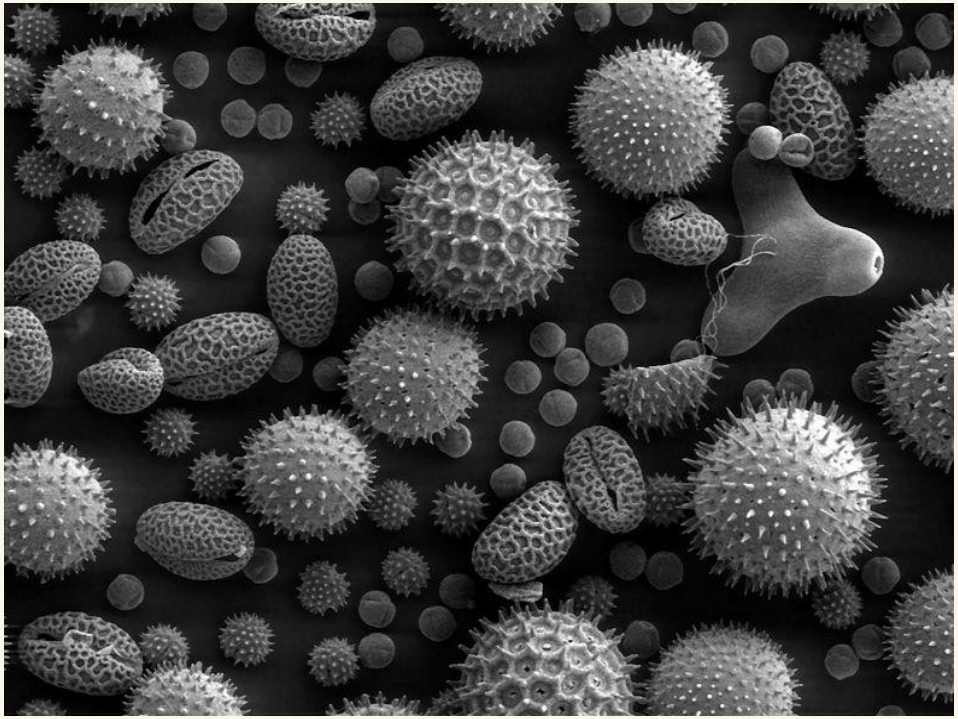
# MOE Beekeepers' Association
# Est. circa 1885

