

# Practical issues of diagnosis

- *Surveillance can result in many detections of damage symptoms or insects / fungi on host*
- *Step from detection to diagnosis can be huge*
- *Full diagnosis of every detection would be beyond the capacity of most countries*
- *How do we make the judgement of when to proceed to formal diagnosis?*



# Type of damage symptom

Symptom attribute	Diagnostic value	Characteristics
General	Low	Many causal agents, both biotic and abiotic, produce similar symptoms
Distinctive	High	Symptoms contain elaborate features, fungal fruiting bodies, insect intimately associated with damage
Unusual	Neutral	Host well known in area. Symptoms rarely or not previously seen on host.



# Response: general symptoms

- **Establish current damage levels**
  - area affected, incidence and severity
- **Exclude possible causal factors**
  - site conditions, stand history, unusual weather events
- **Monitor affected area**
  - progression of symptoms - development of more diagnostic characteristics, evidence of spread or intensification
  - Review if symptoms progress or spread / intensify

# Response: distinctive symptoms

- Identify possible suspects
  - Scan literature / internet
  - Liaise with other specialists
- Short-list possible suspects
  - Suspect list includes species of quarantine significance:
    - Incursion response - containment pending diagnosis
  - No suspects can be identified
    - Monitor affected area (progression of symptoms, development of additional diagnostic features, evidence of spread / intensification)



# Response: unusual symptoms

- Greater likelihood of symptom being caused by an agent new to the area
- Collect additional information to aid diagnosis:
  - Association with particular site conditions, stand treatments, unusual weather events
  - Look for evidence of biotic agent (insects intimately associated with damage, fungal fruiting bodies, attempted isolation of pathogen onto agar - if facilities are available)
- Progress to obtain diagnosis



## Case study: stem galls on *Pinus radiata*



- A 3-year-old *P. radiata* with unusual swellings on stem and branches found during health surveys
- Symptoms both distinctive and unusual - suspected western gall rust
- Photo e-mailed to pathologists familiar with the disease
- Advised that western gall rust was a possibility
- Initiated an incursion response

# Case study: stem galls on *Pinus radiata*

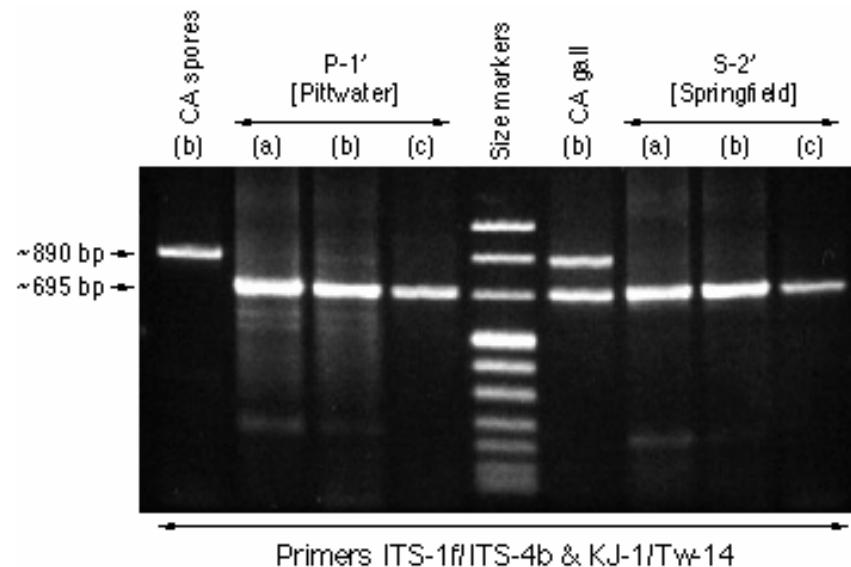


- Google search to find someone working on the pathogen
- E-mailed overseas expert identified from Google search
- Confirmed western gall rust a possibility
- Sent preserved (in alcohol) samples of gall to overseas expert under quarantine authority

# Case study: stem galls on *Pinus radiata*



- DNA diagnostic was developed to detect rust DNA in galls
- DNA test able to confirm gall was not western gall rust



# Resources to assist diagnosis

- Network of colleagues (other pathologists and entomologists)
- Reference sites of pest and pathogen images e.g. PaDIL
- Visual glossary of damage symptoms
- Internet searches (host, suspected pest / pathogen, damage symptom)

