



STRUCTURAL ADAPTATIONS IN HONEY BEES & COMMUNICATION IN HONEY BEES

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STRUCTURAL ADAPTATIONS

COLOUR

EYES

WAX
GLAND

POLLEN
BASKET

MANDIBLES



COLOURATION



It make bees harder for predator to see.

The yellow and black stripes on a bees body helps make bees harder for predators to see.

It is a camouflage when they are gathering nectar and pollen from flowers.

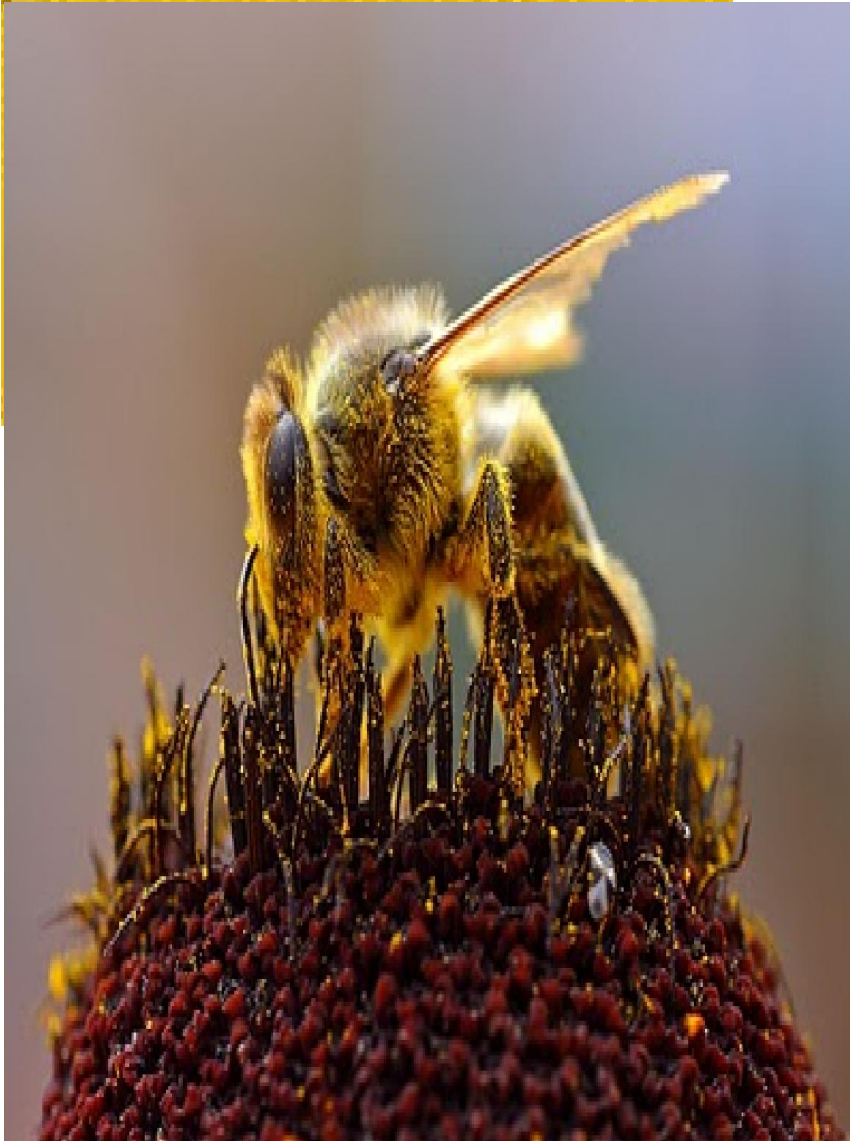
STINGERS

The sting is found in a chamber at the end of the abdomen, from which only the sharp-pointed shaft protrudes.

Honeybees adapted this organ to be sharp enough to penetrate an attacker's flesh.



HAIRS



The hair on a honeybee's body is another adaptation.