# Pollen Identification

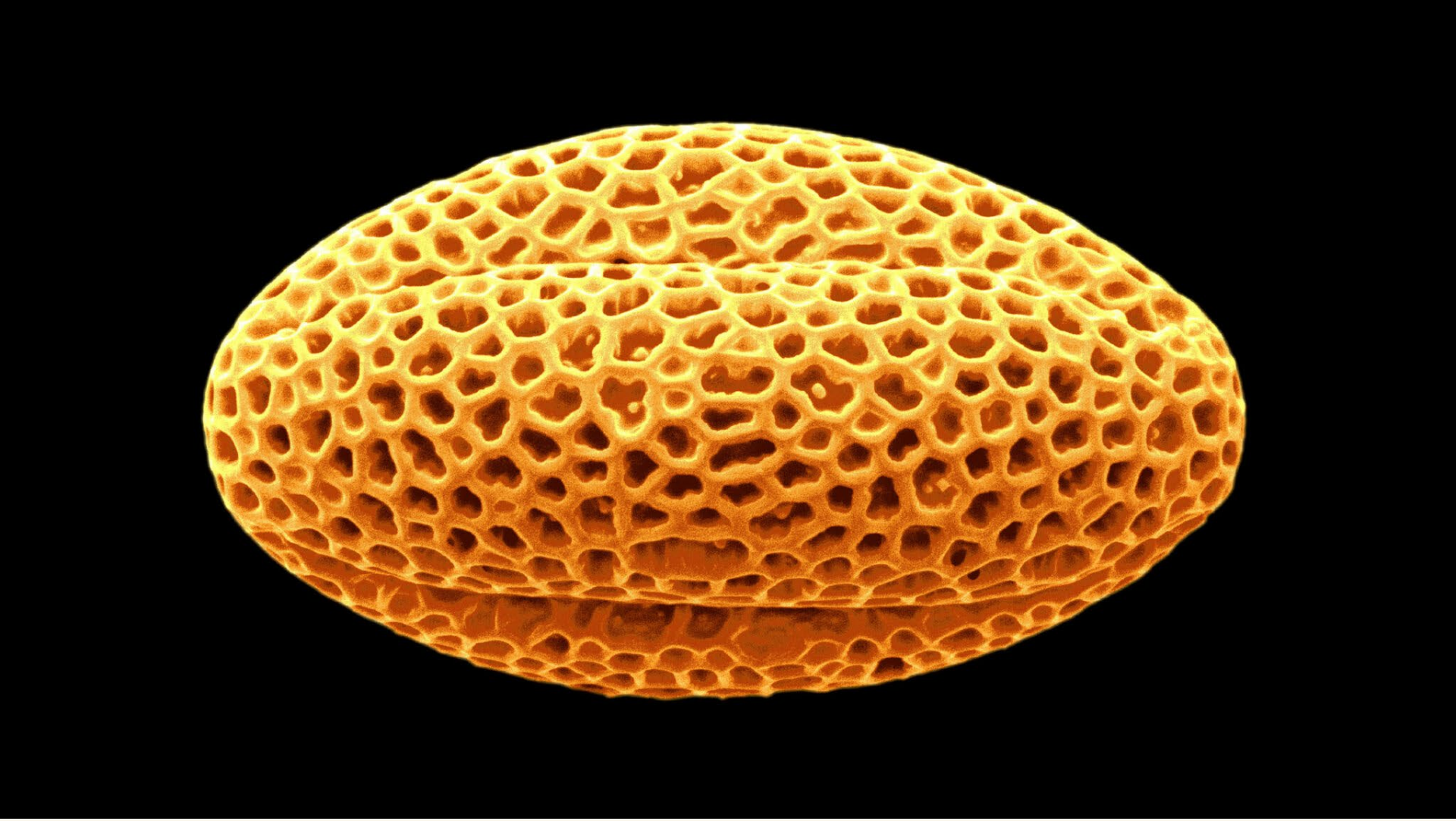
*A practical guide for beekeepers*



Kevin Dolan

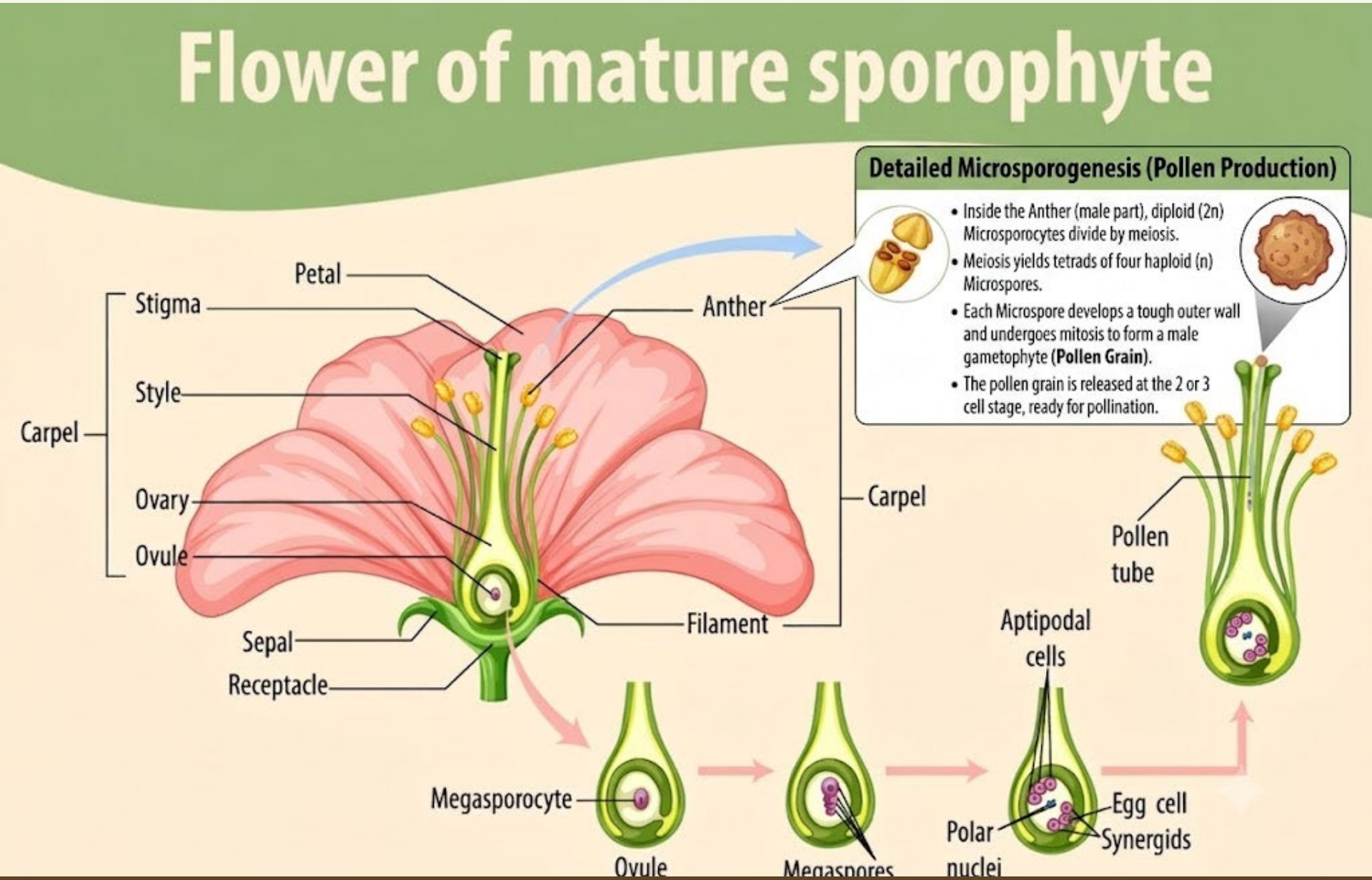
# What is pollen?

