

# Enhancing Pollination



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# Honey Bee Points

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**Contributions made by managed honey bees hired by U.S. crop growers to pollinate crops amounted to just over \$14.6 billion**

**Live for a six to eight-week period, their average honey production is 1/12 of a teaspoon. In that short lifetime, they fly the equivalent of 1 1/2 times the circumference of the earth.**

# **Where to Start ?**

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**What do you all think?**

# The Answer Is.....

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**Promote overall bee and  
hive health plus**



# Efficiency

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# A Little About Bees and Pollination

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Preferred Flower Colors—

blue, purple, violet, white, and yellow

Flower shape



# Pollination Syndrome

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## Scent

- Time of day

## Flower Color & Patterns

- Ultra-violet, green, blue
- Swathes of color indicating that plenty of food here

## Flower shape and nectar/pollen provision



# Key Concept

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**Variety of pollen sources will  
often times increase fruit set and  
yields**



# Terminology

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## **Pollinator**

**An agent (bees, insects, people) of pollen transfer**

## **Pollinizer**

**The plant species or variety that produces the pollen**

## **Cross-pollination**

**The transfer of pollen between two different species or varieties**

## **Self-unfruitful or self-sterile**

**Plants in which very little fruit will set**

## **Self-fruitful**

**Varieties that set fruit with their own pollen**

# Brambles—Raspberries & Blackberries

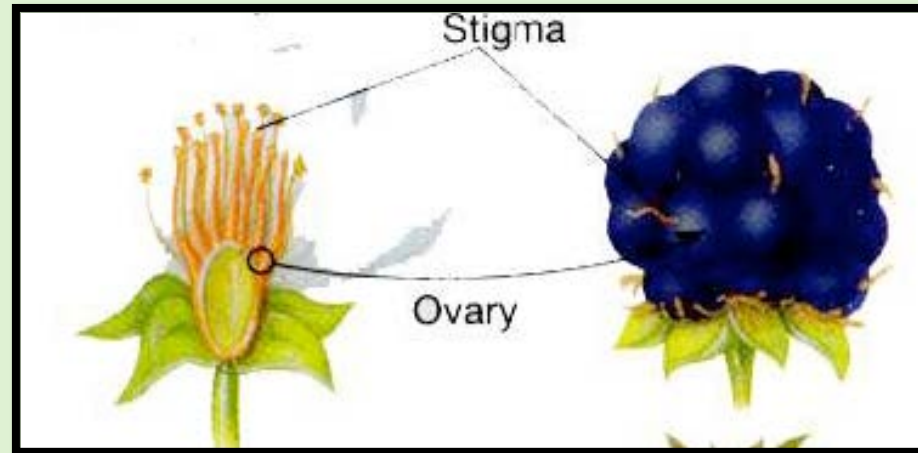
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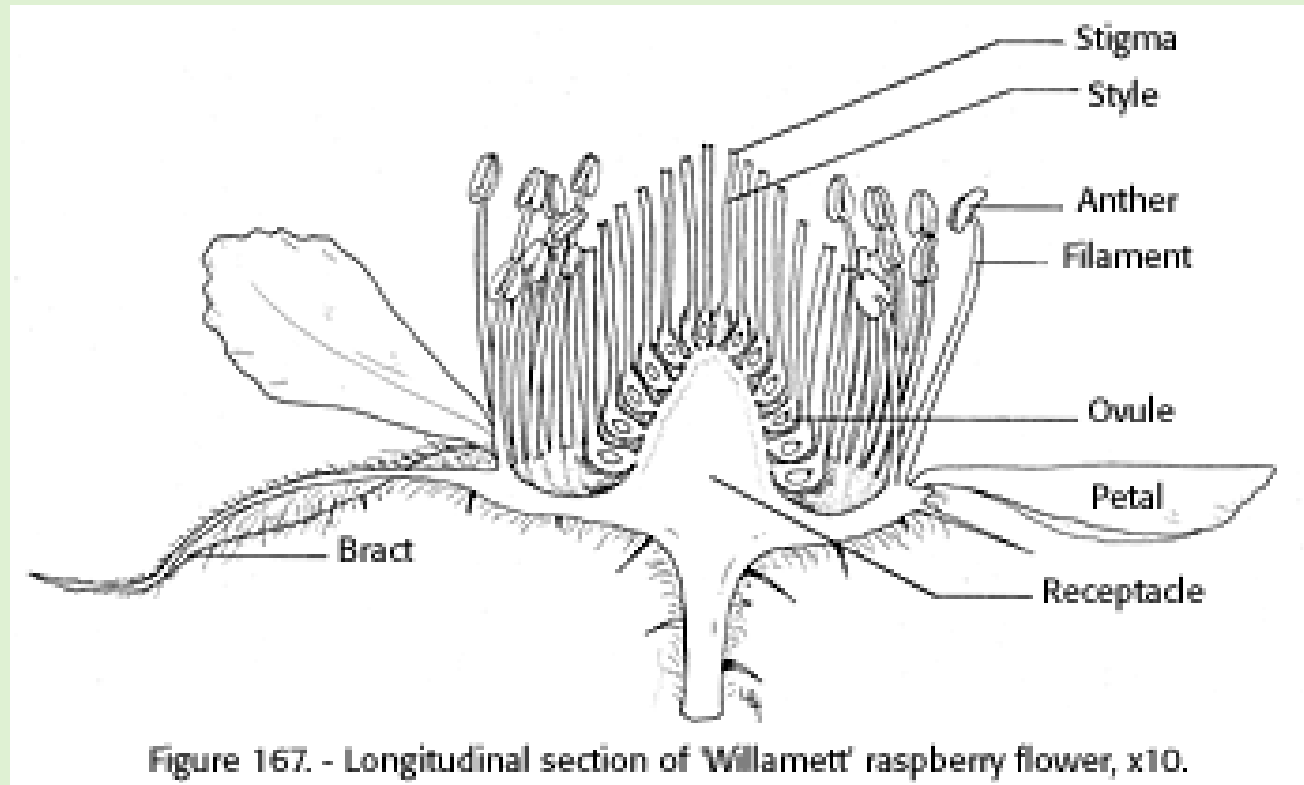
# The Fruit----The Difference

