

# HONEY BEE NUTRITION



**Les Jeske  
Maple Creek Honey Farm  
Tyler, Texas**



Maple Creek Honey Farm

# Primary Needs of Bees

- **Nutrition**
- **Pest Control**



# Nutritional Requirements

- **Water**
- **Protein (Amino Acids)**
- **Fats/Lipids (Fatty Acids & Sterols)**
- **Carbohydrates (Sugar & Starches)**
- **Vitamins**
- **Minerals (Salts)**



# Water

- **Clean Source (Minimal Contaminants, Prefer Salts to Supplement Deficiencies)**
- **Necessary for**
  - **Normal Biological Activity, Physiology, & Brood Rearing, and Normal Behavior**
  - **Food Production (Bee Bread & Re-liquify Granulated Honey)**
  - **Temperature Regulation**
  - **Humidity Control**



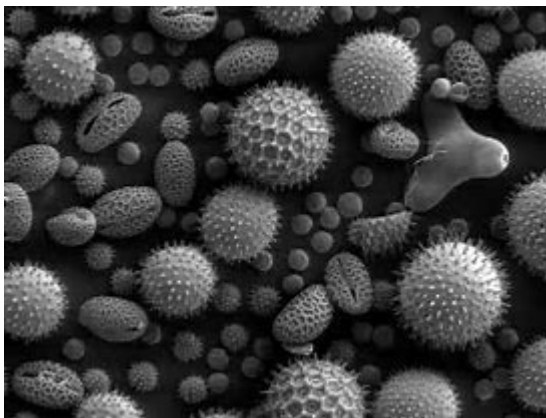
# Protein

- **Develop Body Parts and Organs for Young Bees (1-15 Days)**
- **More Protein (>60%) – Stronger Bodies, Increased Longevity**
- **Require Minimum Content of 20% in Pollen**
- **Can Draw on Body-Protein During Protein Stress (i.e., Spring Buildup, Heavy Honey Flow, or Winter)**
- **Necessary for Royal Jelly Production**
- **Average Hive Consumes 22 to 57 Pounds/Year**



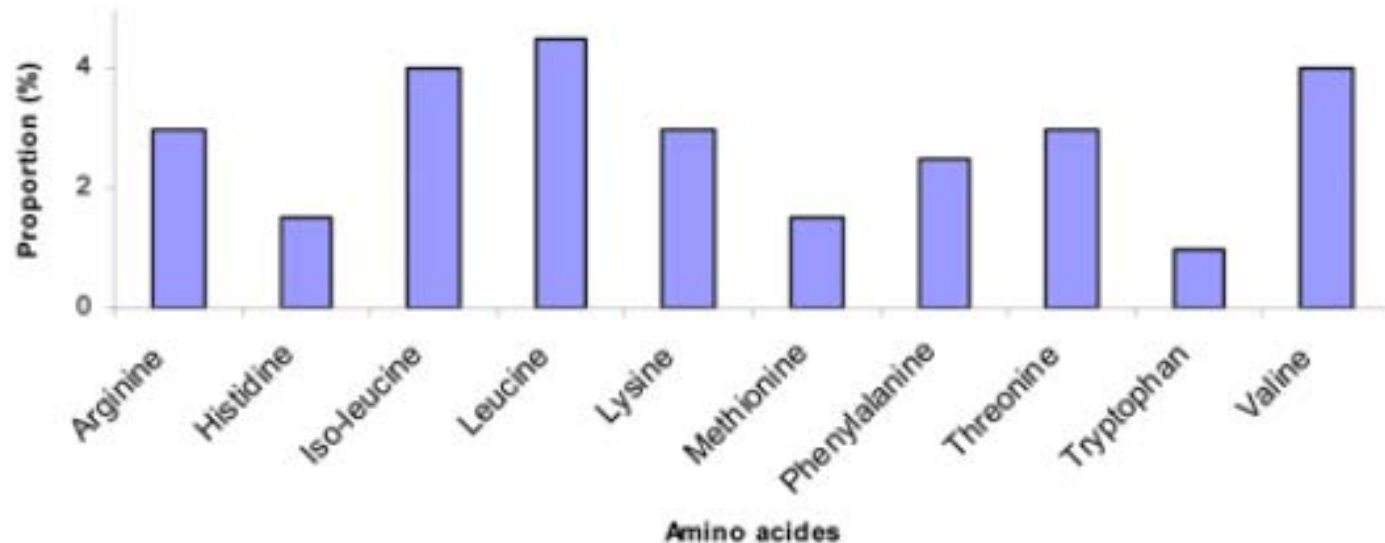
# Protein

- **Primary Source - Pollen**
- **Protein Broken Down to Amino Acids**
- **Pollen Collection is Indication of Brood Rearing**