- Fine, powdery substance made by seed plants for reproduction
- Each grain is a protective shell carrying the plant's male cells



The hard outer shell of this radish pollen grain is made of sporopollenin, a remarkably hardy, inert material.

# How pollen is produced



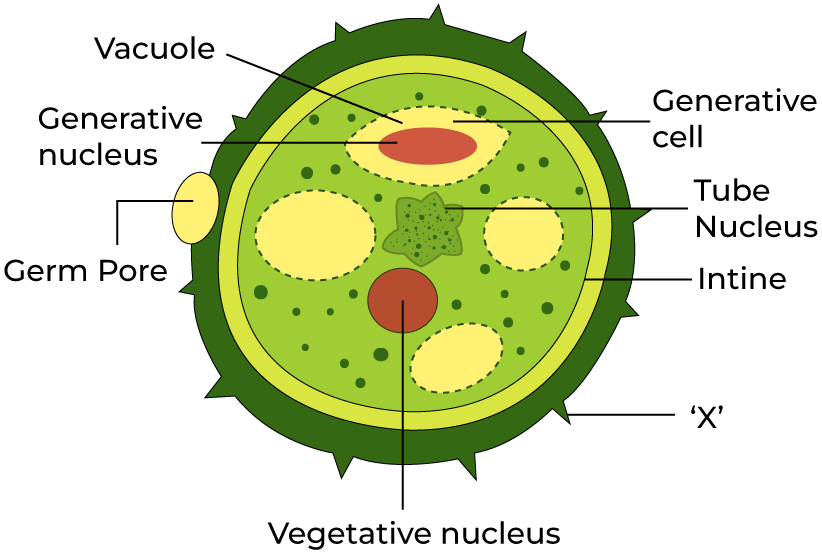
# What colors do you see?

# Anatomy of a Grain

## Built for Endurance

The **Exine** is the outer wall made of **Sporopollenin,** one of the most chemically resistant organic compounds known to science. It survives for millions of years in fossils.

The **Intine** is the inner cellulose layer, while **Apertures** are the exits through which the pollen tube eventually grows.



SECTION 1

# Pollen Colour

# Why are pollen grains different colors?

Colours range from yellow and orange to blue, grey, even black

Colour comes from pollenkitt, a specialised outer coating. This sticky, fatty substance contains:

- Carotenoids – yellows, oranges, warm reds
- Flavonoids – yellows, ivory, purples, blues
- Anthocyanins – blues, purples, reds (water-soluble)
- Chlorophyll – green tint

# What can affect pollen colors? Collection

1. Condition of pollen when gathered
2. Moisture the bee adds to the load
3. Colour and nature of the moistening material
4. Dust, fungus or spores on the flower

# What can affect pollen colors? Weather

Weather can change colour through rain, frost and humidity:

- Dry, warm weather: pollen is freshly released, true to colour and quality
- Wet, cold weather: bees stop collecting; anther pollen ages and shifts colour
- Trees release pollen early (5–9am); wind carries the buoyant grains far

# What can affect pollen colors?
# Time of day

Pollen flow peaks in the morning, roughly 8am–12pm:

- Anthers split open only once the sun warms the air
- Peak foraging time – bees gather fresh, sticky pollenkitt
- Rain shuts flow down: grains wash away and anthers close to protect the DNA

# What is the use of different pollen colors?

- Protect against environmental stress, including UV radiation
- Shield delicate DNA from mutation or damage in transit (anther to stigma)

**Evolutionary advantages:**

- Bright pollen contrasts against petals
- Guides pollinators to the flower's reproductive centre
- Wind-pollinated plants: dull and mass-produced – no need to attract insects

