

**WORKSHOP NOTES**  
**1ST INTERNATIONAL WORKSHOP ON WEED RISK ASSESSMENT**  
**ADELAIDE 16-18TH FEBRUARY 1999**

**SESSION 4 - PREDICTING WEEDINESS**

**PREDICTING WEEDINESS FOR QUARANTINE  
GROUP 2**

**Jean Turner**

**Note - missing Jean's first page (but notes are picked up in summary later)**

**WEAKNESSES:**

- Emphasis on weediness elsewhere (not always known)
- Can't be validated easily (a generic problem with prediction processes)
- Not quantitative (no probability of weediness event right/wrong, no estimate of reliability of the answers)
- Doesn't take account of prevalence (within plant groups)
  - need higher accuracy to avoid "false positives"
- Many characters claimed to be related to weediness are not proven/unverified
- Risk assessment context not clear, doesn't address sources or pathways of entry/invasion (what happens after quarantine decision allows plant in)
- Only assessing one pathway (the "declared" plants that people want to bring in) ie relies on honesty
- Indefensible with W.T.O. (World Trade Organisation)

**GROUPS**

- Doesn't address economic impact, Cost:Benefit measures (this really done on "post-quarantine" entries)
- Still need to do more work on verifying some of the characters used to predict weediness

**WHAT ARE THE FEATURES YOU WOULD LIKE TO HAVE IN AN "IDEAL" WEEDINESS PREDICTION MODEL/SYSTEM?**

- Adaptive/evolving, transparent
- Effective – accurate, easy to use, acceptable to people using it
- Quantitative
  - % of chance of plant being weedy
  - % confidence of being right included
  - Includes measure of likelihood of weediness with respect to family / functional group and habitats it's likely to invade (possibly can make some progress on this)
- Uses (already) available information
- rapid
- Flexible – can add in whatever is relevant for particular weed being assessed

- Free for public to access the system for initial information, small fee for weed assessment (to discourage smuggling)
- Comprehensive – covers environmental and primary industries species
- Part of an overall process – fits into a "big picture" view (not "stand alone")
- Web-based (access via the internet, able to download data etc)
- Robust criteria
- Easy to use
- Prefer that it gives a "false positive" than a "false negative"
- Seamless link to data bases

### IS A GENERIC METHOD FOR "PREDICTING WEEDINESS"

**desirable?**

|  
yes

**practical?**

|  
yes/probably

**feasible?**

|  
probably

### ISSUES

- Is it generic across plant taxonomy and plant forms
  - should be able to
  - Will the questions (of a generic method) be comprehensive enough ?
- Possible to do some "tweaking" of a generic system (like WRA) to make it fit/useable in other countries
- Desirable to be able to ask more about the ecosystems plants are going into (natural systems, forests, cereal crops, aquatic etc)
- A truly generic system should be applied to plant diseases, pest animals etc (⇒ should we be talking about "invasiveness risk assessment of organisms" ?
  - need to keep in mind invasiveness vs. impact
  - What is a weed vs. what is an invasive organism?
  - Pest risk analysis system - should pest and disease people be adopting WRA methods into their systems?

⇒ Action required .... gather the pest weed and disease people together to look at more generic assessment methods

### ACTIONS

→ What do we need to do to improve predictors/ability to predict weediness?

- Research → weedy and non-weed species of the same genus and see how they differ (do for a number of different genera!)
  - New Zealand work being one already on Rosacea and Pinus families
- Weeds in non-crapping situations → do process-based modelling to look at invasion and impacts
- Improve ease of access to existing data (just do it? Action from this symposium?)

- Who? state agencies, symposium delegates
- designation of official routes to access information within all countries
- Ministerial councils or their equivalent (ie political endorsement to make it possible)

→ develop protocols for depositing information eg "Biolink" – linkage of data bases for biological systems

- Identify a validation process (→ who? → AQIS)
- Improve collaboration and co-operation between states, agencies, universities etc.

