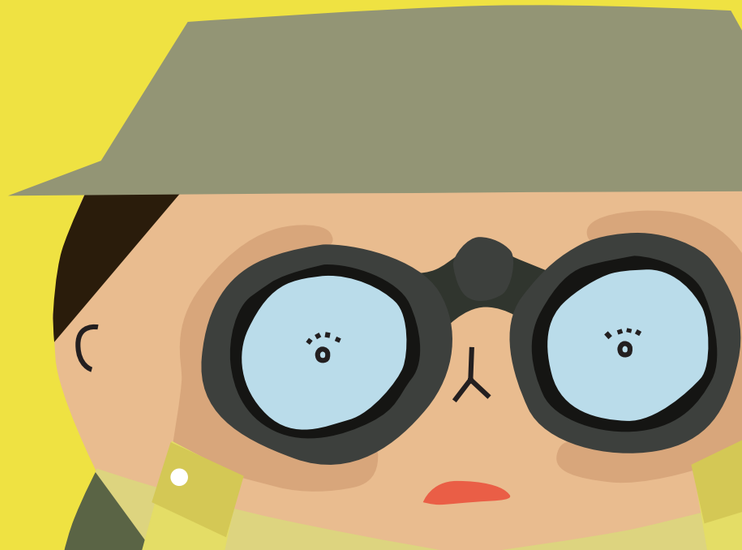
Explore Ogasawara, a World Natural Heritage Site!



World Natural Heritage Ogasawara Islands
世界自然遺産 小笠原諸島

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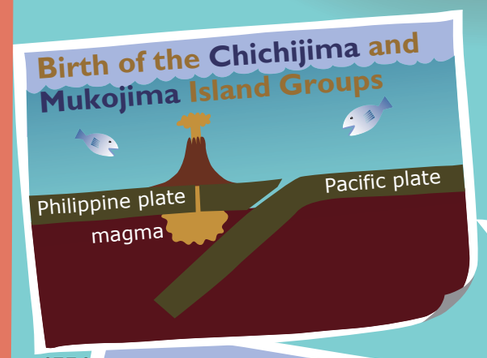
Birth of Ogasawara

48 million years ago



44 million years ago

Present

A long time ago, two plates at the bottom of the sea collided and one of the plates began to sink underneath the other. Then, magma was generated at the location where the plate sunk and caused volcanic activity.
As the subduction of the plate continued over time, the location of the volcanic activity gradually moved westward.
Mountains that were created through such volcanic activity rose above the sea surface and gave birth to the islands of Ogasawara.

These islands popped up in the middle of ocean!

The Ogasawara Islands have never had a land connection to a continent.
Only those species that managed to fly, float, be blown by wind, carried by birds, or found some other way reached the islands.

Among them, only those suited to the islands' environment survived with little competition.
They evolved in unique ways that fit the environment of Ogasawara and spread in the islands.

World Natural Heritage, Ogasawara Islands

As a result of such unique evolution, endemic animals and plants and their unique ecosystems can be seen in the Ogasawara Islands.

The Ogasawara Islands were inscribed as a World Natural Heritage site in June 2011, valued for the unique ecosystems.

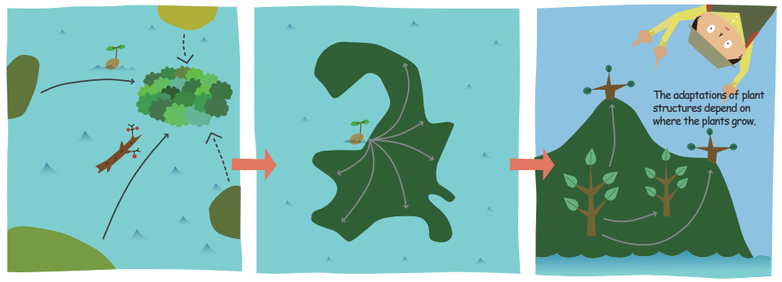
It is the fourth World Natural Heritage Site in Japan, following Yakushima, Shirakami-Sanchi, and Shiretoko.

Value of the Ogasawara Islands as a World Natural Heritage site

Organisms that show how evolution works

Plants

One-of-a-kind plants have evolved.