SECTION 2

# Why Pollen Matters to Bees

# Pollen can be carried between flowers by

wind

bats

mammals

insects

# Why is Pollen important for honeybees?

Pollen is the only protein source for honeybees

Amino acids (protein) feed young larvae

Also supplies fats, sugars, vitamins and minerals

# Why is Pollen important for honeybees?

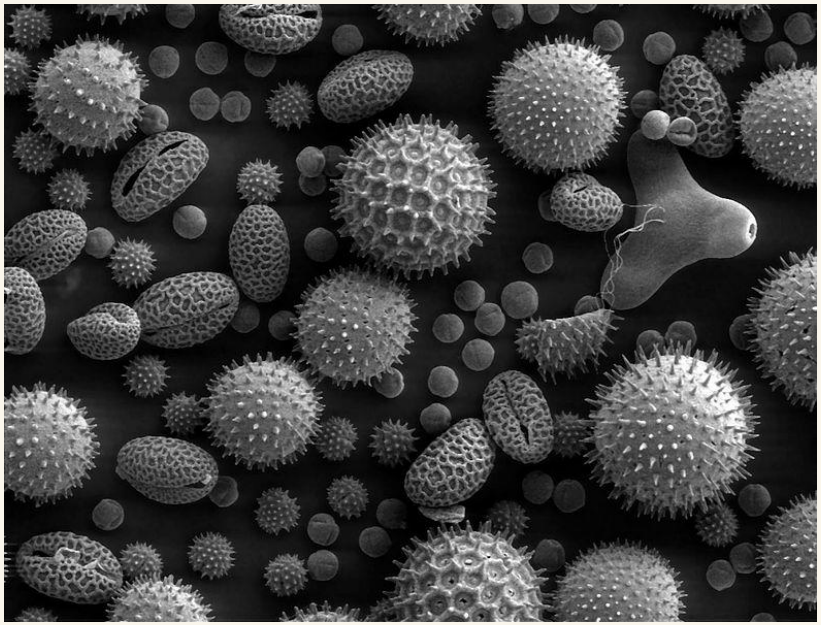
A colony needs between 40 – 70lbs of pollen annually.

Pollen quality falls into 4 classes, most nutritious first:

1. Fruit trees, legumes (esp. clover), willow – >25% crude protein
2. Elm, maple, oak, cottonwood, willow – 20–24%
3. Goldenrod, aster, brambles, dandelion – 15–20%
4. Pines and sunflower – poor quality, <15%

Pollen ranges 4–60%; bees need 18–22% protein in summer.
So bees need a polyfloral diet – many plant sources.

