

Crisis Series: Learning Science through Comics

# FOREST CRISIS



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# The Aim of This Book

The 'Crisis Series' is a science-based comic series in full colour. Our society and the world we live in, our Earth and the universe are filled with many wonderful and surprising things. Science helps us understand these things. Through science, not only can you better understand the wonders that surround you, you can also get excited about it. You will also understand the hidden dangers that lurk all around you. 'Crisis' is another word for 'danger'.

The Crisis Series is different from other science-based series, as it is aimed at explaining science through story-telling, hence making learning more enjoyable. In this book, you will discover many things that will help expand your general knowledge and make you aware of how profound science really is. As this book has been created with the purpose of making science naturally enjoyable, topics that may be considered boring or difficult will become easier and more fun.

Throughout this book, you will also become aware of the dangers that surround you in the natural world and how best you can respond to them. It will also make you think about the kind of adult you want to become.

The theme of this book is 'the forest'.

Is there a forest near where you live? Even if there isn't, perhaps you have gone camping or hiking in one before; or have walked through a forest, collecting insects? There are many forests all over the world, but these are slowly decreasing in number.

A forest is not just a place that has a lot of trees. There are many kinds of forests with different kinds of trees, and they all have their own roles to play. How do trees help us? What secrets do the forest hide? What will happen if we do not protect our trees and forests?

You will find the answers to these questions within this book. We hope you enjoy the book. The more you enjoy it, the more you will understand about science and the natural world.

...  
FIVE HORNED  
BEETLES!!

YOU'RE  
OKAY!!

**R  
A  
N  
G  
L  
E**

WOW...

THIS LOOKS LIKE  
THE SKULL OF A  
MAMMOTH...

MAMMOTHS LIVED MORE THAN A MILLION YEARS AGO DURING THE ICE AGE... THEY'RE THE ANCESTORS OF THE ELEPHANT!



\*PERMAFROST: SOIL THAT IS FROZEN ALL THROUGHOUT THE YEAR. SEE PG. 113

I WONDER IF THE PERMAFROST\* IS MELTING...

HEY... LITTLE HELP HERE FIRST?



SURE!

SMACK

YEOWCH!



SORRY!

OW...

STING



HUH?

WHAT'S THIS?



# We Live, Protected By Forests All Over the World

## The steadily declining global forests

At present, the world's forest cover is estimated to be about 40 million square kilometres. This accounts for only 27% of the total land area globally, which is estimated to be about 147,240,000 square kilometres. In the decade spanning the year 2000 to 2010, the world's forest cover is forecast to have decreased by 520,000 square kilometres, an area that is nearly equal to the size of Thailand.

The forests surrounding the Amazon River in South America and those in Africa are also steadily declining.

In the same decade, Asia showed an increase in forested areas, but this is largely attributed to reforestation efforts by China. In other parts of the continent, such as South Asia and South-East Asia, however, the decline continues.

## The immeasurable value of forests

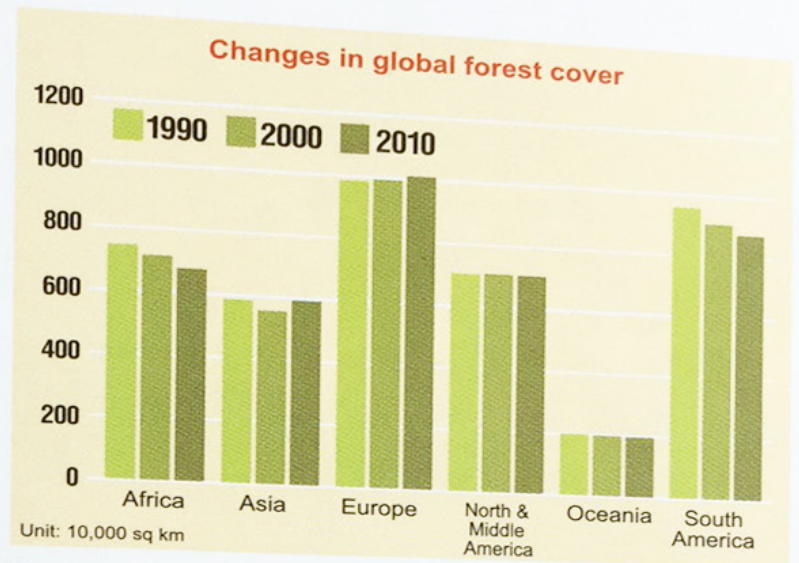
As explained before, forests have sustained all creatures, from Man to animals and even plants. In order to understand the extent to which declining forests can impact us, it is necessary to consider and understand the role that forests have played in our development. If forests keep degenerating, it will become harder for them to do what they do. To recap, let us ask again: What have the forests done for us?

### Forests store up carbon dioxide and emit oxygen

As trees and shrubs absorb and store large quantities of carbon dioxide, they are referred to as 'cans of carbon-dioxide'. Moreover, they have the ability to produce oxygen internally and release it. This ability enables plants to adjust the balance of oxygen and carbon dioxide in the atmosphere and to maintain it.

### Timber from forests provides us with the things we need in daily life

We take things like timber, the pulp that is used to make paper, sap from trees and leaves to make useful things. The ingredients of many medicines are also derived from forests.



