

Program Script

The Life cycle of Wasps and Bees

Title: Mud Wasps

It's a sunny day in early summer. A mud wasp awakes from hibernation. Its mandibles gnaw through the cocoon where it has spent the last 10 months.

At first male wasps appear. You can tell that they are male because their antennas are rolled up.

Everywhere you look you can see abandoned cocoons. Now they search for flowers to feed on.

A few days later female wasps emerge from their cocoons. Their antennas are straight.

After a cleaning herself, this female obtains nourishment from nearby flowers.

Soon after, mating takes place – the male dies shortly afterwards. Caring for offspring is the sole responsibility of the female.

Mud wasps like to build breeding caves in muddy soil on steep slopes.

At first she selects a suitable site for digging a shaft. Then she collects some water.

The water softens the soil and she starts digging with her mandibles. The finished shaft will be 5 cm deep.

The wasp uses the dirt that is being dug out to build a small tube above the surface. She is working tirelessly, and in less than an hour the tube is 1 centimetre high. It is probably designed to keep out rain and parasites. Later on the dirt is used to close the shaft.

Often lots of brood sites spring up side by side. This is only due to the favourable living conditions in this particular spot. There is no social contact between them; the wasps live a solitary life.

As soon as a breeding chamber at the end of the shaft is ready the wasp crawls backwards into it. When she emerges again a tiny oval egg is hanging from a fine thread at the end of the chamber.

If the offspring are to survive, food has to be provided. Mud wasps hunt for the larvae of proboscis beetles, which camouflage themselves on clover plants. But the wasp detects them easily.

The wasp stings and paralyzes the larva, then carries it back to the breeding shaft.

The wasp keeps doing this until the breeding shaft is full – usually 10-20 beetle larvae will fit. She then seals the top of the shaft with dirt.

Then the next breeding chamber is prepared.

Once the wasp larva starts eating, it doesn't take long to grow.

After about a week the food supply runs low, and the wasp larva starts to cocoon.

There are 4-6 breeding chambers on each shaft. Because they are built and supplied one after another, some larvae have not even hatched while others are already spinning their cocoons.

As soon as all chambers are supplied with an egg and live food, the wasp starts filling up the shaft with dirt. The entrance is carefully and inconspicuously closed. The wasp can't do anything more for her offspring – she dies soon after.

The grown up larvae spend the winter motionless in their cocoon. When summer arrives the following year, the metamorphosis from pupa to an adult insect begins inside the cocoon.

The life cycle is completed when the first male wasp emerges from his cocoon.

Title: Paper Nest Wasps

In early spring a queen paper-nest wasp emerges from hibernation.

To establish a nest she starts collecting the necessary building materials. She mixes bits of wood and plant fibres with saliva to make a pulp, which resembles paper when it dries.

This material is formed into a multi-celled nest ending on a short stem.

The Queen builds the nest on blades of grass, or twigs or rocks. The nest is aligned towards the morning sun.

The queen works away on her own. As soon as possible an egg will be deposited in each cell of the nest.

But an approaching thunderstorm is stopping the construction work.

As soon as the shower is over the queen has to dry the nest. At first she sucks up the water; her abdomen is holding it. Then she turns her head down over the edge and regurgitates the water. Once the cells are dry, she starts drying the walls. The eggs inside the cells have to be kept dry.

A few days later the wasp is cooling the nest with her wings. The eggs have hatched, and the larvae inside must be kept cool.

The queen has a lot of work to do. She has to protect the nest, find food, and feed the larvae.

Again and again she has to fan the nest. In-between she builds cells and lays one egg in each.

These larvae in their cocoons will emerge soon, and will need to be fed. The queen cannot do it all on her own.

After a while a fair number of working wasps have left their cocoons after metamorphosis. They are sterile females, whose only task is to extend and fan the nest and to nurse the brood.

To supply the larvae with the right food, female workers have to hunt. This one caught a fly.

At the nest, the catch is divided into smaller pieces and passed on.

The protein rich diet is only for the brood. The wasps themselves feed on nectar.

Field wasps have black and yellow banded and spotted bodies. The thorax and abdomen are connected by a narrow waist, which gives the abdomen mobility for egg laying and stinging.

Autumn has arrived.

In this nest the queen laid unfertilised eggs. They have developed into male wasps. We can tell that they're male by their rolled up antennas and yellow faces.

At the same time some young queens emerged. Sometimes they mate with male wasps of their own nest.

Unfortunately for the wasps, as autumn comes to an end, their time starts to run out. All the female workers and the males die. Only the young queens hibernate in a safe place to be ready to start a new nest next spring.

Title: Bumblebees

A bumblebee queen awakes from hibernation in early spring.

Her sturdy, round body is very hairy.

As soon as she feeds on some blossoms, the search for a nest site begins.

She explores the area to find a suitable place to build a nest. This queen has already started to build a nest in a deserted mouse-hole.

On the left are two hollow cups filled with nectar and pollen. The spherical breeding cells on the right contain the first eggs and some larvae. The foundations for a bumblebee society are in place.

She adds some more grass and straw for insulation, and then she's off.

Bumblebees are almost unaffected by cold weather. They generate body warmth to be able to fly when other insects are still paralysed by the cold.

Three or four weeks after the eggs have been laid, the first female workers hatch. They are comparatively small because the queen alone had to nourish all the larvae. These female workers will help to feed the next generation of workers, which will be much bigger and stronger.

Now the workload can be divided. Hive or house bumble bees take care of the brood and build new cells. Others gather food. Nectar and pollen are stored in designated cells, from which the bumblebees serve themselves.

Only the larvae will be mouth fed. For that a worker bumble bee bites open a breeding cell, feeds the larva, and closes the cell again.

The queen is cared for by a royal household so she can dedicate herself completely to laying eggs. In each of the pollen-filled cups she lays around a dozen eggs.

After 3 to 5 days the larvae hatch and begin to feed on the stored pollen. They all share one cell, which bursts open during their fast development. But still every larva is protected by wax.

Now they start to spin their cocoon to pupate as seen here in time lapse.

Within the cocoon their change or metamorphosis to an insect is taking place.

It takes about a week before they start to emerge.

A bumblebee helps. She tears the cocoon apart to make the exit easier for her little sister.

The last step is done with a little push from behind.

The young bumblebee is still damp and tousled and without distinctive colours. Only when her black and yellow stripes have developed, in a few days time, will the young bumblebee fly for the first time.

At first she circles above the entrance – this is so she can remember where the hive is. Gradually the circles become bigger. She explores the area and finds her first flower.

At the edge of a field are some red corn poppies. The nutritious pollen is collected and carried back to the underground hive.

Meanwhile summer has arrived. The bumblebee population has reached its peak, with up to 400 buzzing insects.

The stock-piling of honey and pollen is going ahead at full steam.

To keep the inside temperature constant, many workers are beating their wings tirelessly.

Towards the end of summer, the first male bumble bees hatch from unfertilised eggs.

At about the same time fully developed females hatch from fertilised eggs. These young queens get the best food, so that they will grow to regal proportions.

After a few days, they venture out of the hive.

In some places, male bees have left a special secretion on grass or leaves. The scent of this secretion attracts a queen bee, and mating takes place.

A short time later the male dies, but his genes live on in his unborn offspring.

As winter approaches, the bumblebees start to die. The queen bees leave and find a safe place to hibernate. Next spring, each of them will establish their own bumblebee society.