Many plants of Ogasawara originate in Southeast Asia and Okinawa.

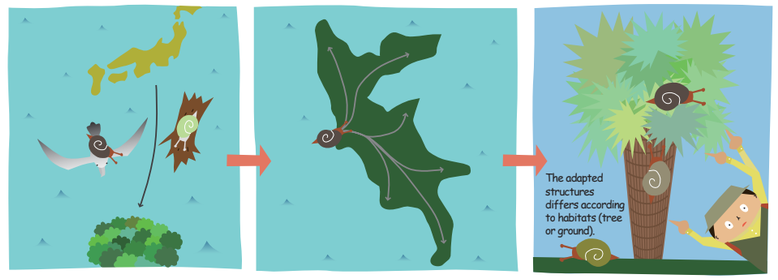
Plants spread to different island habitats.

Thier structures evolved to suit the environment.

Animals

Evolution of unique animals

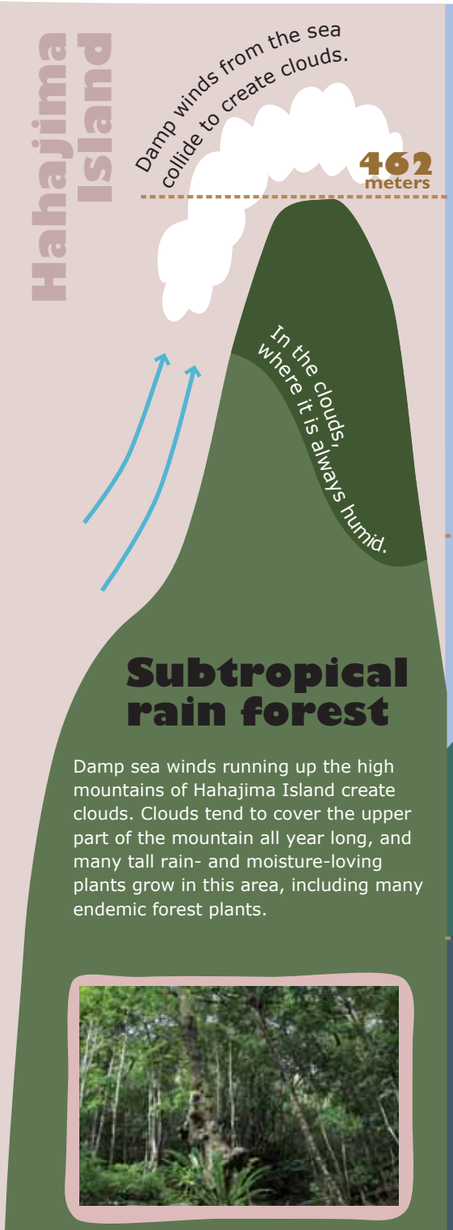
Example: *Mandarina*



Mandarina ancestors probably came from the main islands of Japan.