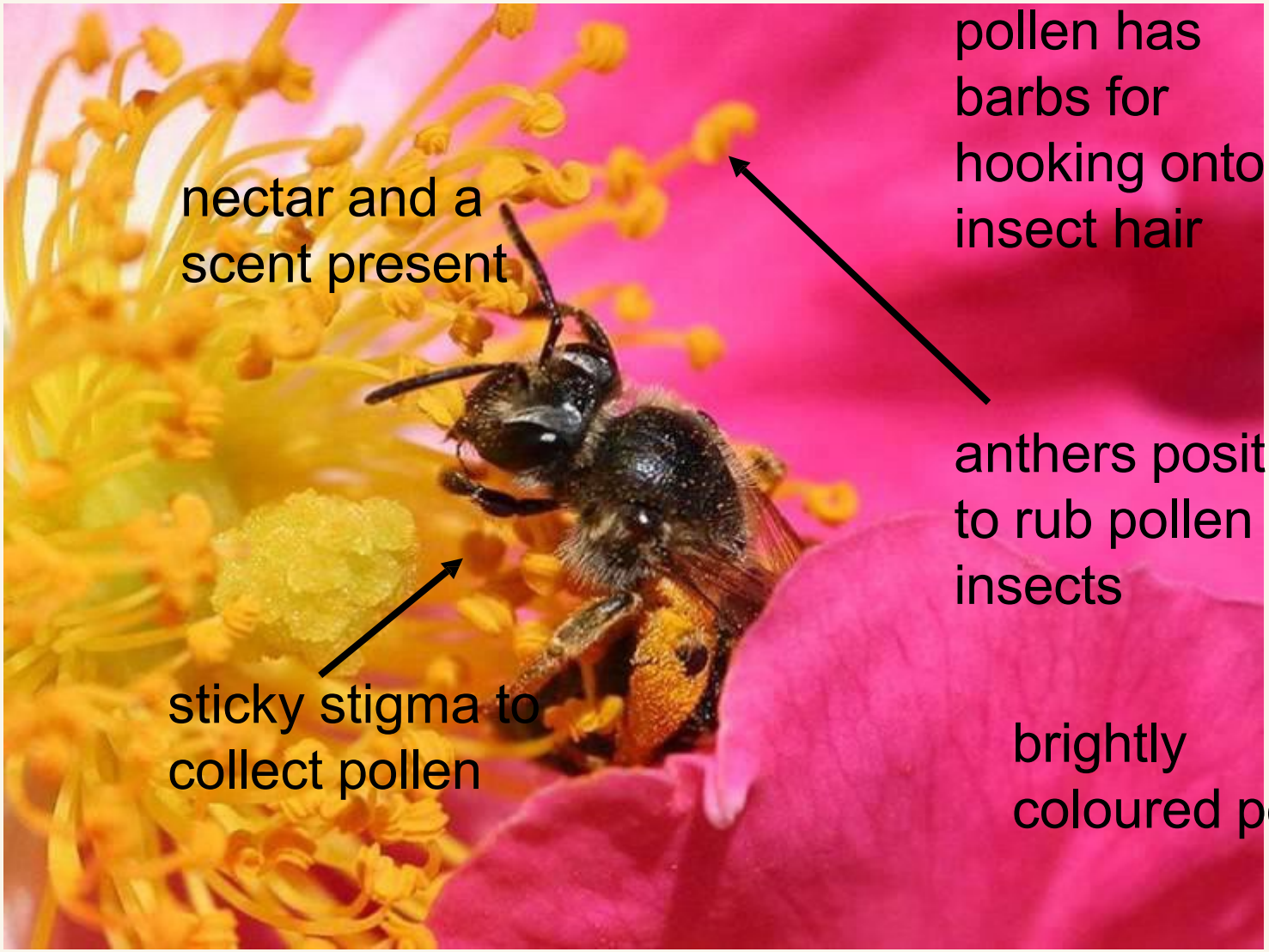
# Pollen

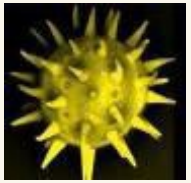


pollen is designed to
stick to insects (Pollenkitt)

honeybee covered
in pollen

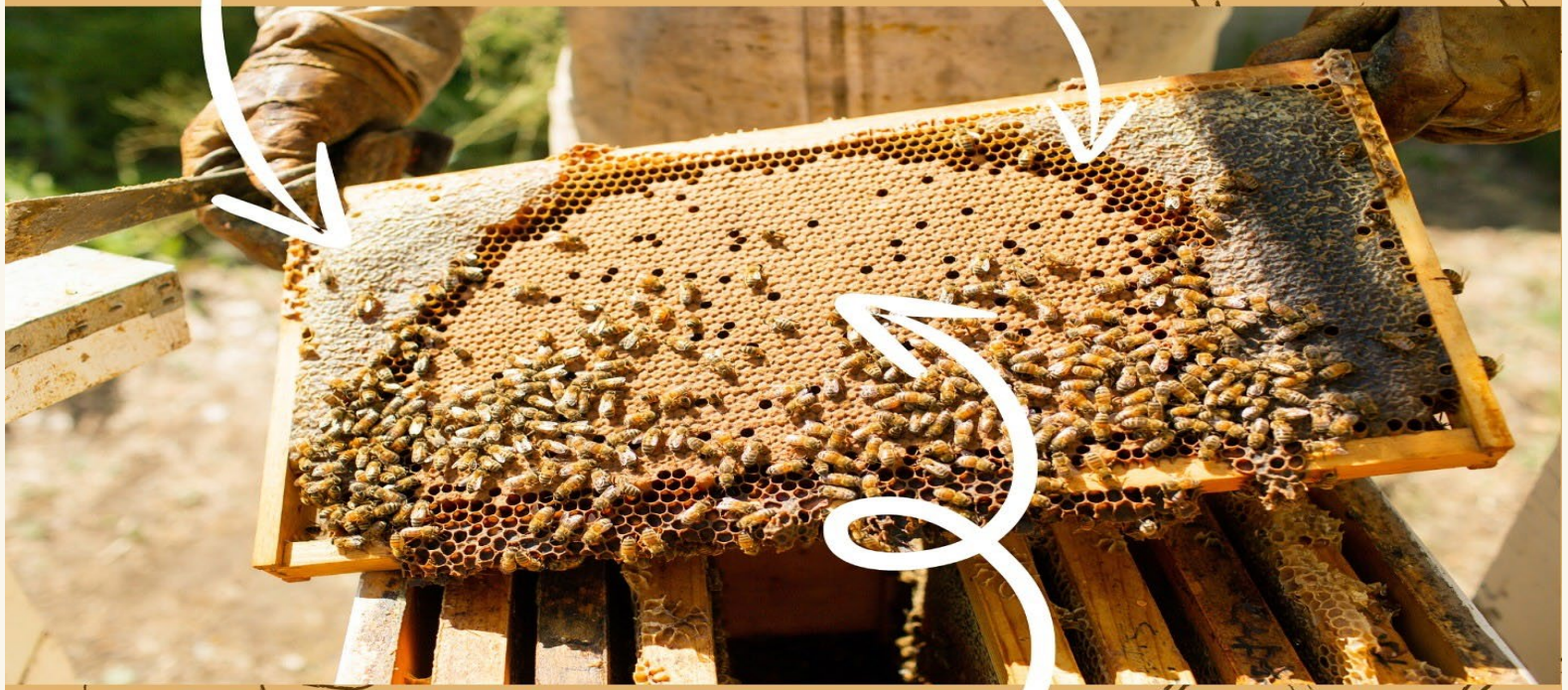
# Insect-pollinated flowers (entomophilous) are adapted to attract insects to them to enable transfer of pollen