When a bee lands on a flower to drink nectar, the flower's fine, dust-like pollen clings to the bee's fur due to the static charge.

The bee can then use their feet to "comb" themselves, gathering the pollen and storing it on the pollen baskets on their back legs.

HEAD



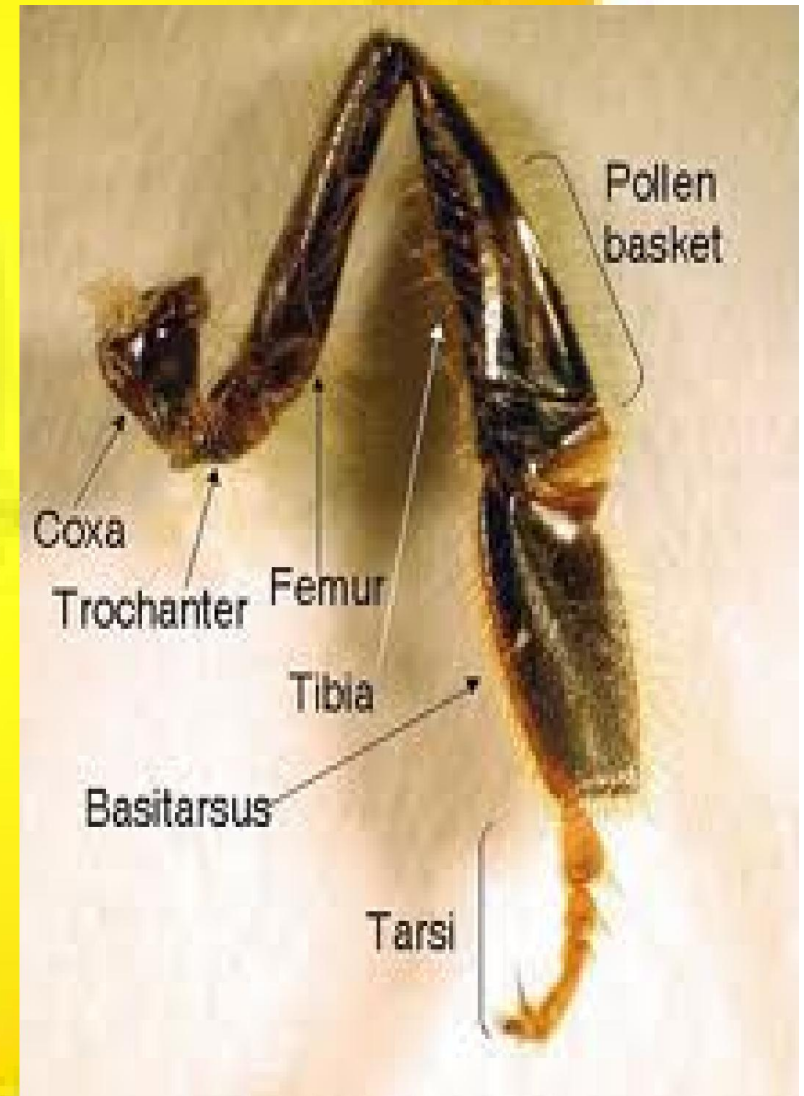
The honey bee head is triangular when seen from the front.

The honey bee uses its proboscis, or long hairy tongue, to feed on liquids and its mandibles to eat pollen and work wax in comb building.

LEGS

The honey bee has three pairs of segmented legs.

The legs of the bee are primarily used for walking.



MANDIBLES

The mandibles are used for any chores about the hive that require grasping or cutting, such as working wax to construct the comb, biting into flower parts.

PROBOSCIS

The proboscis of the honey bee is simply a long, slender, hairy tongue

When in use, the tongue moves rapidly back and forth.

Bees can eat fine particles like pollen, which is used as a source of protein

It cannot handle big particles.

Pollen Baskets

A smooth, somewhat concave surface of the outer hind leg that is fringed with long, curved hairs that hold the pollen in place.