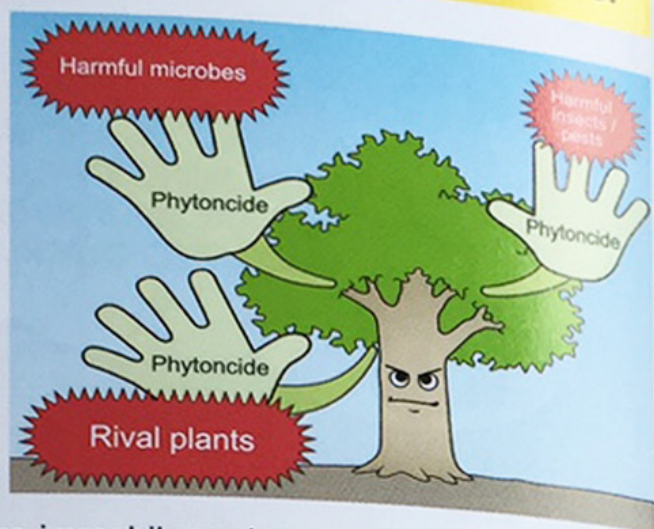
The astounding degeneration of the forests in both Africa and South America.

Source: Food and Agriculture Organization of the United Nations (FAO)

# The Weapon that Protects Plants and Forests

## A weapon that fights on behalf of immobile plants

When we come under threat, humans and animals alike use their bodies to attack or run away. However, as plants are immobile and cannot escape, they emit a special substance that acts as a repellent to ward off their enemies. If insects are eating their bark or leaves, or if another plant invades their space, this liquid substance that plants emit is able to transform easily from liquid to vapour (this is known as a liquid's 'volatility'). This liquid is known as 'phytoncide'.



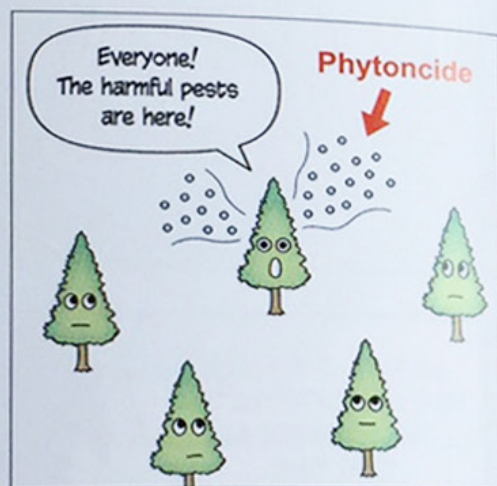
## The characteristics of phytoncide

Phytoncide was first coined in 1930 in the former Soviet Union\* by scientist Dr. B.P. Tokin. In Russian, 'phyton' means 'plant' and 'cide' means 'to kill'. The word translates to the phrase 'exterminated by the plant', which sounds scary. What it actually means is 'a weapon that aids plants to kill'. The properties of phytoncide and what it does have not always been easily understood, but this has become a lot clearer recently.

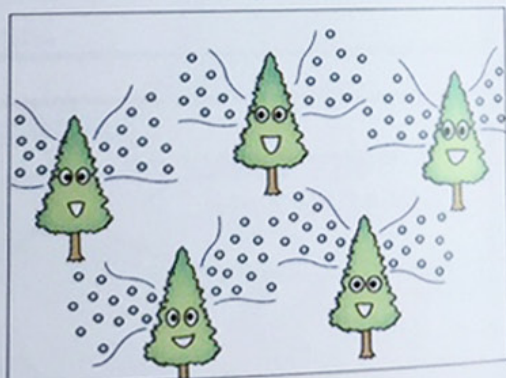
## It also plays the role of messenger

The primary role of phytoncide is to protect the plant itself. It also has anti-bacterial, anti-mould properties, and acts as an effective repellent. Moreover, it lures insects, inhibits the growth of plants, and contains anti-oxidant properties and more.\*\*

For example: if an insect like a tent caterpillar starts to infest and eat the leaves of a willow tree, the substance stored in the willow's leaves will prevent the caterpillar from growing into adulthood.



When harmful pests infest a tree, the tree emits an anti-pest phytoncide, which also warns other trees nearby of the imminent danger.



Soon, all the trees will become inhospitable for the pests.

In addition, other willow trees nearby will also begin to produce the same substance. This happens because the first willow has sent a 'message' out as a warning to the others. When this phenomenon was researched, it was discovered that phytoncide may have been the 'message' itself.

In conclusion, phytoncide halts the growth of caterpillars and other insects when consumed, and also serves as a warning message to other plants.

### Practical application in daily life

It was believed that furniture made from the wood of the Paulonia tree would repel the insects that ate into kimonos. The phytoncide that is found in the timber of this tree still remains in the wood after it has been turned into furniture, thereby continuing to repel insects.

Humans have long been aware of the properties of phytoncide, and have found various ways of incorporating it into daily life. Phytoncide has been used in fragrances, anti-bacterial medicines and anti-repellents. Its derivatives have even been added into human cough medicines. Trees emit a special fragrance, one that is healing and calming. Recently, the health benefits of this fragrance have gained more attention, and as a result, the number of people who take calming walks through the forests to feel the benefits of 'forest therapy' have increased.

Why has phytoncide – a substance that is so effective in repelling germs, insects and animals – aided in our well-being and become so useful to us? It's been said that this is because, from the time humans lived in forests, trees and humans have always mutually sustained each other.





# FOREST CRISIS

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