Flower –ve charge
Bee +ve charge

# WHAT A PERFECT BROOD FRAME LOOKS LIKE!



# How do honeybees carry pollen to the hive?

Abundance of open larvae stimulate foragers to collect pollen

They forage on one plant type at a time(fidelity).It is stored near larvae during brood rearing

Nurse bees make brood food with it for growing larvae

Packed into the corbicula (hind leg), then passed to house bees

# Comb Storage

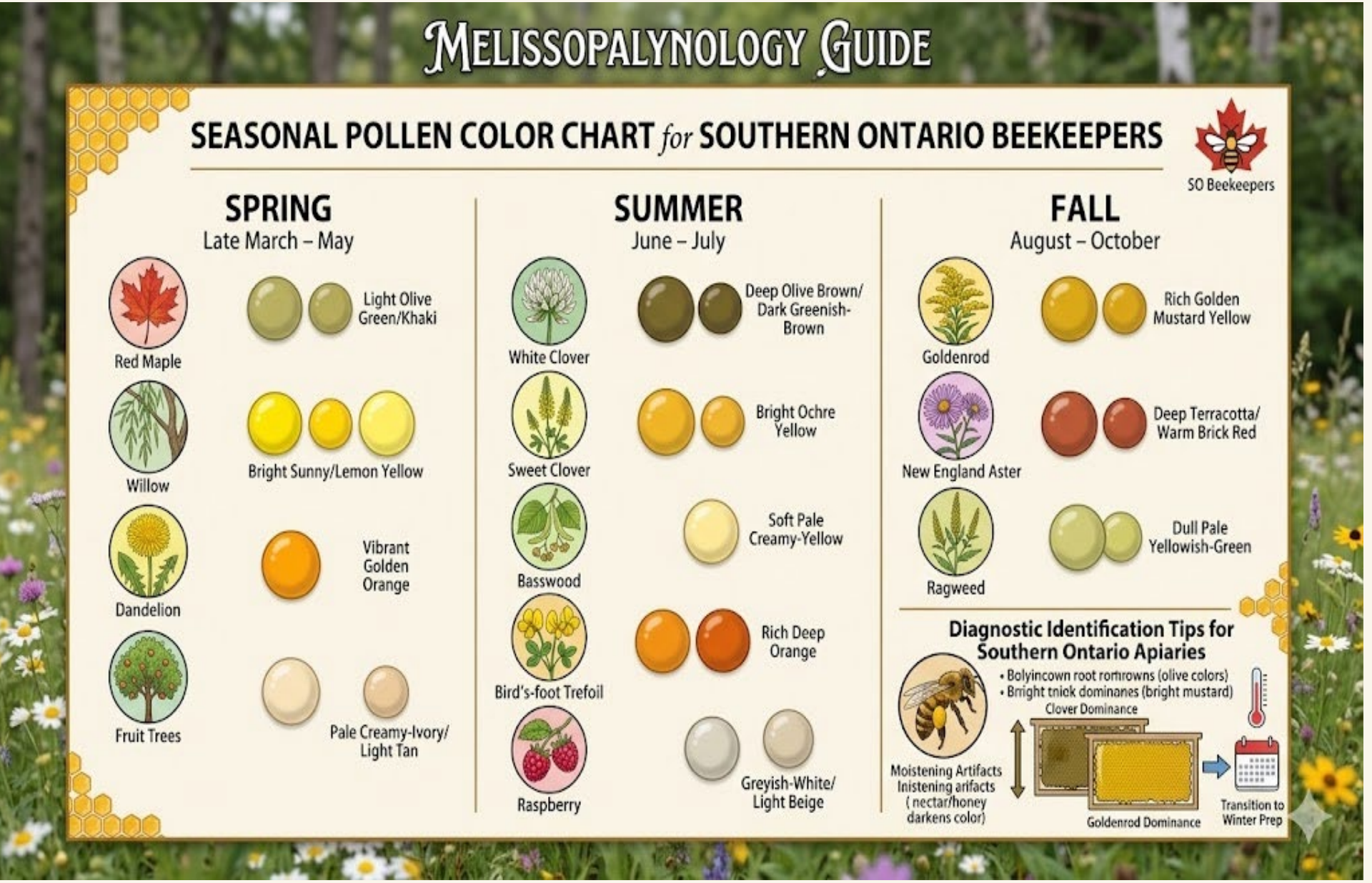
- Foragers moisten pollen with nectar or honey; honey-crop bacteria turn it into Bee Bread
- Lactic-acid fermentation stops germination, giving good shelf-life