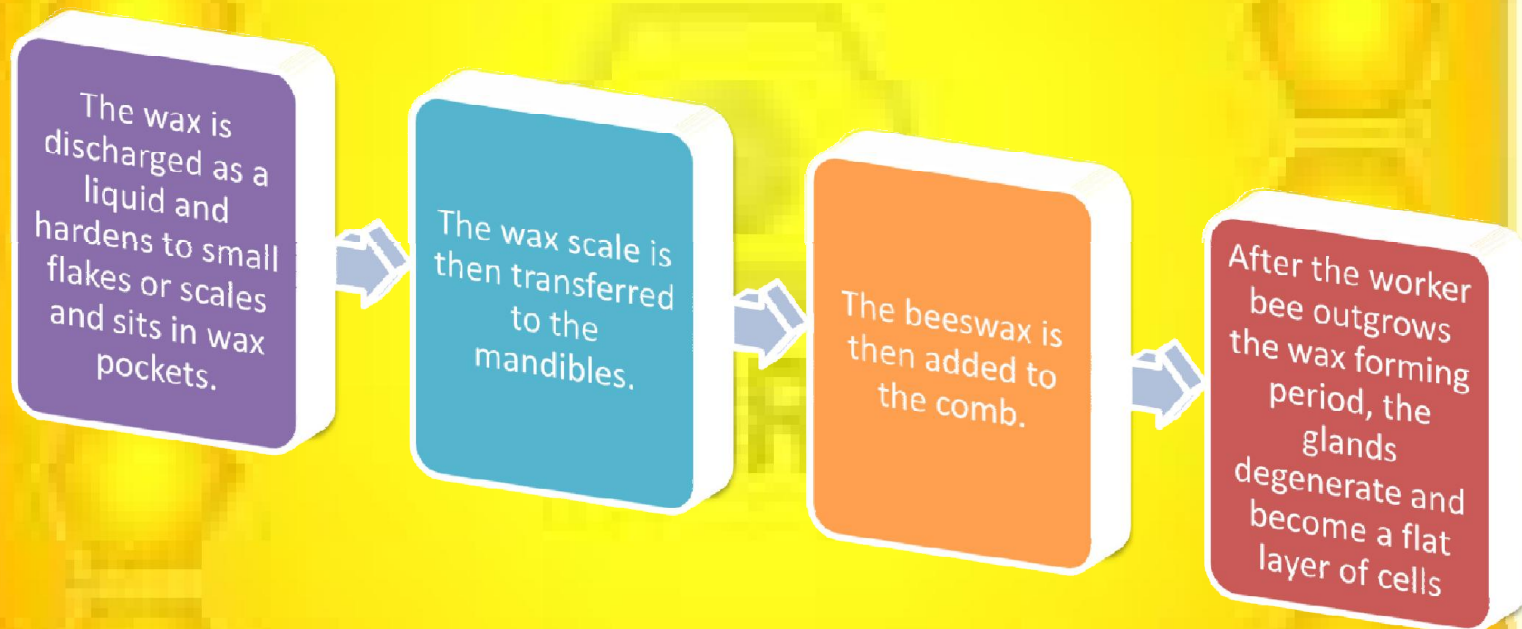
This enclosed space is used to transport pollen and propolis to the hive.

It is also called as corbicula.

POLLEN BASKET



WAX GLAND



WAX GLAND



WINGS

The honey bee has two sets of flat, thin, membranous wings, strengthened by various veins.

The fore wings are much larger than the hind wings, but the two wings of each side work together in flight.

Just flapping the wings does not result in flight. The driving force results from a propeller-like twist given to each wing during the upstroke and the downstroke.