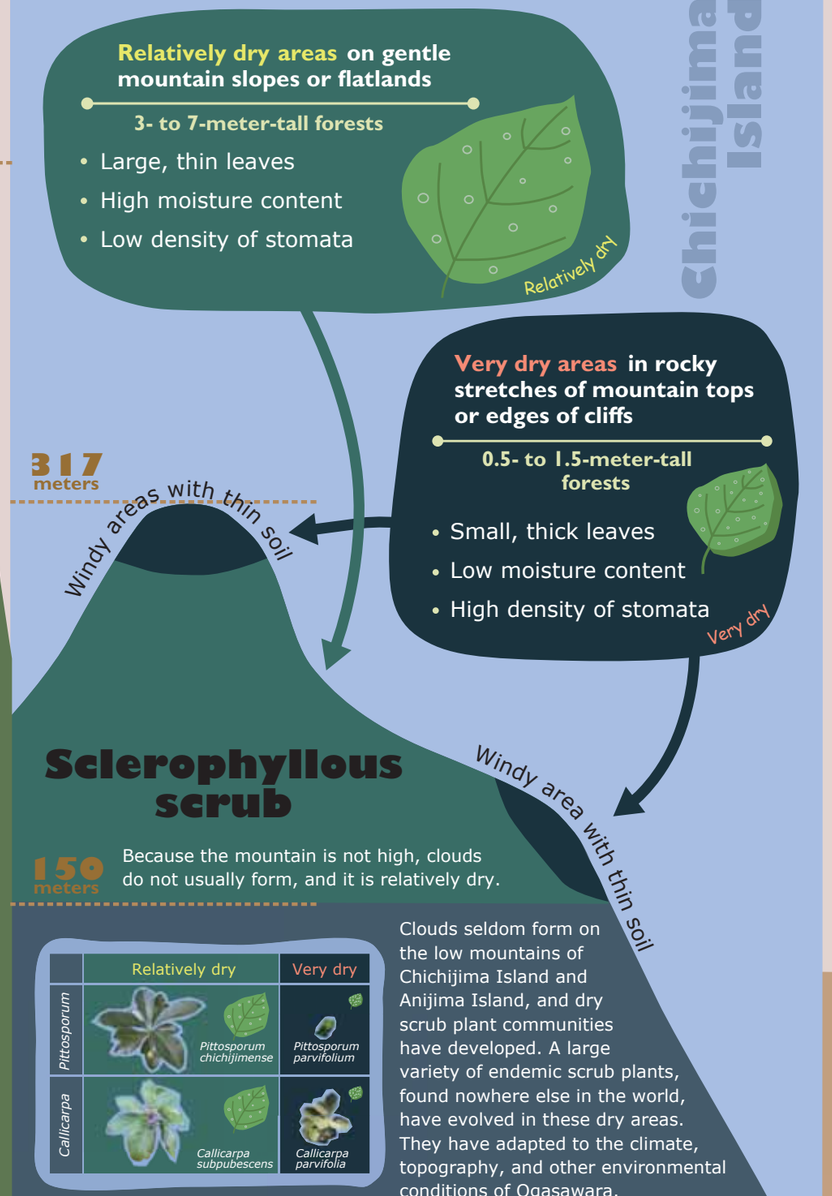
They spread to different habitats on the islands.

Their structures evolved to suit their habitats.



Subtropical rain forest

Damp sea winds running up the high mountains of Hahajima Island create clouds. Clouds tend to cover the upper part of the mountain all year long, and many tall rain- and moisture-loving plants grow in this area, including many endemic forest plants.

