

## SOCIAL NETWORKS

**David Sillam-Dussès** – Termites appeared about 250 million years ago, during the time of the dinosaurs. They are social insects, that is to say that they live in colonies i.e. in a society. In a termite colony there will be a king and a queen who give birth to the other individuals: the soldiers, who take care of the defence of the nest and the workers who take care of the construction of the nest and search for food. They feed on cellulose, whether they be wood-boring termites that feed on wood or univorous termites that feed on soil. But the problem is that the workers are blind and deaf so when they come out of the nest to look for their food, they have no choice but to leave a smell on the ground, called a pheromone, which allows them, once they have found their food, to find their nest. It's much the same system as with Tom Thumb but with smells. Termite nests can be more than nine meters high which is enormous, especially for an insect that is a few millimetres long, and there can be several million individuals within the same colony, all from a single king and queen. The workers and the soldiers live about a year while the king and queen can live for several years. The queen typically has an abdomen that is huge in order to produce a great many eggs and she can be more than twelve centimetres long versus a length of only one centimetre early on. She might lay an egg per second and live forty years laying eggs almost without cease and from these eggs emerge larvae that will develop into workers, soldiers or into individuals called alates – that have wings – and will fly away from their colony and create a new colony of which they will be the king or queen.

The soldiers are highly specialized in the defence of their colony having large teeth called mandibles that allow them to cut and pierce the skin of predators. Some soldier termites also have a small point on their head that allows them to produce toxic products that will sometimes include a glue that acts on the main predators of termites – ants – who get stuck in this glue and typically die of fatigue. There is a hypothesis that the specific smells of individuals is among the factors that determine whether a larva is more likely to become a worker or a soldier. Soldiers are thought to have a smell of their own so that when there is a big fight with ants that causes many termite soldiers to die in battle, the general smell of soldiers within the colony will decrease. The larvae will perceive this diminished odour with the consequence that many develop into soldiers, thus renewing the stock of soldiers.

We tend to think of termites as harmful insects and it's true that they attack human constructions. But in reality it's only a minority of termites that do this and most termites are beneficial to the ecosystem, for example they will feed on the dead wood in forests and that's very important for the recycling of organic matter and for carbon recycling as a whole. Termites will also build galleries in

the ground that will allow better infiltration of rainwater and better aeration of the soil. There are even termites in semi-desert regions that are able to draw water from groundwater that can be more than fifty meters down. They do this to drink but also to bring the water to the surface so that their companions can also drink and also to moisten their colony! Now if the colony is moist, there are plants that will grow on the termites' nest. And if these plants grow, insects that feed on these plants will be able to breed. And if there are phytophagous insects that breed, insects that predate on these phytophagous insects will be able to develop, and so on! So we get an entire food chain that is set up, all thanks to termites.

**04 min 25 s**