WINGS





COMMUNICATION IN HONEY BEES



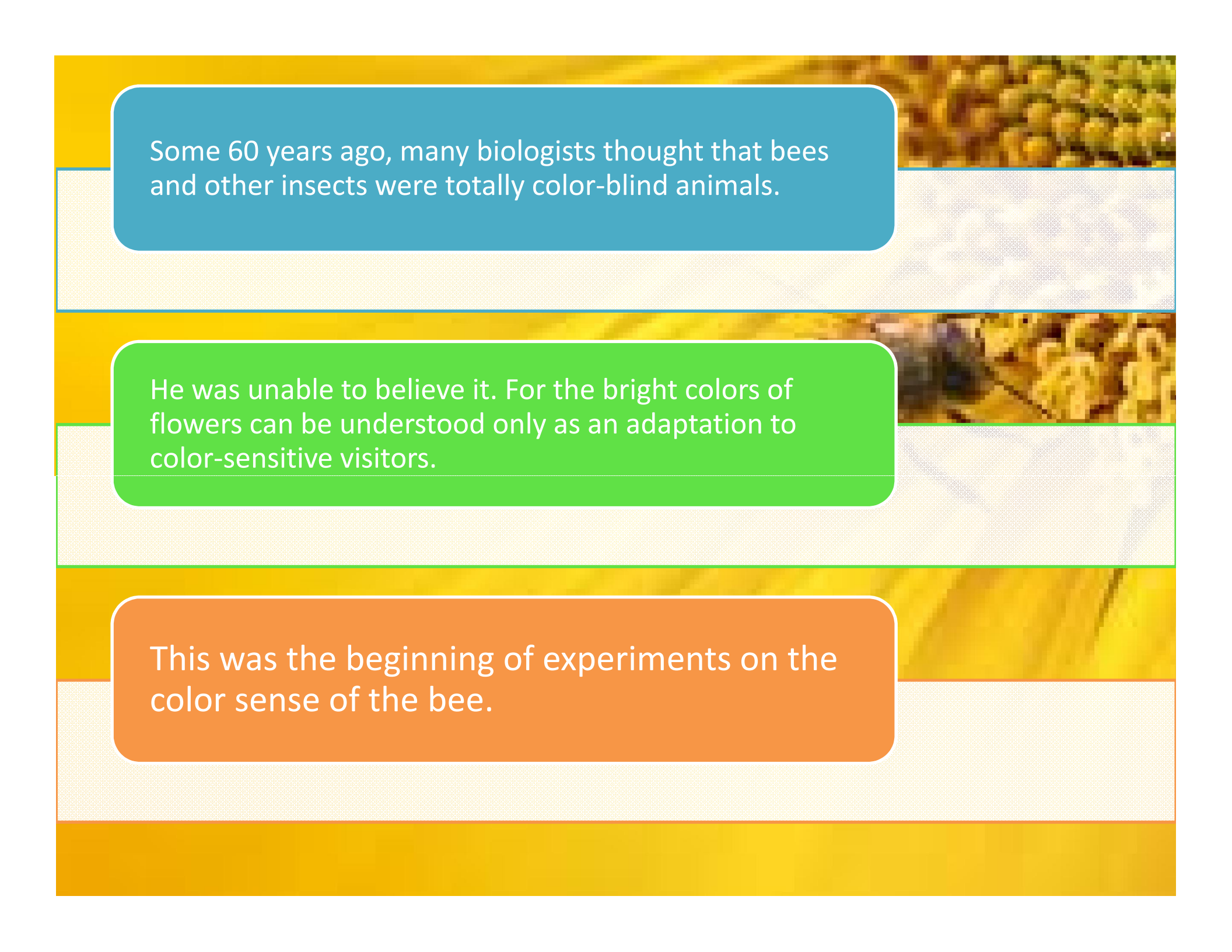
KARL VON FRISCH

Karl von Frisch was born on November 20, 1886, in Vienna, the son of a university professor

He displayed an early interest in animals, which his family encouraged.

In 1945 he made the astounding discovery that honeybee workers communicate symbolically about the location of food sources such as fields of flowers.

