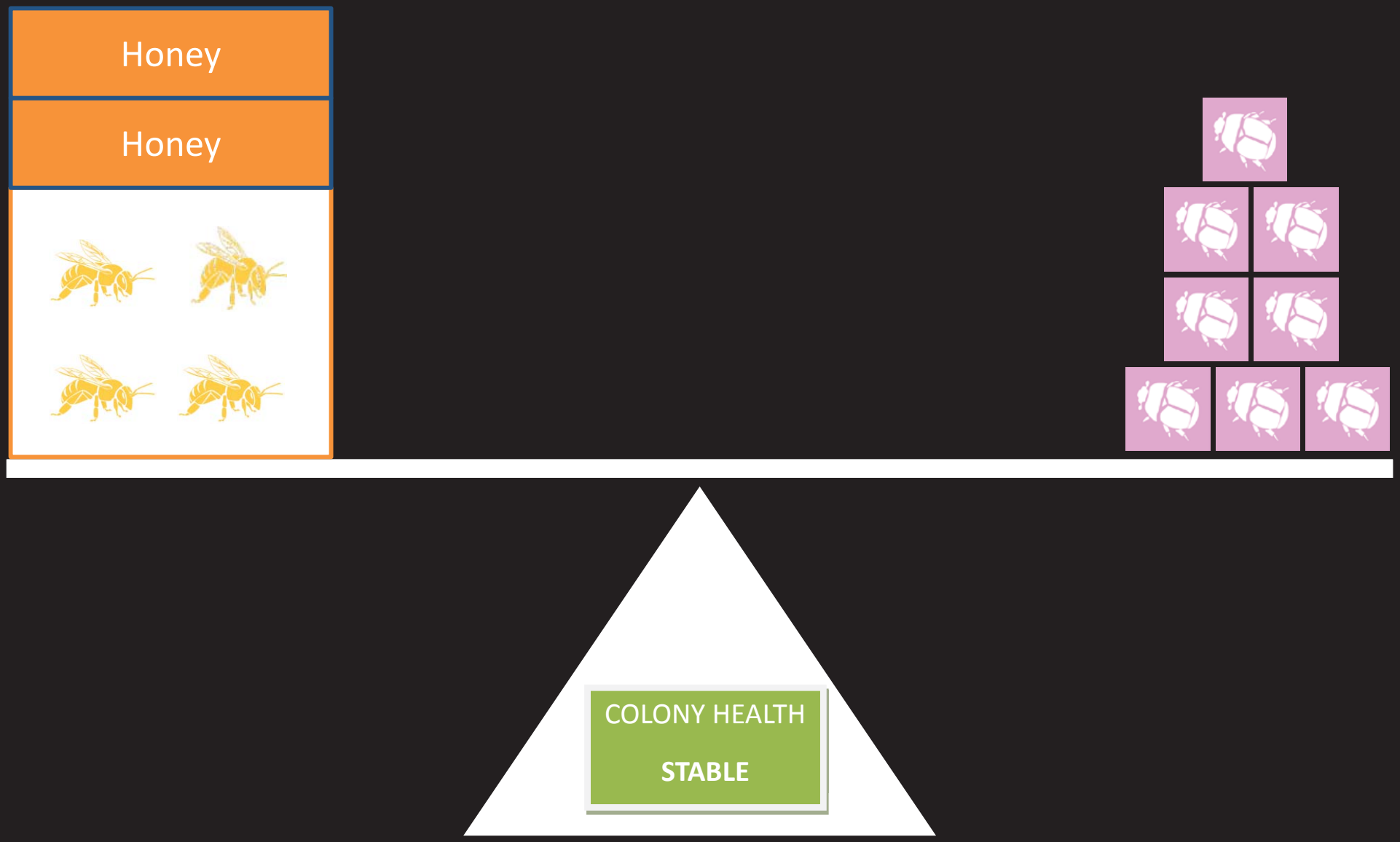


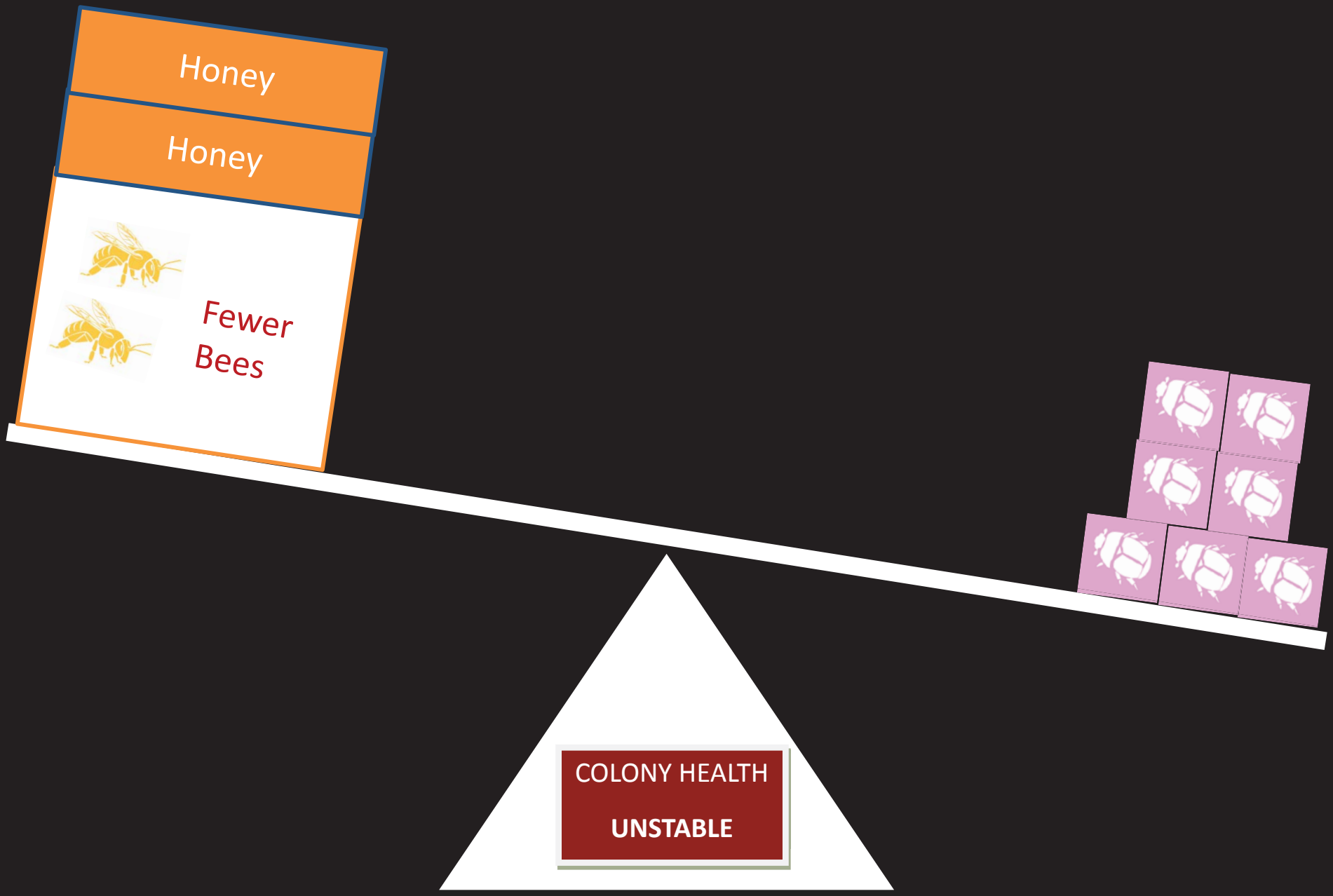
SHB levels vary rapidly

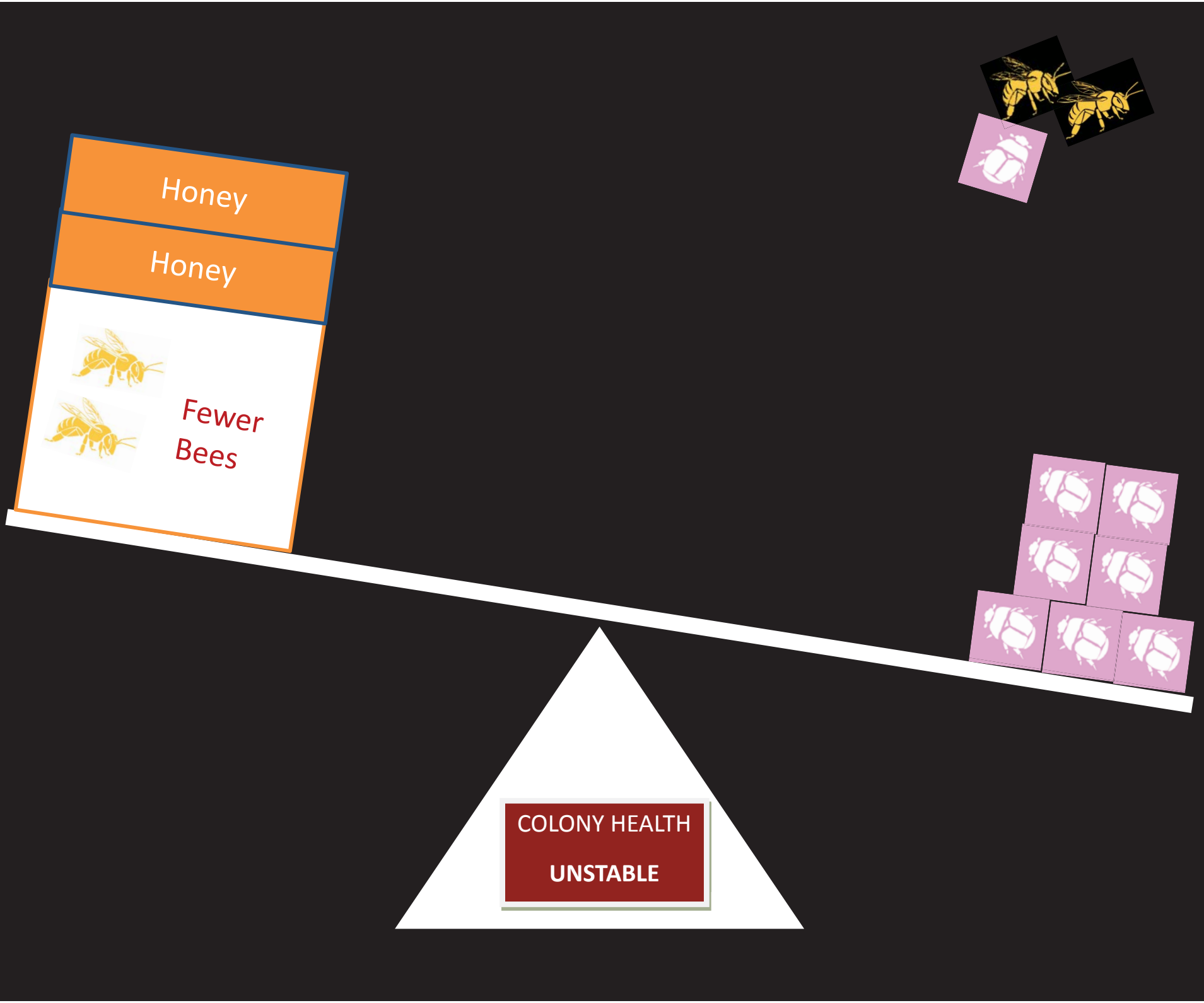



Honey
Honey
COLONY HEALTH
STABLE

Balance altered by natural or human induced events