# Amino Acids

- 10 Essential Amino Acids
- Minimum % are Important



# Protein

- **Floral Pollens – 4% to 60% Protein**
- **Varied Plant Sources Important (Polyfloral)**





# Pollen Groups

- **Fruit Trees, Legumes (Clover, Vetch, Peanuts), Mesquite, Blackberry, Cottonwood – Highly Nutritious**
- **Elm, Dandelions – Moderately Nutritious**
- **Alder, Hazelnut – Fairly Nutritious**
- **Pines – Poorly Nutritious**



# Fats (Lipids)

- **Extracted from Pollens & Nectars**
- **Broken Down to Fatty Acids – Building Blocks of Lipids/Fats**
- **Short-Chain Fatty Acids – Energy Production**
- **Long-Chain Fatty Acids – Cellular Structure & Function, Pheromones, & Reproductive Hormones**



# Carbohydrates

- **Sugars & Starches Extracted from Pollen and Nectar – Energy for Flight & In-Hive Activity (Honey & Bee Bread Production)**
- **Food for Bacteria to Ferment Stored Pollen**
- **Nectar Source of Sugars (Sucrose) – 5% to 75%**



# Carbohydrates

- **Carbohydrates Converted to Glucose and Body Fats for Storage**
- **Average Hive Consumes 2 Pounds of 50% Sugar Water per Day**
- **Foragers Add Enzymes to Convert Sucrose into Glucose and Fructose, and Gluconic Acid (Honey Acidity) and Hydrogen Peroxide (Germ-Killing Properties)**



# Vitamins and Minerals

- **Basic Biochemical Roles**
- **Vitamin E – Cellular Antioxidant Affecting Aging & Immunity**
- **Vitamin C – Extends Effectiveness of Vitamin E**
- **B Vitamins – Body Function & Reproduction**



# Vitamins & Minerals

- **Calcium, Phosphate, Magnesium, Sodium, Potassium, Chloride**
- **Sourced Mostly from Pollen**



# Trace Minerals

- **Sourced from Pollen – Cobalt, Copper, Iron, Iodine, Manganese, Nickel, Selenium, and Zinc (Vitellogenin)**



# Vitellogenin

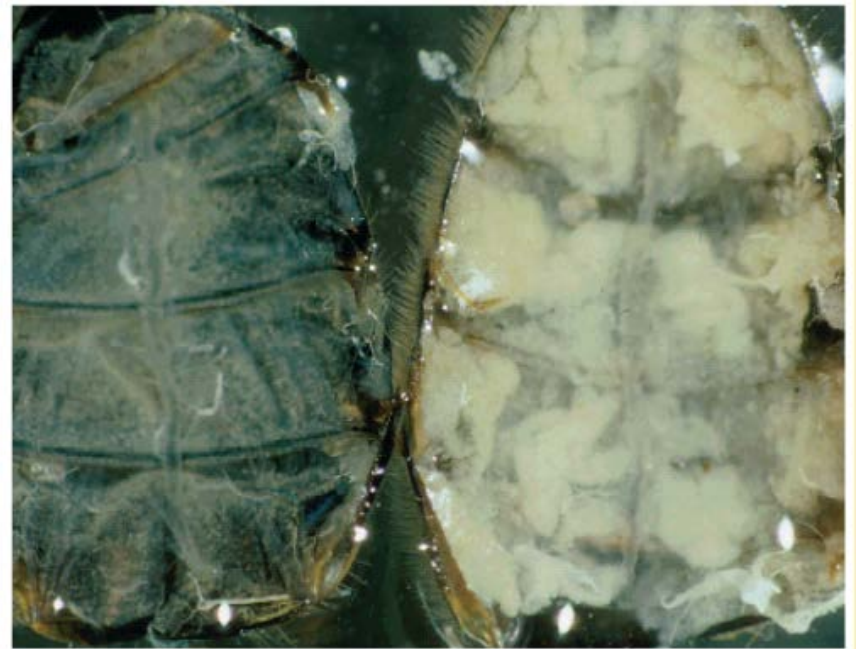
- **Storage of Protein Reserves**
- **Royal Jelly Production**
- **Queen and Worker Longevity**
- **Immune System Enhancement**
- **Spring Buildup without Pollen**
- **Effects Foraging Behavior**