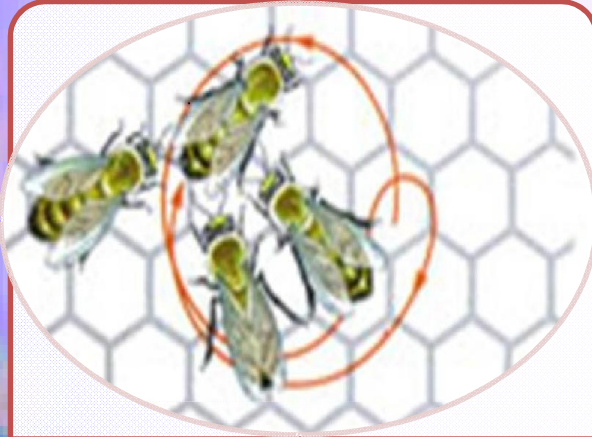




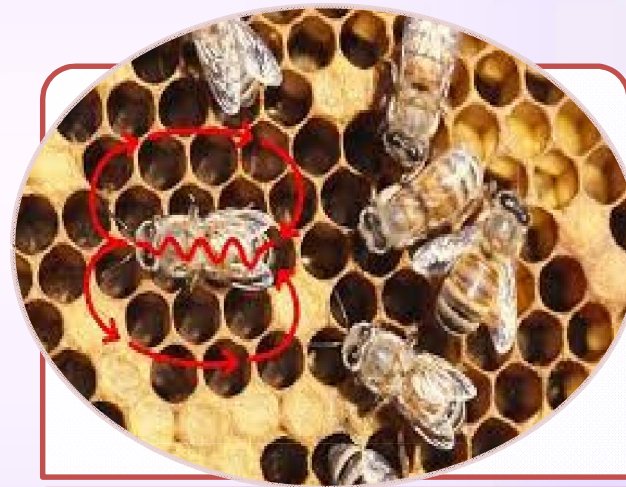
Some 60 years ago, many biologists thought that bees and other insects were totally color-blind animals.

He was unable to believe it. For the bright colors of flowers can be understood only as an adaptation to color-sensitive visitors.

This was the beginning of experiments on the color sense of the bee.