Honey
Honey
Fewer
Bees
COLONY HEALTH
UNSTABLE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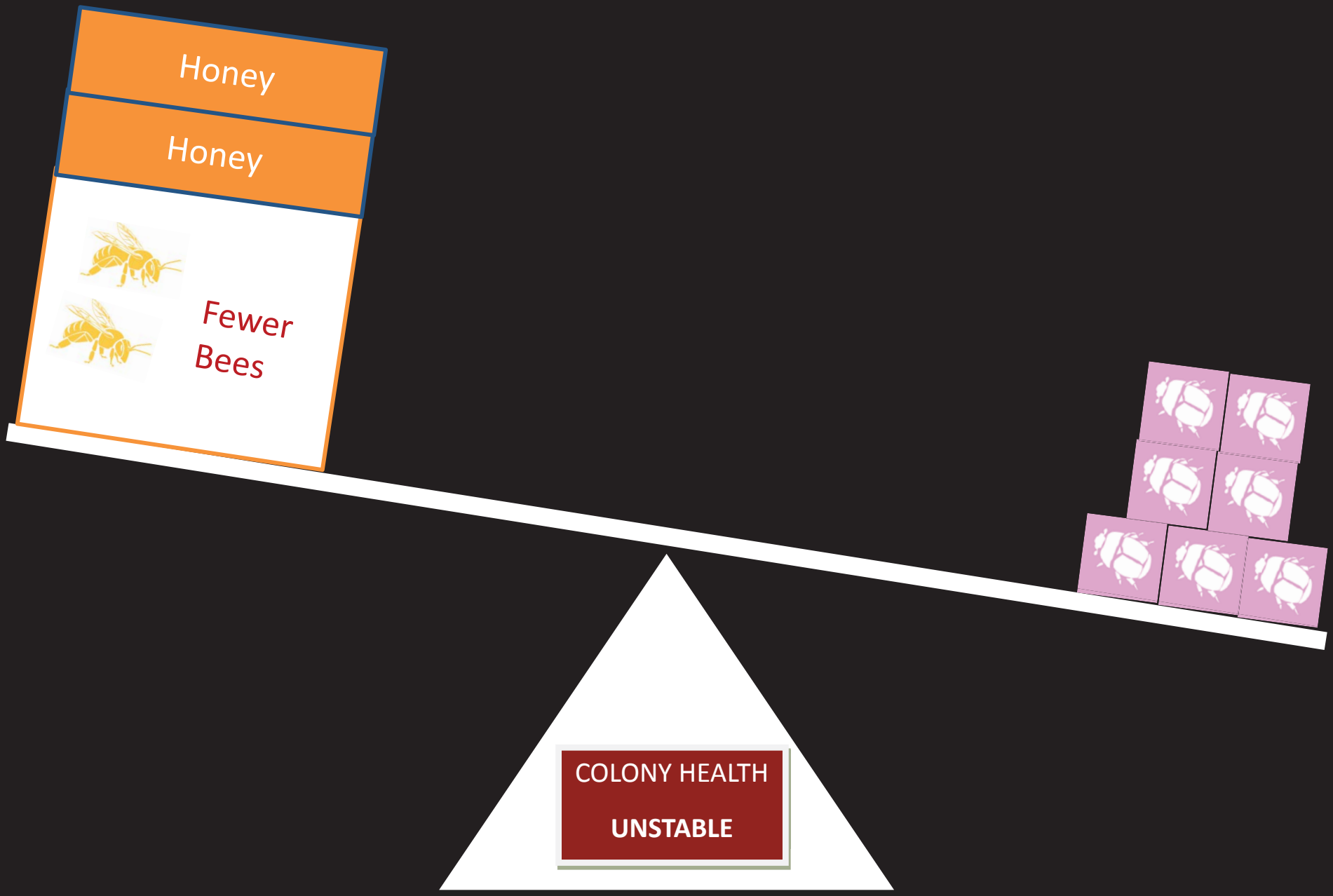
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