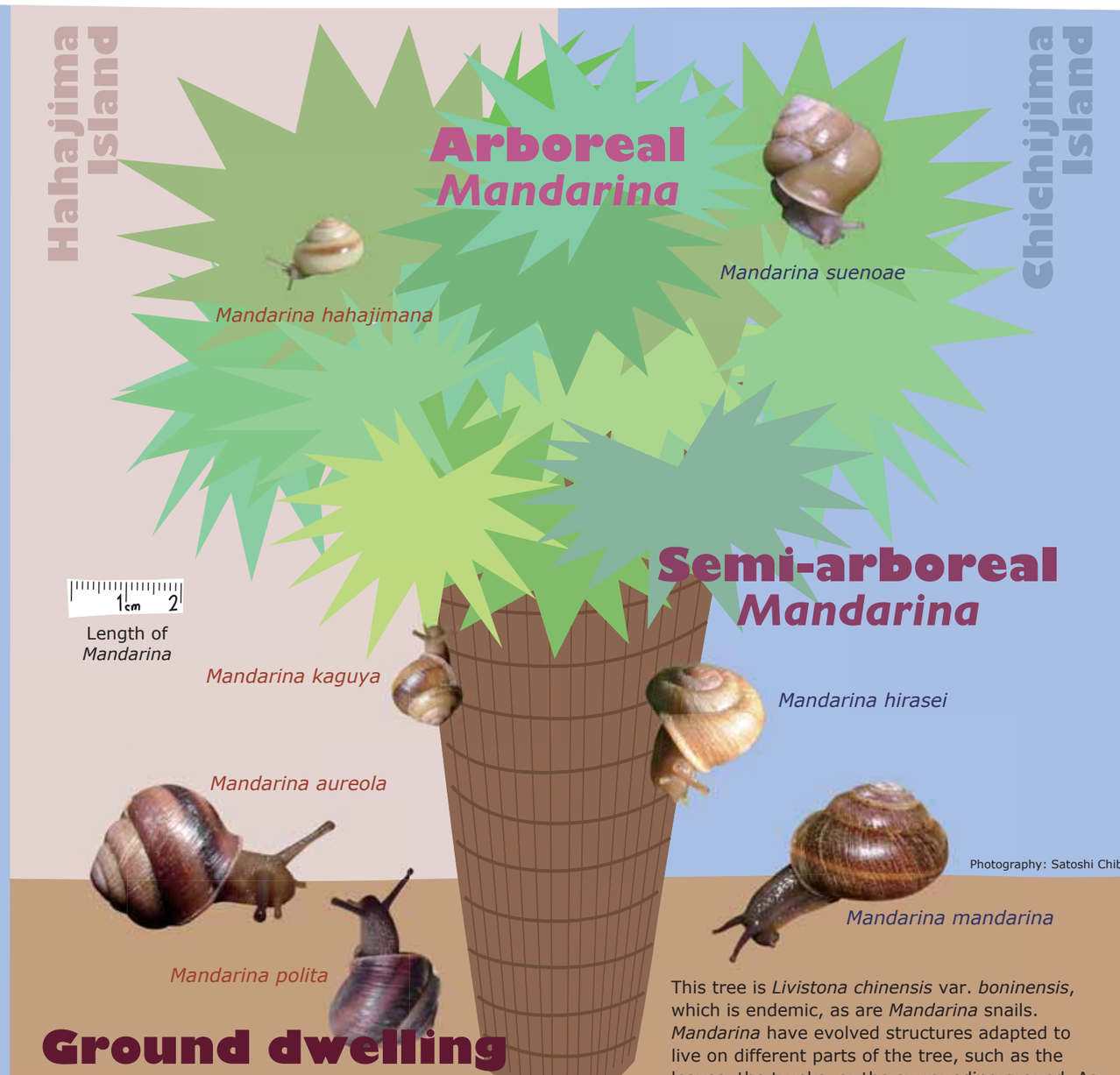


Sclerophyllous scrub

Because the mountain is not high, clouds do not usually form, and it is relatively dry.

	Relatively dry	Very dry
Pittosporum	*Pittosporum chichijimense*	*Pittosporum parvifolium*
Callicarpa	*Callicarpa subpubescens*	*Callicarpa parvifolia*

Clouds seldom form on the low mountains of Chichijima Island and Anijima Island, and dry scrub plant communities have developed. A large variety of endemic scrub plants, found nowhere else in the world, have evolved in these dry areas. They have adapted to the climate, topography, and other environmental conditions of Ogasawara.



This tree is *Livistona chinensis* var. *boninensis*, which is endemic, as are *Mandarina* snails. *Mandarina* have evolved structures adapted to live on different parts of the tree, such as the leaves, the trunks, or the surrounding ground. As a result, they have separated into many species.

Animals and plants nurtured by the ecosystems of the World Natural Heritage site

Unique organisms of Ogasawara


Buteo buteo toyoshimai
(the endemic subspecies of Eurasian buzzard)


Oceanodroma matsudairae
(Mastudaira' s storm-petrel)


Carduelis sinica kittlitzi
(the endemic subspecies of oriental greenfinch)


Celastrina ogasawaraensis
(lycaenid butterfly)


Apalopteron familiare
(Bonin honeyeater)

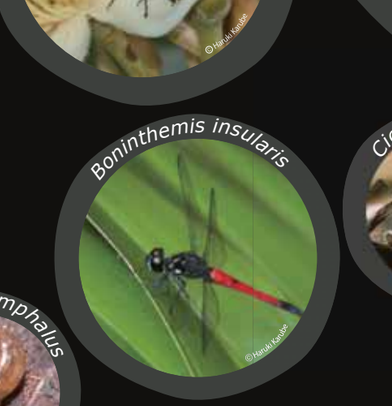

Elaeocarpus photiniaefolius


Pteropus pselaphon
(Bonin flying fox)


Dendrocacalia crepidifolia


Calanthe hoshii


This illustration includes widely distributed species.