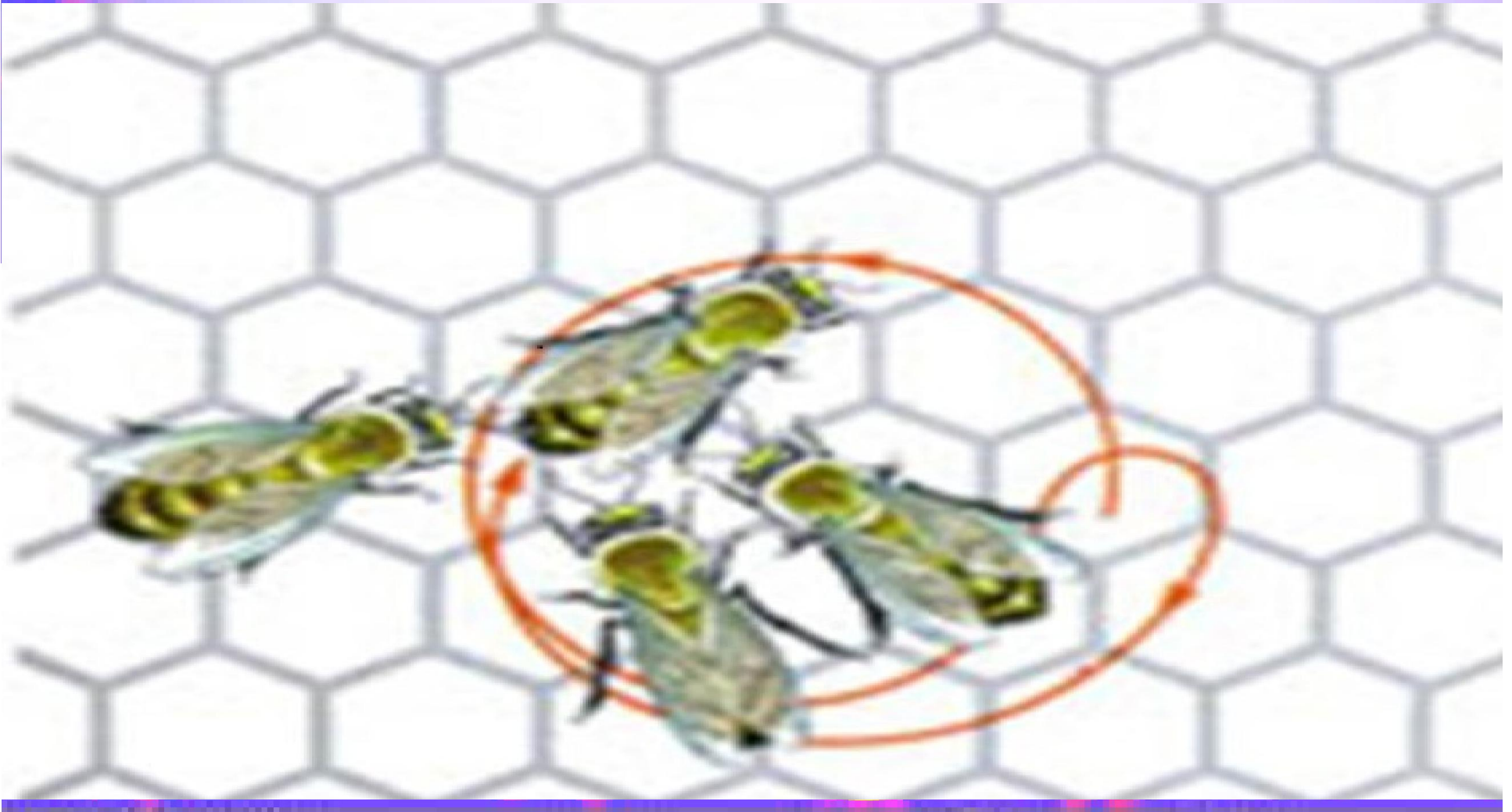
Round
dance



Tail wagging
dance

ROUND DANCE:

It is used to indicate a short distance less than 80m in case of *Apis mellifera*.