## **PREDICTING WEEDINESS FOR QUARANTINE**

### **GROUP 3**

**Mary Reiger**

#### **STRENGTHS**

- Considers both weedy and non-weedy traits
- We actually have a system
- Takes into account the significance of weeds
- Useable, workable system and the system is well accepted
- The scoring method is testable
- The system is transparent
- Industry friendly
- The system and assessments are consistent

#### **WEAKNESS**

- Will be some kind of error or failure rate, false positives
- System hasn't been tested. Can't really be tested
- The system may lead to international or domestic disputes
- The system misses issues of providence
- Permitted list already has weeds on it, and we are bringing in more genetic material
- Economic impact assessment could be made clearer

#### **GAPS**

Discussed the issue of sleeper species – that is a plant on the permitted list but has the potential to be a weed.

Discuss specific examples and the problems of making people aware of the problem.

Political, industry and special interest implications.

**GROUP 5**  
**PREDICTING WEEDINESS FOR QUARANTINE**  
**Mark Williams**

DEFINITION → predicting weediness

"What should be in a system?"

Invasiveness}

Impact }

Distribution }

Didn't want to revisit these factors

Evaluation should be built in.

- Generic system desirable – feasible but not yet available - Quarantine risk assessment – needs action.

**GAPS**

- AQIS third tier needs development - need to be able to assess "sleepers"
- Better system for dealing with plants that need further evaluation
- GMO's need to be covered better
- Lack of \$\$ for evaluation of systems
- ISO 14000/9000 standards – evaluation funding not available to do this
- System doesn't help in prioritisation at a state or regional level

**ACTIONS**

- Monitoring – follow up assessment of "sleepers"
- Need to ID plants after entry for verification
- Flexibility – adaptive management as a result of feedback
- Transparency – will assist with evaluation
- Need better management / monitoring planning etc. of WRA systems
- Add ons to current WRA systems needed eg. potential rate of spread
- Ensure access to current taxonomy

## **PREDICTING WEEDINESS FOR QUARANTINE**

### **GROUP 6**

**Vicki Linton**

#### **STRENGTHS**

- We have a system
- Early intervention
- Proactive NZ/Aust (permitted list or tested)
- Not required to know everything
- Key characteristics can be identified – not lost in the noise

#### **WEAKNESSES**

- "Weed" is management term not biological term
- Rely on information that is hard to get
- Is all information reliable ?
- Is system reliable? (evaluating current based on history)
- Can't be used in isolation
- Can't be generic for all stages of invasion
- Interpretation of the number/score
- Genetic differences may make the problem worse if allowed in because plant is already in country but not under official control

#### **GAPS**

- No clear idea of which features separate weeds from other species
- Inadequate information and use of information technology
- Knowing base level of weed to non-weeds in a population

#### **AQIS SYSTEM USED AS EXAMPLE – WHAT NEEDS CHANGE FOR YOU TO USE**

- Need to test outside New Zealand and Australia
- Provides a good basis
- Can't apply it at state/local level (Australia) where testing plants already here
- Would like some probability scores or ranges of invasiveness
- Is for policy people
- Lifeforms behave differently, not accounted for
- Cut-off will depend on where you're coming from (grower, conservationist)
- Want a better idea of how system developed

#### **IS GENERIC METHOD PRACTICAL, FEASIBLE, DESIRABLE**

- Problem with definition of generic – for all quarantine bodies?, for all plants?
- Generic system desirable
- Common framework for all Quarantine bodies and research groups.