Xylotrechus ogasawarensis


Rhododendron boninense


Cyathea mertensiana
Stem Patterns


Ogasawarana optima


Meimuna boninensis


Hirasea operculina


Hirasea diplomphalus

Boninthemis insularis


Cicindela bonina
(tiger beetle)


Indolestes boninensis


Boninagrion ezoin


Rhinocypha ogasawarensis


Chrysochroa holstii


Callicarpa parvifolia


Boninosuccinea ogasawarae

Columba janthina nitens
(the endemic subspecies of Japanese wood-pigeon)

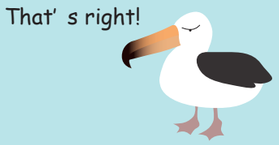

So many endemic species!

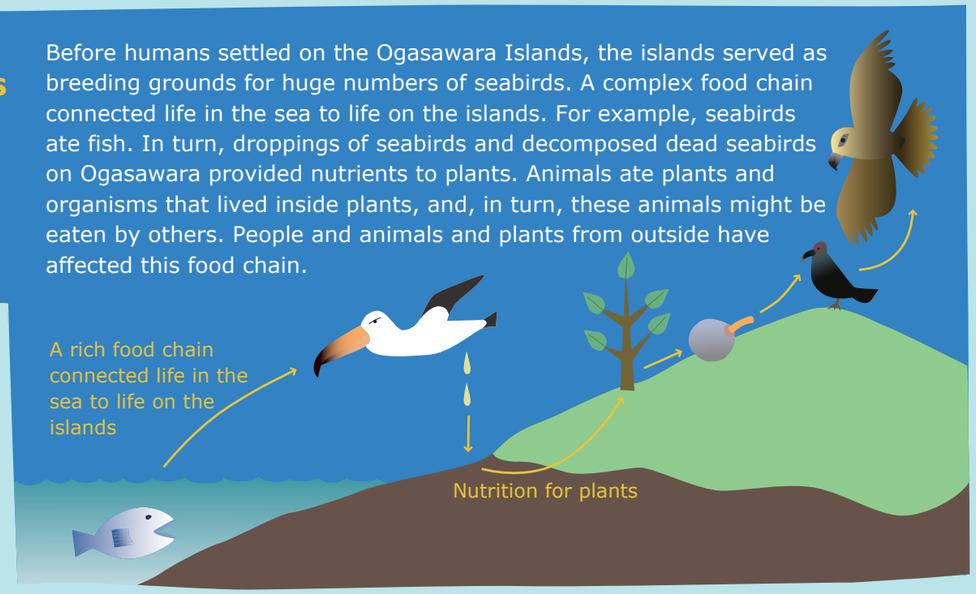
The original ecosystem of Ogasawara has changed.

The addition of just one organism can affect the whole ecosystem.

How seabirds have affected ecosystem changes

Before humans settled on the Ogasawara Islands, the islands served as breeding grounds for huge numbers of seabirds. A complex food chain connected life in the sea to life on the islands. For example, seabirds ate fish. In turn, droppings of seabirds and decomposed dead seabirds on Ogasawara provided nutrients to plants. Animals ate plants and organisms that lived inside plants, and, in turn, these animals might be eaten by others. People and animals and plants from outside have affected this food chain.