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Aggregate fruit develop from a single flower with multiple pistils. Each pistil develops into an individual fruit called a drupelet. Individual fruit fuse together as they grow and develop producing a single structure.



# Raspberry Flower



# Poorly Pollinated Fruit

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# Compatibility

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**Generally, raspberries and blackberries are self-pollinated**

# Bloom Period

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**Summer Bearing**

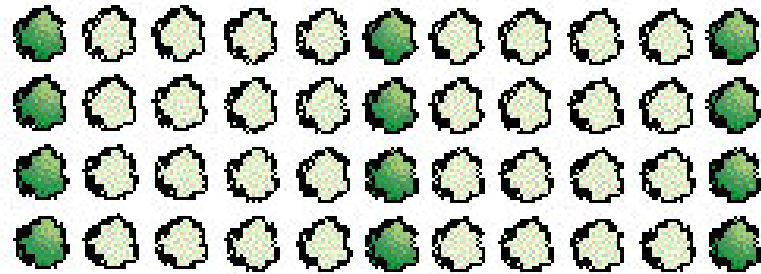
**Ever Bearing**

**Fall Bearing**

# Planting Layout Schemes

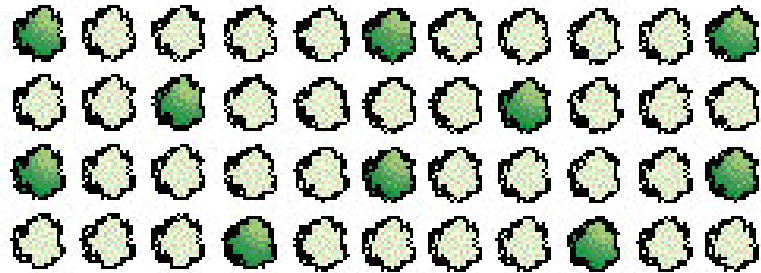
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**Pollenizers placed in solid rows**



 Shaded trees represent pollenizers

**Pollenizers placed within rows**





# Hive Placement and Numbers

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- **1 -2 Healthy hives per acre**
- **Avoid clustering**



# Strawberries

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**If all the strawberries produced in California in one year were laid berry to berry, they would go around the world 15 times.**



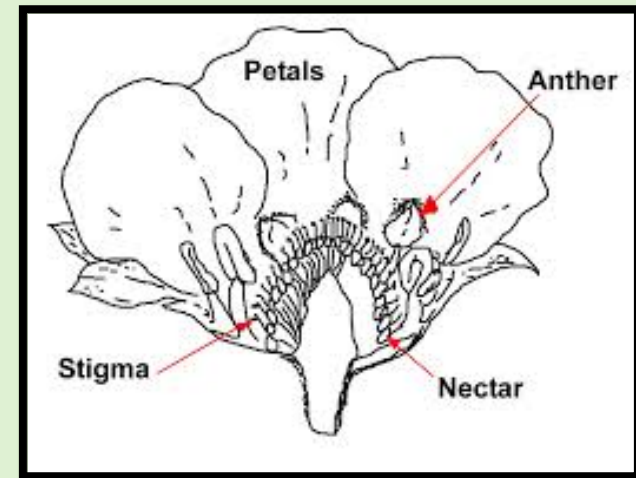
# Pollination

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Generally considered self-pollinating