# Vitellogenin

- **Composed of Sugar, Fat, & Protein**
- **Deposited in Fat Bodies in Abdomen and Head**
- **Fat Bodies –  
Biosynthesize  
Lipids, Carbo-  
hydrates, Amino  
Acids, & Proteins**



# Larvae & Young Bee Requirements

- **Greater Protein Needs – Body and Glandular Development**



# Adult Bee Requirements

- **Prefer Carbohydrates over Protein**
- **Shorter Life Span for Workers Fed Less Protein During 1<sup>st</sup> 15 Days**



# Queen Needs

- **High Protein for Egg Laying**



# Drone Needs

- **Primarily Carbohydrates**



# What Can the Beekeeper Do?

- **Provide Clean, Close, and Constant Supply of Water**
- **Plant Beescapes with Diversity of Flowers, Bushes, & Trees (Polyfloral and Staggered Bloom)**
- **Supplemental Feeding – Sugar Water & Protein Substitutes (Pollen Patties)**



# Sugar Water

- **Sources – Bag Sugar, High Fructose Corn Syrup (HFCS), Others**
- **Warning: Do Not Allow HFCS to Overheat**





# Other Protein Sources

- **Sources – Soy Flour, Brewers Yeast, Wheast, Pollen Fed as Patties**



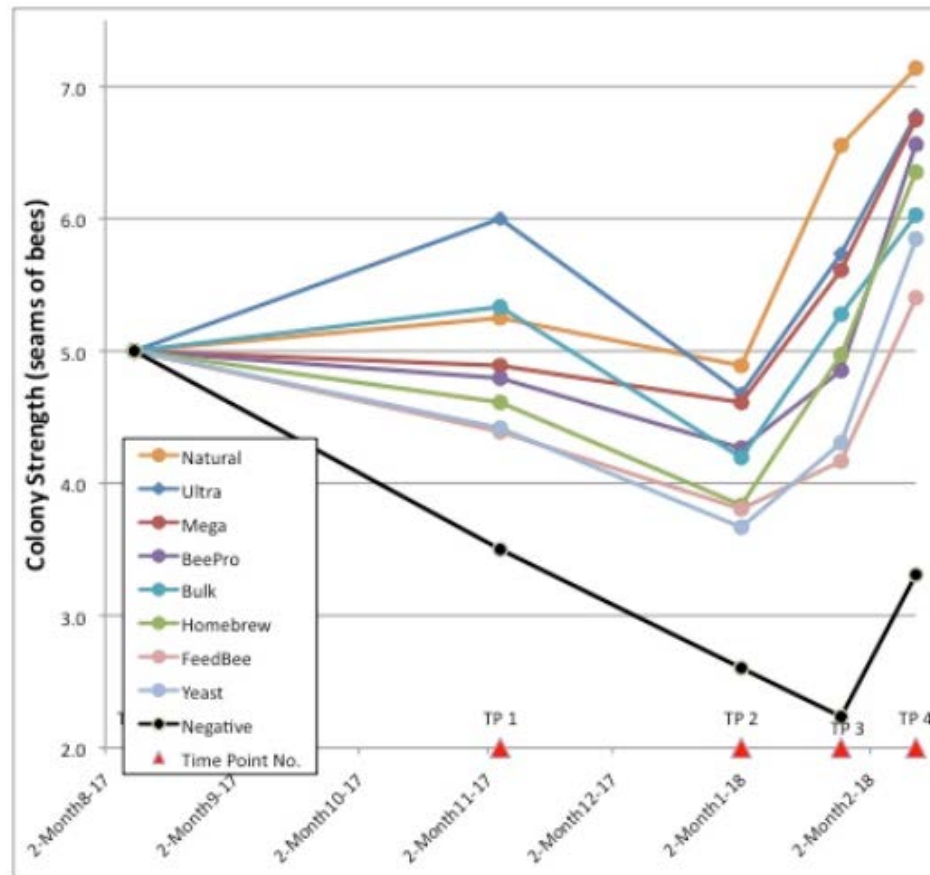


# Protein Supplements

- **Substitutes**
  - Palatable
  - Digestible
  - Balanced
- **Major Brands – Bee-Pro, Feed-Bee, MegaBee, and Bee-Pol**