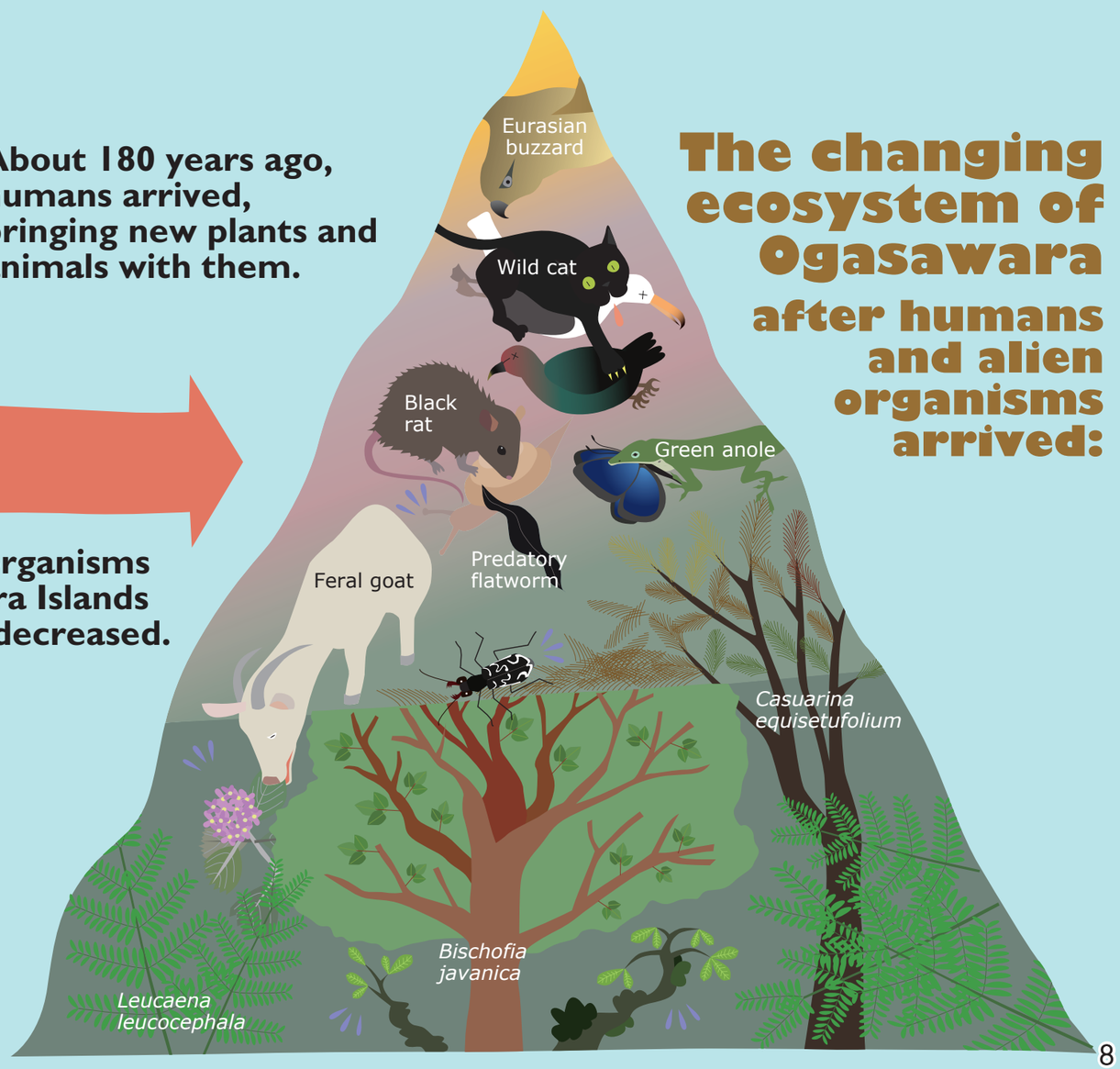


The original ecosystem of Ogasawara before humans and alien organisms arrived:

About 180 years ago, humans arrived, bringing new plants and animals with them.

The number of organisms on the Ogasawara Islands decreased.

The changing ecosystem of Ogasawara after humans and alien organisms arrived:



Look back to the past,

Underwater volcanic activity in the Chichijima and Mukojima Island Groups

Volcanic activity in the Hahajima Island Group

48 million years ago

Only organisms that could travel over water or by sky reached Ogasawara. Ogasawara became home to these plants and animals over tens of millions of years.

Jan. 1 "New Year's Day"

Feb. 1

The time scale of changes to Ogasawara.

Jan. Feb. Mar. Apr. May Jun. Jul. Aug. Sep. Oct. Nov. Dec.

The Chichijima Island Group had risen above the sea by this period.

The "Ogasawara calendar"

Imagine that the period from the formation of Ogasawara to the present is one year. We can date events on our pretend "calendar."
For example, on the "Ogasawara calendar," Chichijima Island is one month older than Hahajima Island.

The ancestor of *Mandarina mandarina* arrived at the beginning of "December." By that time, an ecosystem with many plants had evolved in Ogasawara, so the ancestor of *Mandarina mandarina* could live and grow.

Dec. 7

Arrival of the ancestor of *Mandarina mandarina*
About 3 million years ago

The original ecosystem of Ogasawara slowly formed, from some time before "December" through at least the next "month."

