ABOUT THE PINE FOREST ALONG THE SEA

造林学　学部四年　渡辺花観

MENU

- **the function of sea-shore forest**
- **black pine – major trees in sea-shore forest**
- **sea-shore forest is being damaged by pine wilt disease**
- **how can we keep the healthy forests?**
  - **1.the positive effects – ectomycorrhyzal fungi**
  - **2.the negative effect – invasion of black locust**
- **I went to Niigata, my hometown!!**

THE FUNCTION OF SEA-SHORE FOREST

HOW MANY FUNCTIONS OF SEA-SHORE FOREST DO YOU KNOW?

- 飛砂防止
- 防風
- 潮害防止
- 防霧
- 魚付
- 航行目標
- 風致レクリエーション
- 津波被害軽減

Protect from…

- sand
- wind
- salty damage
- fog

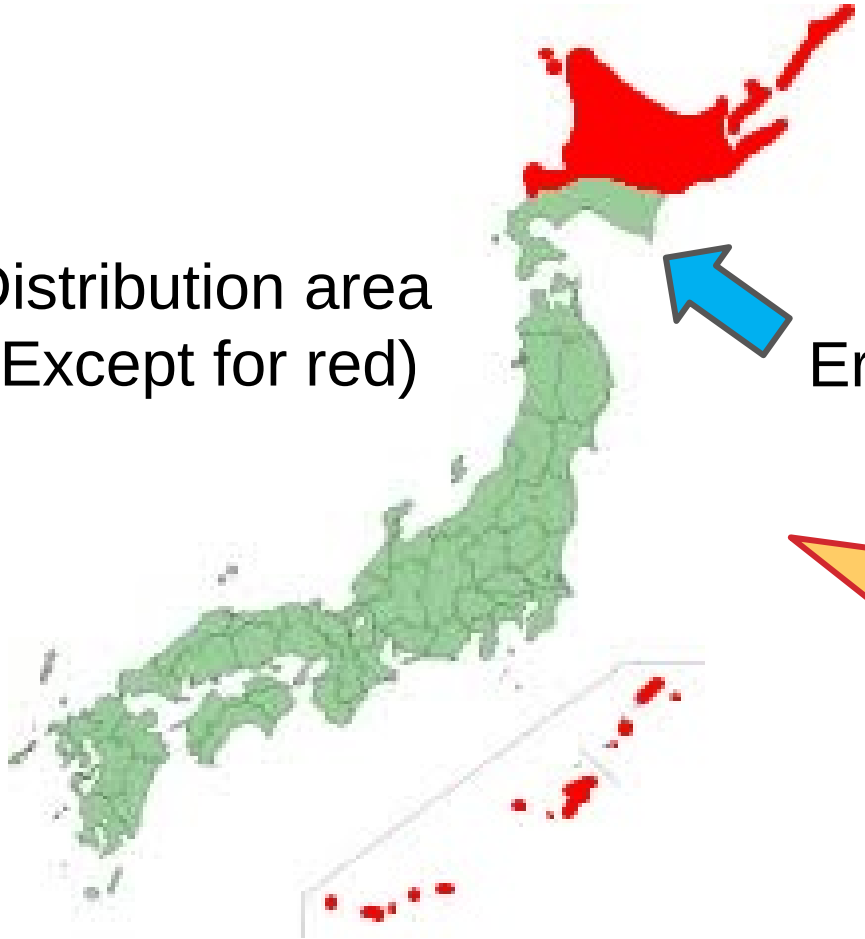
- produce a fertile fishery
- scenic beauty
- lighten a Tsunami

IF THERE IS NO SEA-SHORE FOREST…

BLACK PINE – MAJOR TREES IN SEA-SHORE FOREST

ABOUT THE BLACK PINE

・マツ科マツ属 (*Pinaceae-Pinus*) *Pinus thunbergii*



Distribution area
(Except for red)

Erimo cape

Also famous as
Bonsai!

FEATURE OF BLACK PINE
-WITH THE HISTORY-

***Pinaceae*：150 million years ago　　*Pinus*：100 million years ago**

***Pinus* is a group that appeared lately among coniferous trees.**

New species can grow up in a condition there are few competitor

i.e. <u>hard condition</u> (cold, dry or infertile)