Pollination of all stigmata is required for proper berry development

- 53% self pollination
- 67% wind assist
- 91% insect assist



# Fruit Shape

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Best fruit shape results when:

- Multiple visits from pollinators—4 to 11 visits
- Variety of pollinators visit the flowers

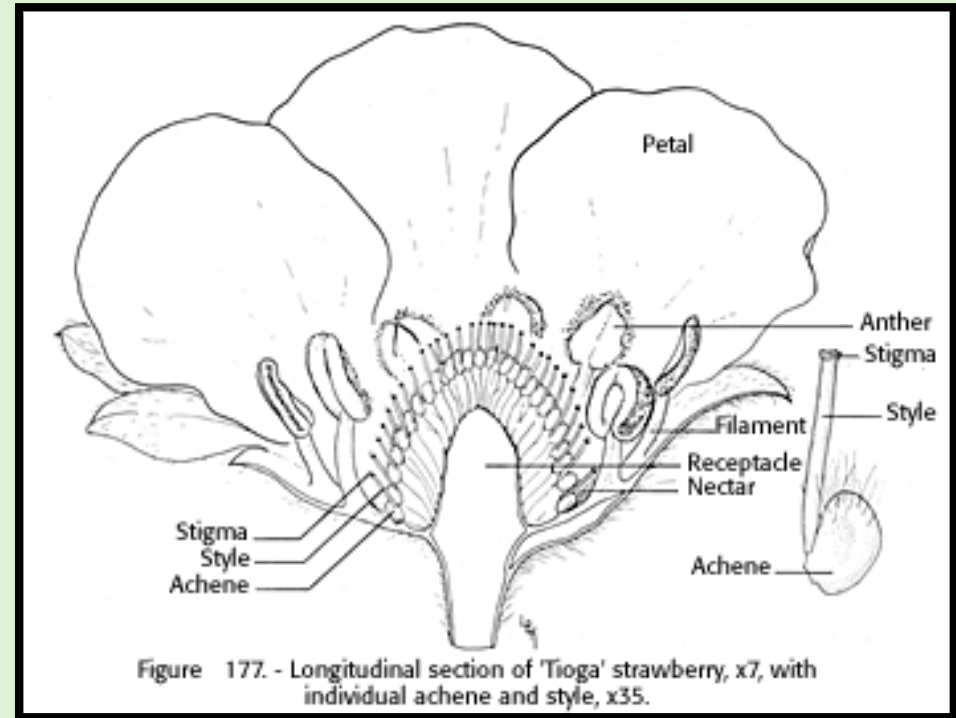




# Kept and Wild Bee Interaction

Wild bee and kept bee interactions caused an increase of visitations by the kept bees

Better seed and fruit set



# Blueberries

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# Flowering Characteristics

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**Self-fertile**

**Early, mid-season, late season varieties**





# Pollinator Planting Schemes

Two Varieties 1/2 Variety - A 1/2 Variety - B	A	A	B	B	A	A	B	B
	A	A	B	B	A	A	B	B
	A	A	B	B	A	A	B	B
	A	A	B	B	A	A	B	B
	A	A	B	B	A	A	B	B

Two Varieties 2/3 Variety - A 1/3 Variety - B	A	B	A	A	B	A	A	B	A
	A	B	A	A	B	A	A	B	A
	A	B	A	A	B	A	A	B	A
	A	B	A	A	B	A	A	B	A
	A	B	A	A	B	A	A	B	A

Three Varieties 1/3 Variety - A 1/3 Variety - B 1/3 Variety - C	A	B	C	A	B	C	A	B	C
	A	B	C	A	B	C	A	B	C
	A	B	C	A	B	C	A	B	C
	A	B	C	A	B	C	A	B	C
	A	B	C	A	B	C	A	B	C

# Hive Numbers

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**3 Hives per acre**

- **Lots of flowers**
- **Honey bee is not the most efficient pollinizer**
  - **Pollen grains large**
  - **Shape of flower**
  - **Low nectar producer**

# Is The Honey Bee The Best Pollinator?

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# Promote Nesting Sites



# Promote Habitat

- Diversify your planting
- Plant fence rows to pollinator attracting plants
- Watch your sprays