However, just before the countdown to the "New Year," humans arrived, and the ecosystem dramatically changed. People began to settle the islands starting around 1830.

Dec. 31 11:58 p.m.

Arrival of humans with other plants and animals
About 180 years ago

and imagine the future.

What will happen if this continues?

Will the ecosystem be fully occupied by alien (nonnative) species?

Imagining the ecosystem teeming with alien species
(imaginary illustration)

What can we do to protect Ogasawara's original ecosystem?

Actions to recover the original ecosystem of Ogasawara

In their own ecosystems, species that are alien here may contribute to a balanced system. However, on the Ogasawara Islands, alien species must be controlled to protect the plants and animals that can live nowhere else. Measures against alien species are carried out considering the total balance of the Ogasawara ecosystem. This is because some endemic species may have become dependent on alien species and could die, or other alien species could spread. In addition to the alien species listed here, there are several other alien species for which measures are also carried out, such as cane toads and *Leucaena leucocephala*.

Progress of measures

Not launched

In action

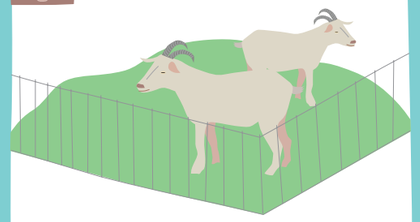
Elimination completed

1. Measures taken against alien species

Major targets of alien species control measures

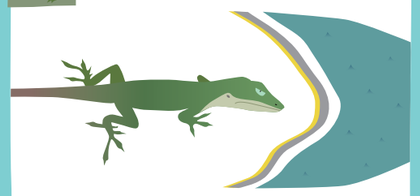
- **Wild cats** — Attack seabirds, the Japanese wood-pigeon, and others
- **Feral goats** — Eat rare endemic plants
- **Green anoles** — Attack endemic insects and other organisms
- ***Bischofia*** — Takes over forests
- ***Casuarina*** — Invades endemic species habitats
- **Black rats** — Attack snails, plants, and seabirds
- **Predatory flatworm** — Attack snails

Feral goats



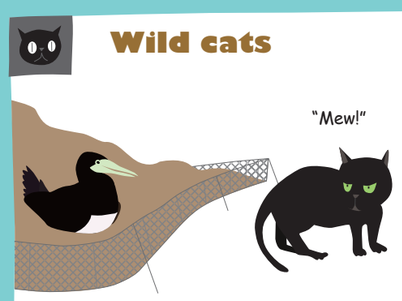
Goats eat rare endemic plants and trample native vegetation. To eliminate them, fences to separate them have been set up and guns are used as a control method.

Green anoles



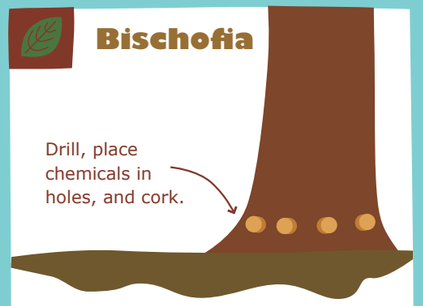
Green anoles live on Chichijima and Hahajima Islands, where people also live. Traps are set around the ports to prevent green anoles from spreading across to the satellite islands. In addition, control measures include enclosing parts of the forests with fences to protect endemic insects.

Wild cats



On Chichijima and Hahajima Islands, wild cats are removed using basket traps and fences. The captured freal cats are rehabilitated for life with humans in the mainland of Japan and placed with new owners through the Tokyo Veterinary Medical Association and other organizations. In addition, proper husbandry of household cats is promoted by the Ogasawara Village, for example, through an ordinance which requires that a household cat to be registered and a microchip should be implanted in the body of the cat.

Bischofia



Chemicals are used to control *Bischofia* to stop its rapid invasion of the endemic forests of Ogasawara and to restore the original ecosystem.

