

Topic: Food chains / Climate change

Dr Rebecca Ellis, PSTT College Fellow, links cutting-edge research with primary science

✉ rebecca.ellis@pstt.org.uk

Termites can help rainforests survive droughts

Scientists have discovered that termites have an important job in rainforests.

What are termites?

Termites are insects (Figure 1). They live in groups called colonies and eat dead plants, dead animals and their poo. Termites can break down even tough wood into simple materials such as water and useful **nutrients**. Because they can do this, they are called **decomposers**.



Figure 1. Termites (*Hospitalitermes* sp.) are found in massive numbers in tropical forests. © Bernard DUPONT

Recycling in nature

All food chains start with plants - the producers that can make their own food (Figure 2). The animals that eat plants are called herbivores. Animals who eat plants and other animals are called omnivores and those which just eat meat are carnivores.

What happens when plants and animals die? Decomposers make sure that the nutrients are recycled to the soil. Without them, dead plants and animals (and their poo) would pile up and there would be no nutrients available for new plants to grow. Decomposers, like fungi, microbes and termites, are nature's recycling team.

What is the word to describe animals which eat plants and animals?

What is the meaning of the word 'nutrients'?

What happens to autumn leaves once they fall off the trees?

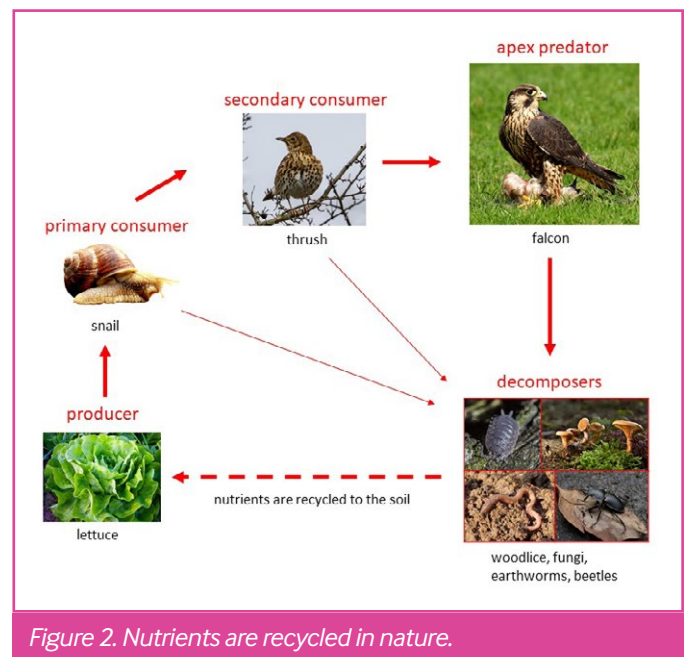


Figure 2. Nutrients are recycled in nature.

Climate change and the rainforests

Tropical rainforests (Figure 3) are so important to our **atmosphere** that they have been called the 'lungs of the world'. Why? Because plants, which grow tall and dense in the rainforest, make their own food by using **carbon dioxide** gas. Removing carbon dioxide from the atmosphere could help slow down **global warming** because it is a **greenhouse gas**. So, if we keep rainforests healthy, they could help us to slow **climate change**. However, scientists are worried that climate change is causing more dry spells, called **droughts**. In the rainforest, will this mean that trees grow less, become weaker or even die?

Do you think plants help cause global warming or prevent it? Explain your ideas.

What other threats are there to the rainforests?

	Depth of fallen leaves	Soil dampness	Nutrients in soil	Survival of seedlings
Area with termites (compared to the area with no termites)	22% lower	36% higher	More nutrients available	51% higher

Table 1. The effect of termites on the rainforest during drought.

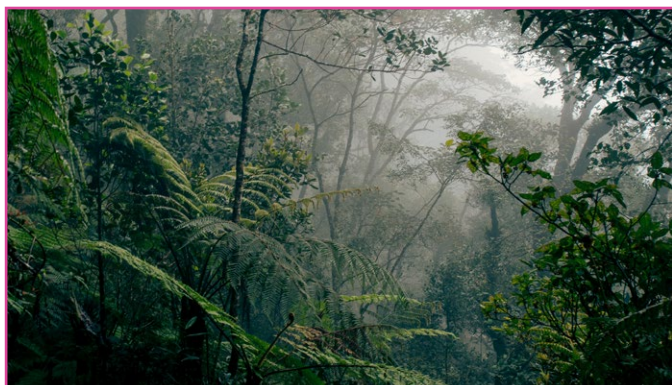


Figure 3. Rainforest in Kinabalu Park, Borneo. © Dukeabruzzo

What did the scientists do?

Scientists noticed that during droughts, the numbers of termites increased and those termites became more active. The scientists planned experiments to find out how this could affect the rest of the rainforest. In some areas of the rainforest, they removed termites and in other areas they left them. They studied the areas closely for two years. Within that time, there was a drought.

In this investigation, what was the variable which the scientists changed?

What did the scientists find out?

During the drought, the scientists found some differences between the areas with and without termites (Table 1). The soil in the area with termites was damper and had more nutrients. More young trees, called seedlings, survived in the areas with termites.

The scientists explained their ideas about what was going on. During the drought, the dry ground made tunnelling and searching for food easier for the termites. This explains why their activity and numbers increased. Termites collected leaves from the forest floor and took them into their underground tunnels to eat. When the termites pooped, water and nutrients were mixed into the soil.

In the areas without termites, decomposers such as fungi and microbes struggled to survive during the drought. As a result, the soil became drier, less nutrient-rich and fewer young trees survived.

This means that rainforest with termites will be more likely to survive a drought than rainforests without them.

Words of wisdom

When people disturb rainforests by cutting down trees, farming or mining, termite populations are reduced. This does not just affect the termites. It means that the rainforests will be less resilient to droughts.

Glossary

atmosphere – the layer of gases surrounding the earth or another planet

carbon dioxide – a colourless gas with no smell that is naturally present in air. It is made from carbon and oxygen

climate change – a long-term change in the average weather patterns on Earth

decomposer – an organism that breaks down dead organisms (and their waste) into the substances that plants need for growth, e.g. fungi, earthworms, beetles and bacteria

drought – drier-than-normal conditions (lower rainfall) for a long period of time leading to a shortage of water

global warming – the long-term increase in the Earth's overall surface temperature

greenhouse gas – a gas in the Earth's atmosphere that traps heat and contributes to global warming, e.g. carbon dioxide, water vapour, methane

nutrients – a substance used by a living thing to survive, grow and reproduce; they include carbohydrates, fats, proteins, vitamins and minerals

The paper that inspired this work was:

Termites mitigate the effects of drought in tropical rainforest.

By L. A. Ashton, H. M. Griffiths, C. L. Parr, T. A. Evans, R. K. Didham, F. Hasan, Y. A. Teh, H. S. Tin, C. S. Vairappan, P. Eggleton

Published in *Science* 363: 174-177 (2019), last accessed 1.12.23

Acknowledgement:



This resource contributes to XAIDA – a project supported by the European Union's Horizon 2020 research and innovation programme under grant agreement No 101003469.

Investigations for children are described in the Teacher Guide which can be accessed [here](#).