Tail wagging dance:

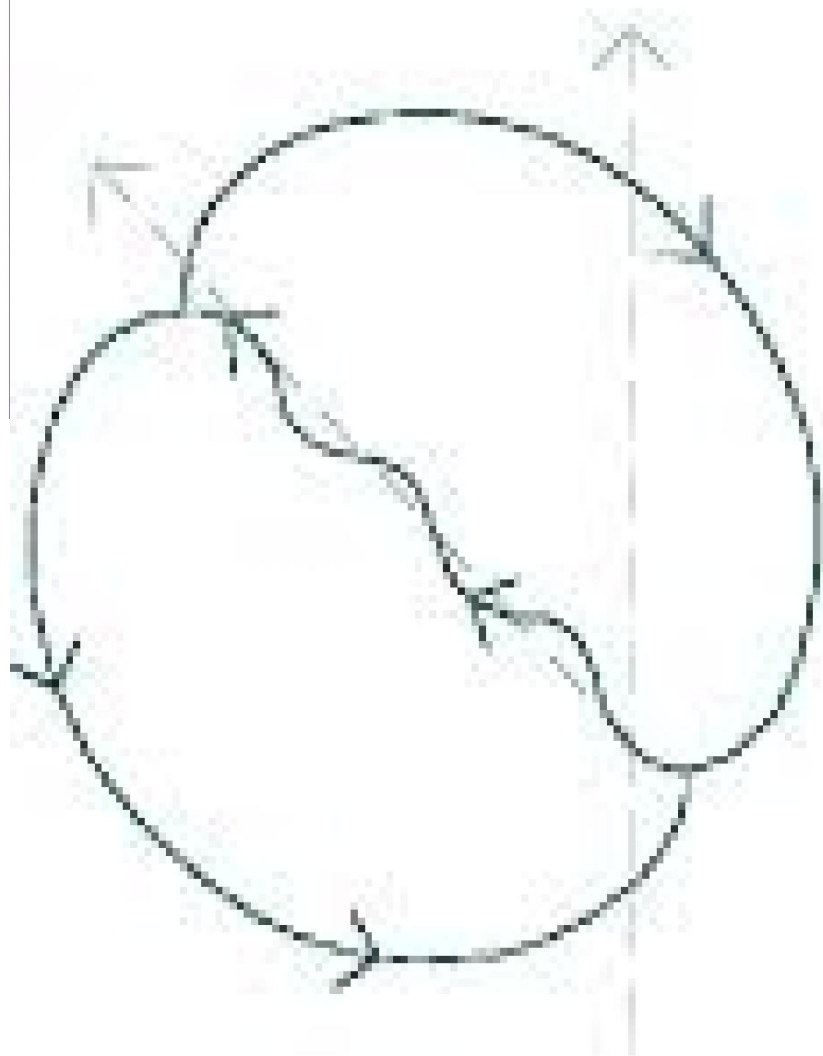
This is used to indicate long distance more than 80m in case of *Apis mellifera*.