2. Protection of rare endemic species

Protection of the Japanese wood-pigeon

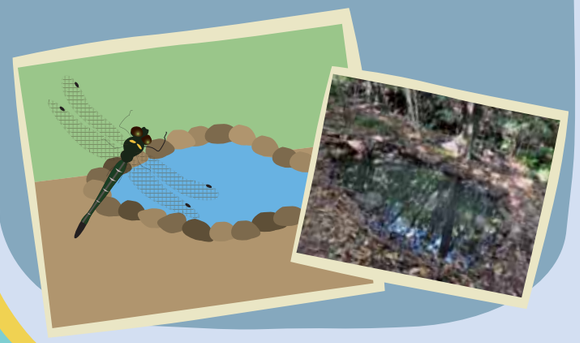
To protect suitable breeding sites, a Japanese wood-pigeon sanctuary has been established in Higashidaira natural forest on Chichijima Island, where many of the pigeons live. The sanctuary protects the forest habitat of the bird and controls alien species. For example, wild cats, which attack the pigeons, are captured. In addition, at Ueno Zoological Garden and Tama Zoological Park in Tokyo, efforts are made to raise and breed the pigeons to protect them from extinction.

Protection of lycaenid butterfly

On Hahajima Island, local residents cooperate in the many efforts to protect the remaining lycaenid butterflies and their notable habitat. In addition, at Tama Zoological Park, efforts are made to raise and breed the butterflies to protect them from extinction.

Help for breeding dragonflies

Dragonflies breed in puddles or waterways. To help the endemic dragonflies of Ogasawara, such as *Boninagrion ezoin*, to breed, dragonfly ponds have been created in the Chichijima Island Group.



Protection of rare endemic plants

In Ogasawara, the number of rare endemic plants, such as *Rhododendron boninense*, *Melastoma tetramerum*, and *Callicarpa parvifolia*, is rapidly decreasing. Fences protect the plants from feral goats and other animals. In addition, at Koishikawa Botanical Gardens, Graduate School of Science, University of Tokyo and other places, studies and research are carried out to protect these plants from extinction.

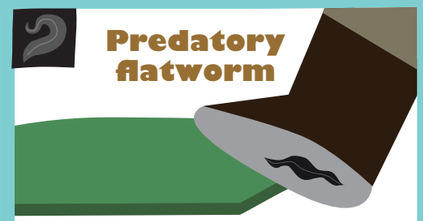
Casuarina

In forests, fallen leaves of *Casuarina* cover the ground and prevent other plants from germinating and growing. To restore the forests to their original condition, *Casuarina* trees are eliminated by using chemicals and others.

Black rats

Black rats eat seabirds, plants, snails, and many other organisms. Rat poison that almost does not affect other animals is used to kill them.

Predatory flatworm



The predatory flatworm that eats snails, and other alien species can be spread when they stick to the soles of shoes. To prevent such spread from Chichijima Island, people traveling by the Hahajima Maru boat are asked to wash the soles of their shoes on mats soaked with seawater that are placed in front of the passenger waiting area on Chichijima Island and at the disembarking zone on Hahajima Island.

What you can do!

How can we prevent new invasions of plants and animals such as *Bischofia* and green anoles that could harm the ecosystem of Ogasawara?

Do not bring plants, animals, soil, or seedlings with soil from the main islands of Japan. Plants, animals, and soil organisms could spread to Ogasawara.

If you travel to the mountains and other islands, prevent the spread of alien plant seeds and small animals that may stick to you. How do you do that?

Check the soles of your shoes and your clothes and baggage to make sure that seeds and small insects are not attached.

When you travel to the mountains, it is important that we do not step on plants, disturb breeding birds, or trample on areas where animals like snails live.What can you do?

Obey the rules: keep to trails and pathways and follow the set route when you go to the mountains.

The number of wild cats that attack and eat birds must be reduced to protect seabirds, the wood-pigeon, and other valuable birds. What can you do?

Spay or neuter your household cat and register it using a microchip tag. Keep cats in the house as much as possible.

Changing Ogasawara

Many different organisms settled on the Ogasawara Islands as the islands emerged from the Pacific Ocean millions of years ago. Their descendents now live on Ogasawara. Over time, they slowly evolved and changed. These unique organisms formed an ecosystem that is found only in Ogasawara.

However, they have no protection against the alien organisms that humans and their activities bring in.

Our success in preserving the unique nature of Ogasawara for future generations depends on our individual actions.

Ogasawara is still changing, and we cannot relax our efforts.

Thank you for exploring the Ogasawara Islands!