

THE CURRENT STATUS OF PINE WILT DISEASE IN KOREA - SURVEY AND CONTROL -

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Korean peninsula
captured by an artificial satellite

The Republic of Korea

- ✓ Located in north-east side of the Asian continent
- ✓ Latitude : 33~43N / Longitude : 124~131E
- ✓ Population : 49 million
- ✓ Land area : 100,140km²
- ✓ Capital : Seoul
- ✓ Language : Korean

Autumn of Korean forest

- ✓ Mt. NaeJang is noted for the glorious tints of its autumn foliage

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General Information on Pine Wilt Disease of Korea

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Forest of Korea

- Forest area: 6,540,000 ha (65%)

- ✓ Coniferous forest (40.5%)

- *Pinus densiflora*, *P. thunbergii*, *P. koraiensis*

- Major tree species in Korea



Pinus densiflora Korean Red Pine *Quercus serrata* Serrate Oak *Quercus mongolica* Mongolian Oak *Zelkova serrata* Japanese Zelkova



Pinus koraiensis Korean Pine *Taxus cuspidata* Japanese Yew *Quercus variabilis* Oriental Oak *Pinus thunbergii* Korean Black Pine

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Pine Wilt Disease

- Caused by pinewood nematode, *Bursaphelenchus xylophilus*

- ✓ Native to North America and introduced into Korea in 1988
- ✓ Major host trees : *Pinus densiflora*, *P. thunbergii*, *P. koraiensis*
- ✓ Introduced nematode reproduce rapidly in the sapwood resulting in rapid and extensive tree mortality

➢ Symptoms

- ✓ Rare of resin secretion, and then discoloration and bent down of shoots

➢ Development

- ✓ Dead within 3 months after infection (susceptible host) if conditions are favorable to disease development

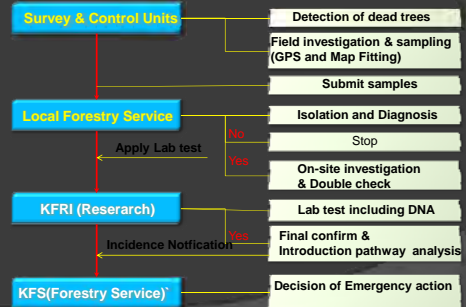
- Significant economic, aesthetic and cultural losses

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Survey of PWD in Korea

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Flow-chart of survey & control for PWN



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Survey Methods

- Target plant species
 - ✓ *Pinus densiflora*, *P. thunbergii*, *P. koraiensis*, *P. parviflora*, *P. strobus*
 - check the whole dying and dead trees without any causes
 - ✓ Other Pinaceae including larch, spruce, fir, deodar etc.
- Identification of suspected trees
 - ✓ Weak trees with umbrella like wilting of needles
 - ✓ Weak trees with exit or entering hole of vector insects
 - ✓ Trees with easy-peeled barks and dusts
 - ✓ Trees without resin

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Management of PWD in Korea

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Management strategy of PWD

Monitoring of PWD



- Chemical** Fumigation
- Physical** Chipping wood
Burning wood
- Prevention** Aerial spray
Trunk injection
Parasitoid to vectors
- Legal Control** Special law, 2005

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Monitoring system

- Monitoring system
 - ✓ Ground monitoring
 - : well-trained investigator
 - ✓ Aerial monitoring
 - : FGIS (Forest Geographical Information System)

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Chemical control

➤ Cutting and fumigation

- ✓ Cut down to 1~2m³
- ✓ Treat fumigant (Metamsodium)
- ✓ Seal with vinyl cover for 6 months

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Physical control

➤ Cutting and burning

- ✓ Low cost and high efficiency
- ✓ Elimination of vector beetles
- ✓ Disadvantage
 - : restriction of period due to risk of forest fire

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Physical control

➤ Cutting and crushing (chipping)

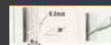
- ✓ Cut the infected trees and make them into sawdust or small chip
 - : less than 1.5 cm
- ✓ Infected trees can be reused (environmentally friendly)
- ✓ Require high cost
 - : labor and movement of machine

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Prevention

➤ Trunk injection of insecticide (nematicide)

- ✓ Inject nematicide to the trunk of healthy trees around infected area
 - : December to next February
- ✓ Abamectin and emamectin benzoate were selected in 2004
- ✓ Selectively used for the purpose of prevention
 - : garden trees, important and special forests, etc.



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Prevention

➤ Aerial spraying of insecticide

- ✓ To prevent the dispersal of adult pine sawyer from May to July
- ✓ Insecticides used
 - : fenitrothion, thiacloprid
- ✓ Effective to wide area of forest
- ✓ Disadvantage
 - : adverse effect on forest ecosystem

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Prevention

➤ Release of *Sclerodermus harmandi*

- ✓ *Sclerodermus harmandi*
 - : ectoparasite of Monochamus beetles
- ✓ Developed mass rearing system
- ✓ Under field application test

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