**Bee Bread**


SECTION 3

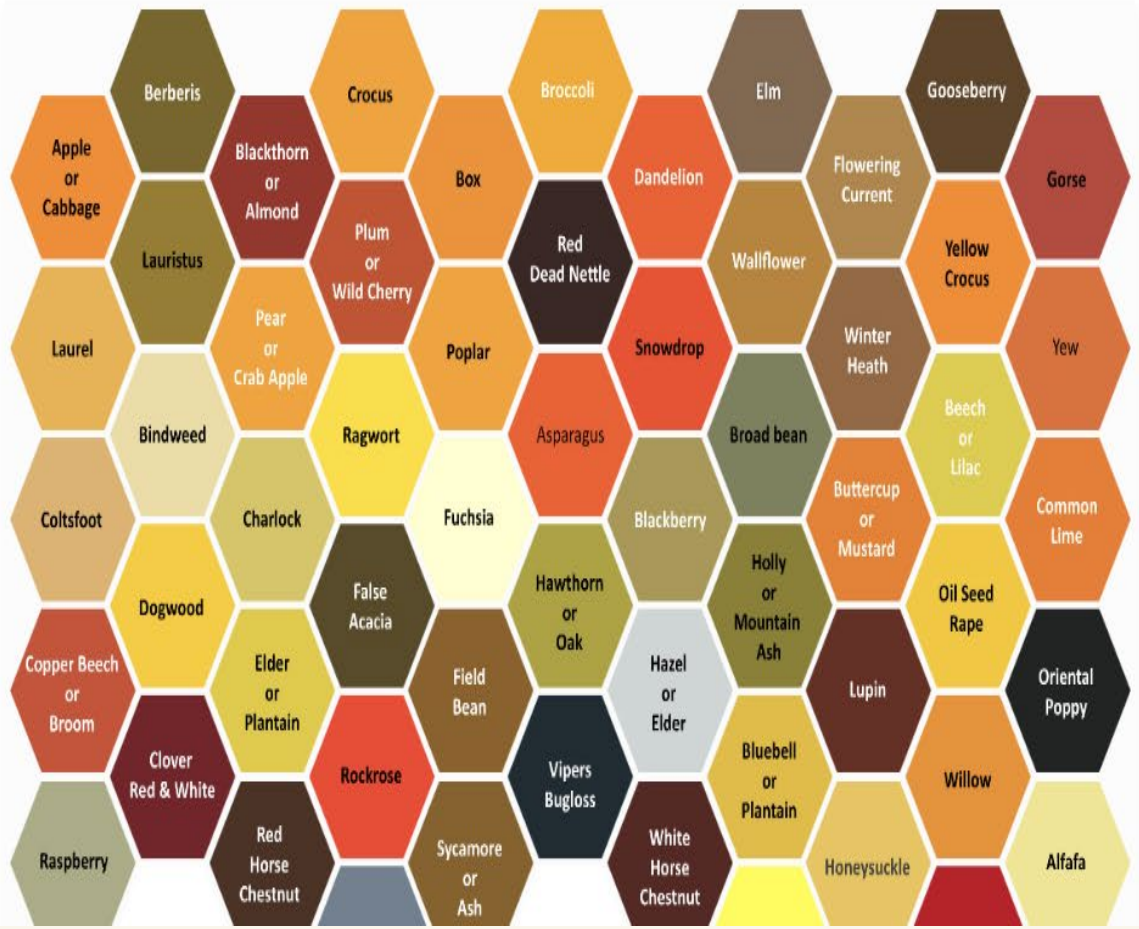
# Pollen Through the Seasons

# Southern Ontario pollen by season



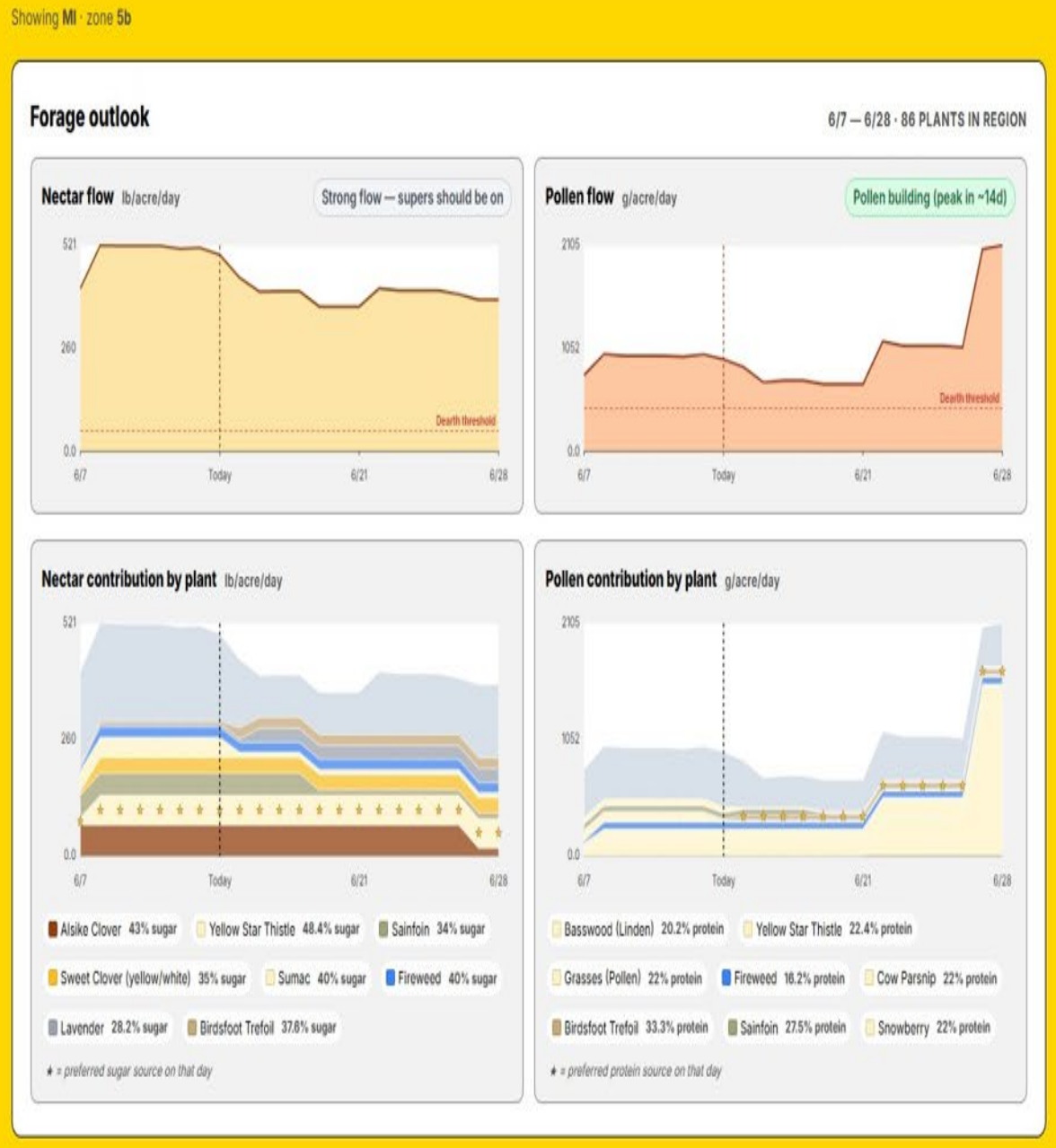
# Pollen Color Chart

The following chart depicts the various colors of pollen. Click to enlarge. The source of this chart is the North Shropshire Beekeepers' Association (nsbka.org).



Info from[WAGGL]

https://waggl.dance/explore



# Take aways:

- Know what plants are in bloom in your area

- Have a pollen colour chart available to compare colours of pollen loads coming into hive

- Varying colours of pollen coming into your hives is a good sign of nutritional diversity

- Pollen is not stored the same as nectar and is needed close to the brood for growing colonies

- Your bees require lots of pollen to thrive, it is a precious resource