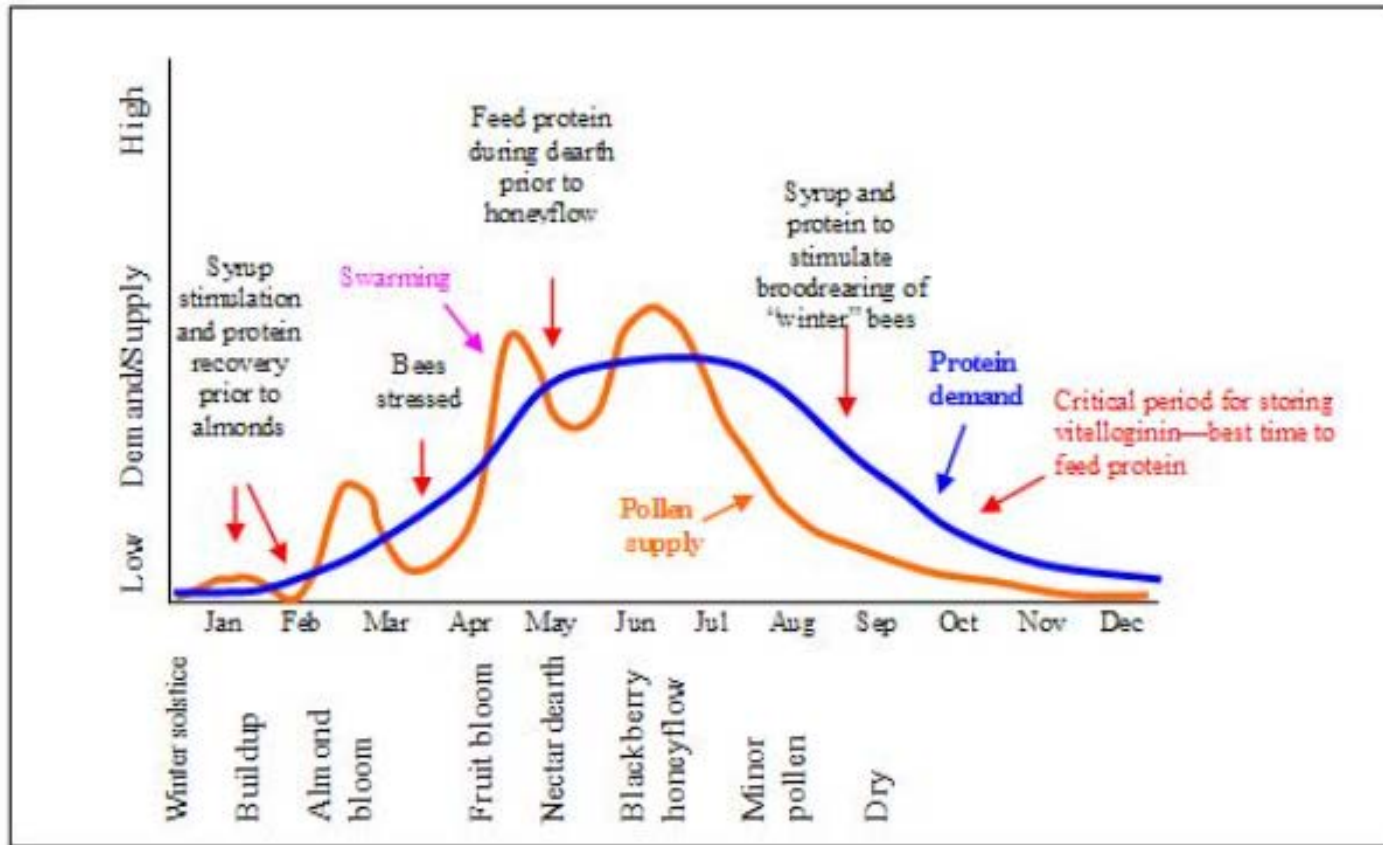


# Protein Supplement Comparison



Maple Creek Honey Farm

# When to Feed



# Summary

- **Water, Water, Water**
- **Balanced Diet – Varied Food Sources with Varied Blooming Periods**
- **Supplement Feeding, As Needed**



# Other Helpful Resources

- <http://articles.extension.org/pages/28844/honey-bee-nutrition>
- <http://scientificbeekeeping.com/bee-nutrition/>
- <https://www.wildseedfarms.com/>



# Questions and Answers

**“You are What you Eat”**



Maple Creek Honey Farm