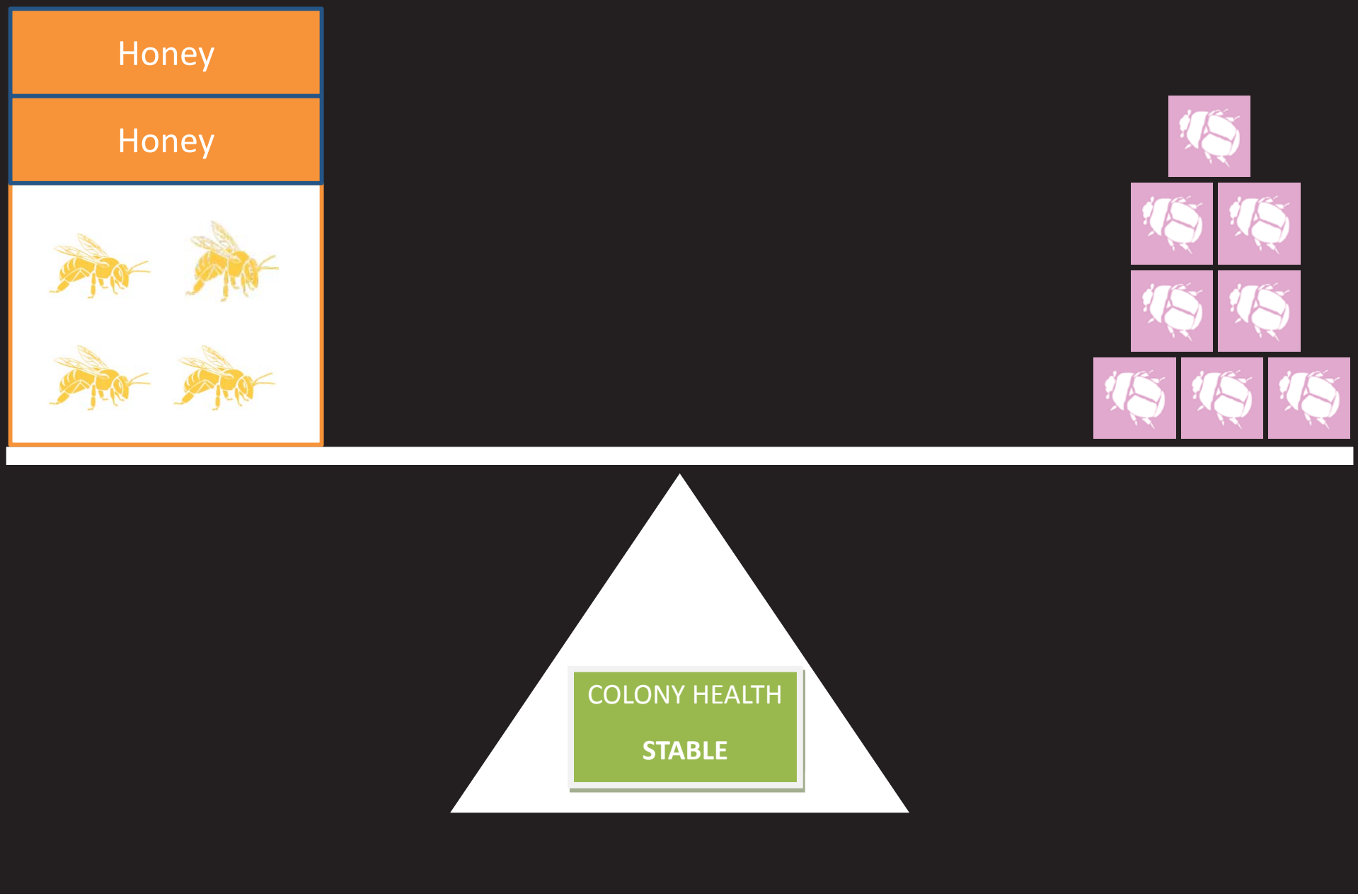
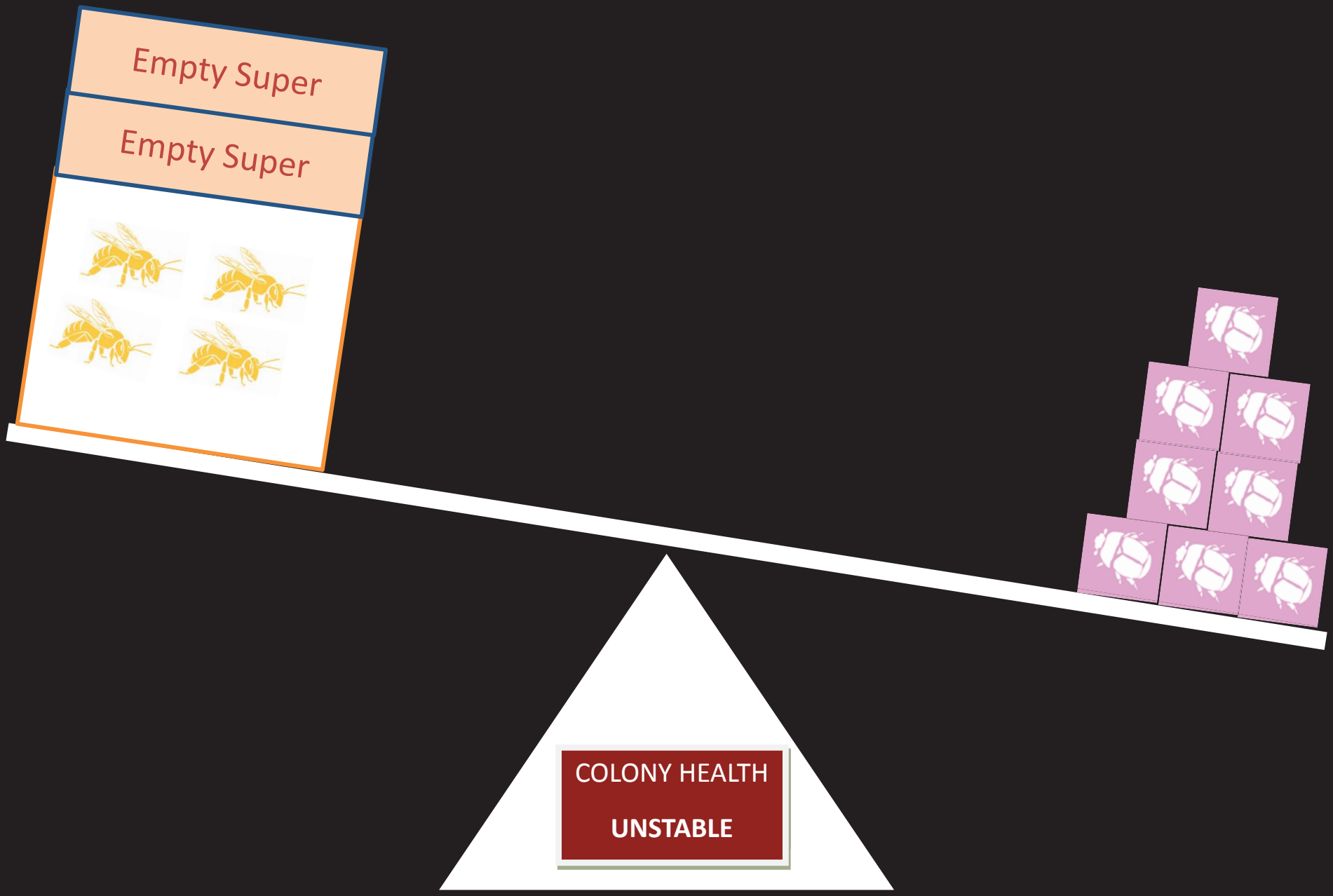
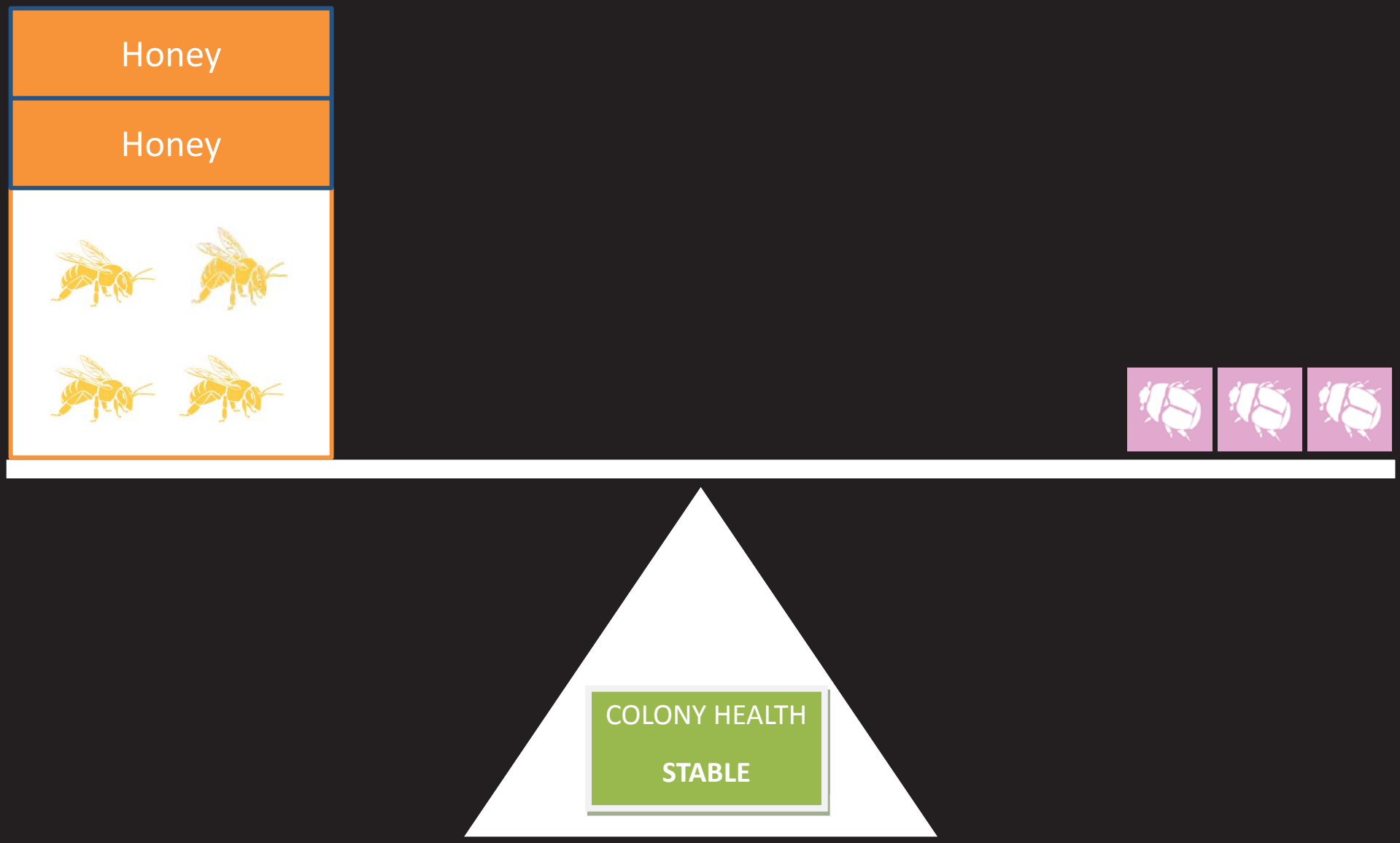
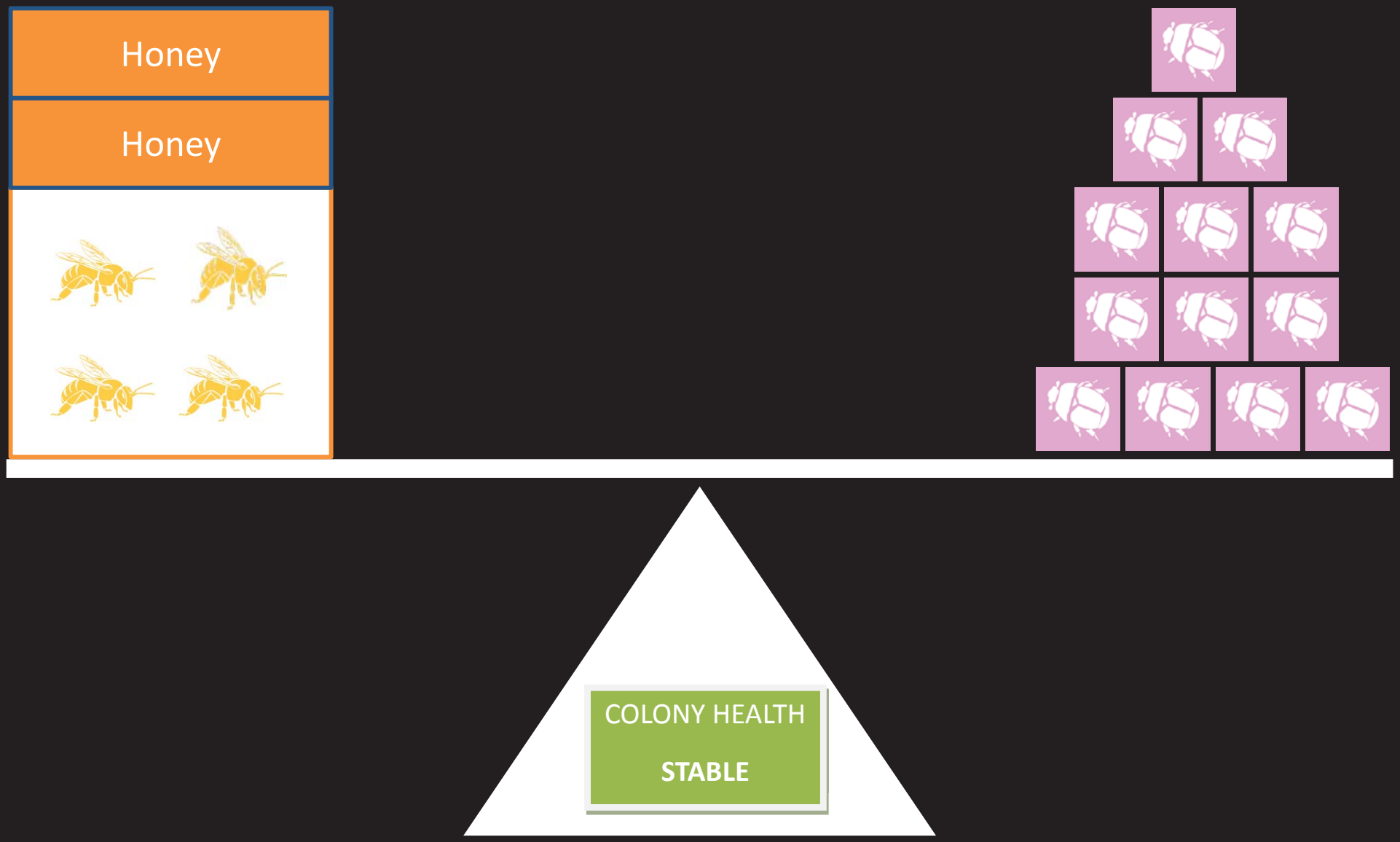

Honey
Honey
COLONY HEALTH
STABLE


Empty Super
Empty Super
COLONY HEALTH
UNSTABLE

The more beetles



The more sensitive the system



Colony characteristics and colony management are very important in Hawaii

- Variable levels across state
  - 5 beetles/ week to…> 200 beetles/ week
- Variable from week to week
  - 80 to 20 beetles/ week

Colony characteristics: Strength

Colony characteristics: Age

Re-stocking issues with swarms

Colony characteristics
Defensive behaviors

Colony management is a powerful tool for Hawaii

- Reduces:
  - Beekeeper induced collapses
- Compensates:
  - Quickly changing conditions

Intensive colony management suits Hawaii's conditions

- Allows beekeepers to track changes
- Beekeepers in temperate regions get 1 to 2 honey harvests/ year
- Modifications relating to colony structure adding /removing boxes are more seasonal

Beekeeping Program

Commit to weekly hive management

- Basic beekeeping
- Honeybee pest monitoring

Examing Colony Health

Mahalo

To our collaborators: local beekeepers, personnel at Urban Garden Center, and CTAHR extension agents in Molokai

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