They grow up faster and germination rate is higher among the conifer

⇓

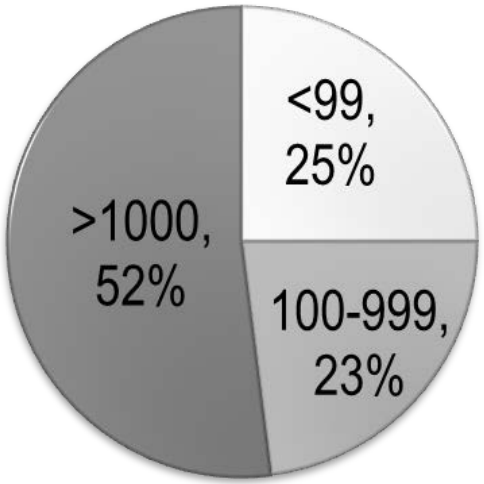
i.e. <u>they can grow anywhere</u> and <u>expand their habitat rapidly</u>

But it is short time that they have been under the natural selection

⇒<u>die out dramatically</u>

SEA-SHORE FOREST IS BEING DAMAGED BY PINE WILT DISEASE

ABOUT THE PINE WILT DISEASE



The number of nematodes per beetle

SUFFERED AREA IN JAPAN

2010 in Aomori
Suffered area is expanding

Next page!

1905 in Nagasaki
The first infection

Nematodes were imported from USA with logs

SPREADING TO AOMORI

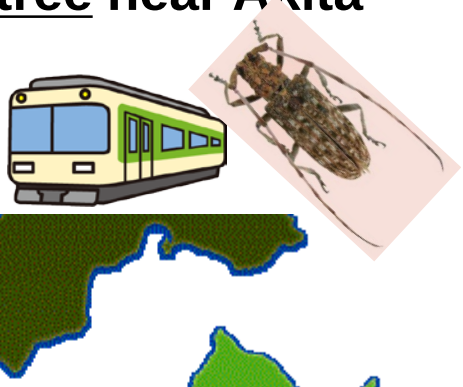
beetle's moving range in a year is 7-38m(by Togashi)

Attached?

※Substantially, a period they can move is <u>a month</u>(June to July)

→administration <u>changed species to broad-leaved tree</u> near Akita like a belt.

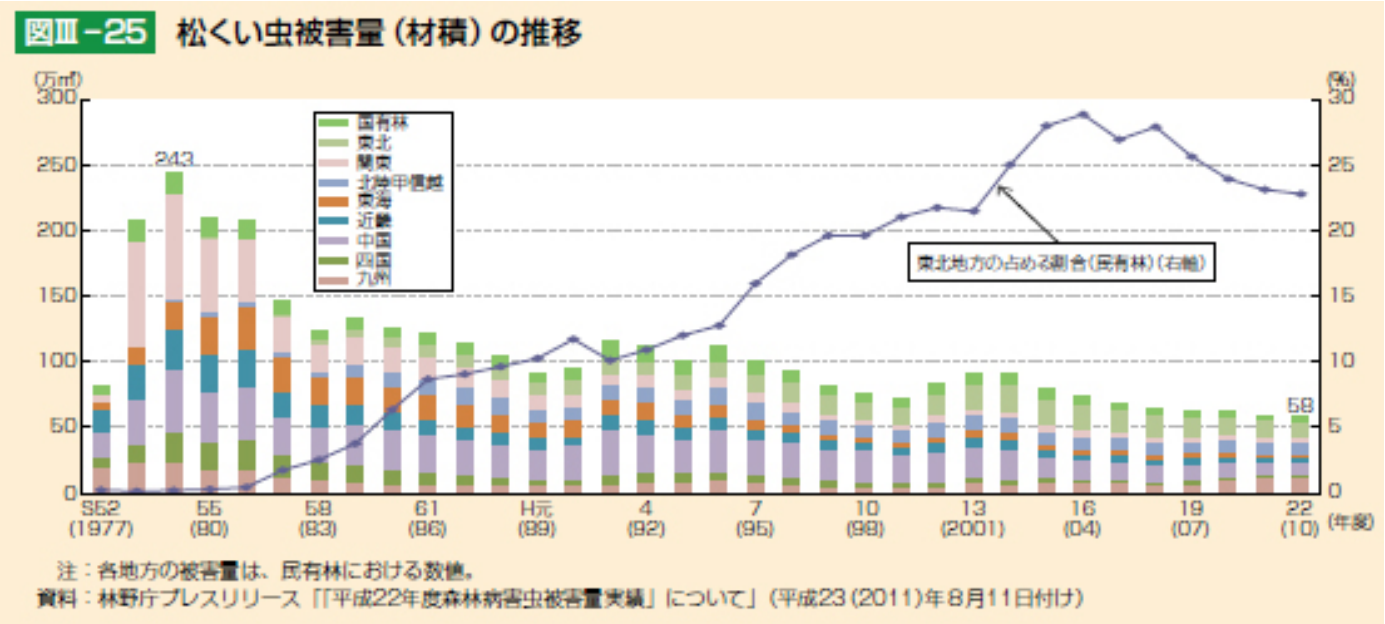
But nematodes were found in dead tree!!