The no. of wags/time $\propto \frac{1}{\text{Distance of the food}}$

The direction of the food source is conveyed by the angle.

Bee Dance



Direction of Flowers



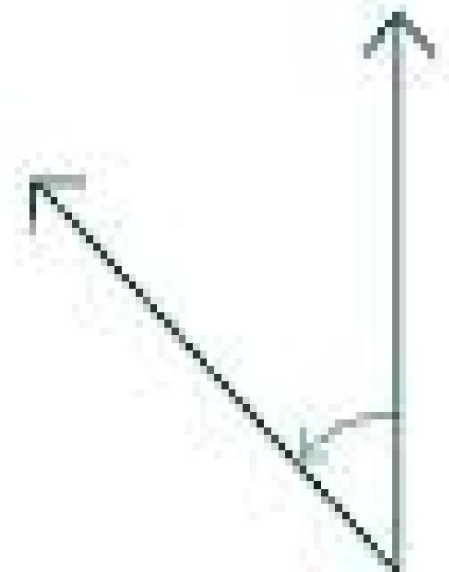
Flowers



Sun



Hive

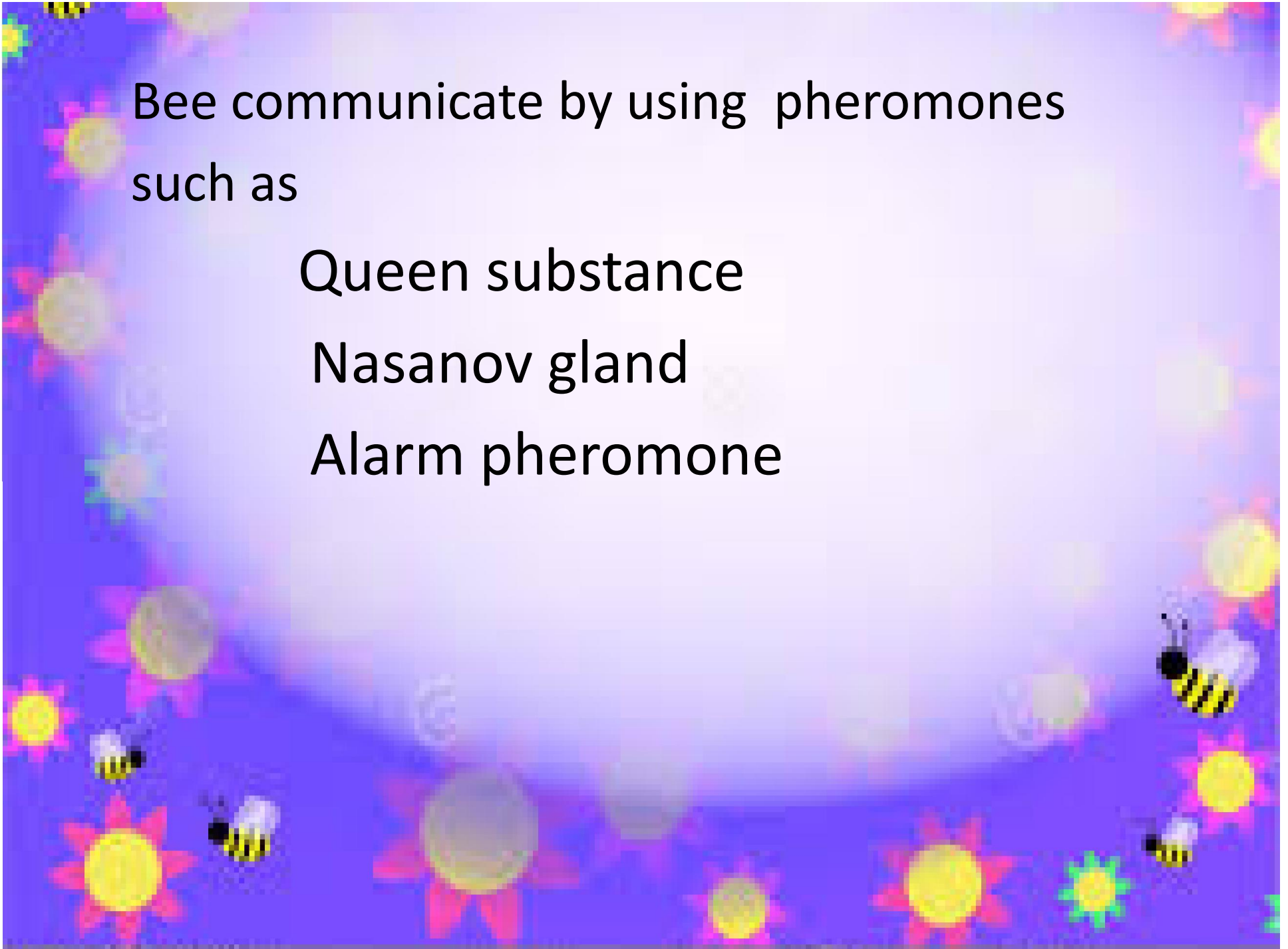


Bee communicate by using pheromones
such as

Queen substance

Nasanov gland

Alarm pheromone



Pheromones are chemical scents that animals produce to trigger behavioral responses from the other members of the same species.

Honey-bee pheromones provide the “glue” that holds the colony together.

The three castes of bees produce various pheromones at various times to stimulate specific behaviors

PRIMER PHEROMONES

It plays a role in the distribution of labor.

Foragers gather a chemical called Ethyl oleate.

It feeds the chemical to the worker bees.

If the foragers dies off, nurse bees become foragers.

PHEROMONE	FUNCTION	SOURCE
Sex Attractant	Sex attraction	Mandibular glands
Aphrodisiac	Sexual stimulation of drones	Mandibular glands
Swarm orientation substance	Orientation of flying swarm	Mandibular glands
Swarm stabilisation substance	Stabilisation of landed swarm	Mandibular glands
Queen substance	Inhibit queen replacement & worker ovary development	Mandibular glands
Alarm Odour	Defence alarm	Vicinity of worker sting
Alarm Tag Odour	Mark site of attack	Vicinity of sting chamber
Alarm substance	Provokes attack	Mandible gland of worker
Scent gland secretion	Orientation of position and direction.	Nasanov gland of worker

nature calls

that was an awesome dance
but i still have no idea
where that field of clover is...



search for bee

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berry

TROPHALLAXIS



Trophallaxis is the transfer of food or other fluids among members of a community through mouth-to-mouth or anus-to-mouth feeding.



THANK YOU