<u>How did they move?</u>

- ~~①~~ **they existed originally**
- ~~②~~ **they moved from neighbor area**
- **③they moved long distance accidently**

THE BIGGEST DAMAGE TO FOREST IN JAPAN BY INSECTS



We should keep pine forests and its function!

→How can we do?

HOW CAN WE KEEP THE HEALTHY FORESTS?

1. EMC
2. BLACK LOCUST

ECTOMYCORRHYZAL FUNGI -POSITIVE EFFECT-

菌根菌は樹木の水分吸収機能を助ける働き

宿主は菌根菌に約30%の光合成産物を与えている

菌根形成率が高いマツは、カミキリによる食痕数が同じでも死亡率が低い

How to observe?

Ectomycorrhyza help tre absorb water

Trees give them about 30% photosynthetic products

Black pine that have high infection rate are expected to have high tolerance to pine wilt disease

THE WAY TO OBSERVE EMC

1.Dig up

2.Cut the root

3.See using stereo microscope

4.Categorize based on appearance

・color ・hypha ・ramification

・mantle ・rhizomorph…

INVASION OF BLACK LOCUST

マメ科　ハリエンジュ属　ハリエンジュ

根粒菌（窒素固定菌）と共生する

→N豊富な落葉をもたらす

肥料木や蜜源として植えられた

→しかし萌芽が盛ん＆Nリッチな落葉の提供で

クロマツの成長を阻害している

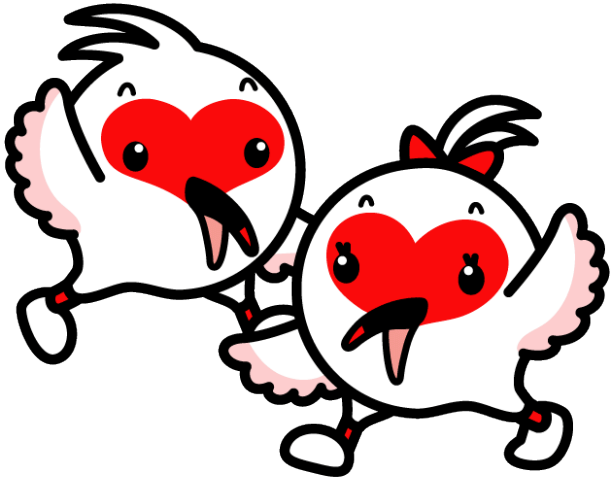
Fabaceae　Robinia　*R.pseudoacacia*

they have symbiotic relationship with nodule bacteria.

Their leaves contain a big amount of N.

High N rate interrupt healthy relationships between Black pine and EMC

I WENT TO NIIGATA, MY HOMETOWN!!



Are they nest…?

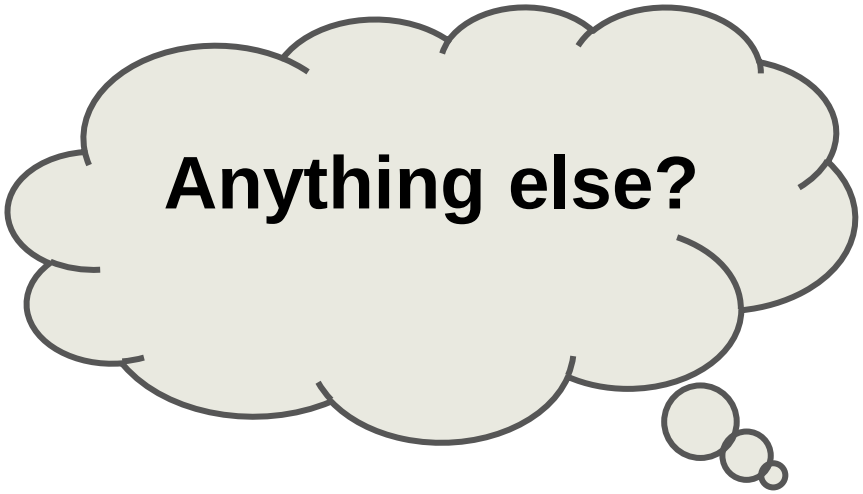
Administration can not scatter chemicals near farm

So they are often suffered and they have many nematodes

As long as infected tree exist, we can’t exterminate completely.

They grow naturally along sea

→they are tolerant to salt



クスノキ科（Lauraceae）

タブノキ属（Machilus）

タブノキ（M.thunbergii）

Broad leaved evergreen trees

IN MY TRIAL FIELD

The light condition is good on forest floor !

Because…dead individuals were cut, canopy gap is created

So many regenerations!

Because…