## **ACTION TO IMPROVE PREDICTIONS OF WEEDINESS**

- Fill in the gaps
- More people, more research, more funding (plants, measurements)
- Develop common framework → form executive body
- Work "benefits" into the system where they exist
- Do some testing – how easy to use, is it accurate
- Data sharing, on-line web databases circulation lists (electronic)
- Searchable databases for plant biology
- Weed risk assessment issue advertise for circulation list to be developed
- on-line web databases circulation lists (electronic)

## **PREDICTING WEEDINESS FOR QUARANTINE**

**Rebecca Lang**

### **The politics of risk assessment (the environment in which risk assessment exists)**

- potentially unpopular decisions for stakeholders/interested parties (the would be importer)
- reluctance on part of politicians to agree to a new set of regulations and to be seen to be seeking funds for something new
- politicians see the benefits, but not the costs
- moral and physical intimidation; verbal abuse etc.
- those involved in WRA bear an onus of responsibility as the protectors of ecosystem integrity
  - the onus is on is to prove our assessment/view point
- weed control is about public benefit; the importers are on about private benefit; we are trying to balance the two, but there is more and more emphasis on the "private" benefit
- perception of self-serving agendas, maintaining careers etc.

### **WHY WE WANT WRA**

- there is a lot of political pressure on the people that assess the weed potential of plants
- WRA shifts the focus from the people that are assessing potential to the process that assesses the potential

### **Expectations of WRA**

- We want a 'simple', explainable system

Problem: there is so much complexity

### **What may be deliverable**

- WRA system may not be simple, but needs to be transparent

### **STRENGTHS**

- we do have a WRA system (in Aust.)
- we have a positive system to exclude weeds in Australia
- the transparency of the process gives it integrity
- up until now local control priorities have been based on 'windscreen' management; WRA changes this - it gives us a tool for allocating funding and other resources

### **WEAKNESSES/GAPS**

- Lack of taxonomic verification
  - Action - need to review the 'permitted list' to get the taxonomy correct
- Data availability



- we need to ensure that we have all the data available
- there is a huge amount of information in the community at large, but no one, no way, no place, no process to collate the data and have the follow up action required eg. monitor situation, destroy plants etc.
- we don't fully know what our weed flora is and where it occurs
- Action - need an international and a national database; build on FAO GPPIS
- Barriers - resources - intellectual property; will increase as an issue with corporatisation and sponsorship - privacy and confidentiality
- Lack of a 'protocol' for WRA
  - how do we define where and when to use WRA?
  - what level of risk is acceptable?
  - need to avoid re-importing of any species already present in a country (???fruit cultivars)
  - as a human being I would have more safety with a 'protocol' or template of standard questions to follow to help with decision making

***Suggested questions for a protocol:***

- 1) ID properly checked/proved? Alternative available?
  - 2) Already present or in other States?
  - 3) Weed elsewhere - similar climates?
  - 4) Closely related to known problems?
  - 5) Does importation have a proven value? versus risks?
  - 6) Ecological information available at origin? special requirements? known to become troublesome at origin?
  - 7) Control measures known if proved undesirable?
  - 8) Acceptable to neighbouring states?
  - 9) Is importer willing to stand in for
    - (a) control costs if required in say 10 years?
    - (b) take responsibility for possession?
  - 10) Conflict created with benefit/cost of existing weed?
  - 11) Could introduction be an alternative host to disease/pest of crop, indigenous plants?
- Follow up
    - response to initial establishment - if the thing gets through the net what sort of response is required to prevent spread?
    - how do we evaluate the effectiveness of WRA
    - Action - need a fail safe system or component (the 4th tier in a 3 tier system)
    - need a fall back system and a system of monitoring incursions
    - need permanent documentation of introductions
    - need to ensure harmless plants are not excluded
    - A way forward - have funds for contingencies, a "bond in the bank", on the beneficiary pays principle, for new introductions
  - Responsibility
    - tension between the precautionary principle on the one hand, and political/economic constraints on the other
    - there is an onus of stewardship in environmental legislation, but not in land management legislation

- nobody is responsible for weeds
- Ways forward: - build on areas of common interest - build alliances and support for decisions

Other suggested ways forward:

- compile a combined (global) list of all weeds and determine which are applicable locally
- in South Africa a National Plant Invaders Atlas exists, coordinated, updated, checked by a specially-appointed weed scientist/botanist

## **SUMMARY FOR PREDICTING WEEDINESS FOR QUARANTINE**

**(From Thursday lunch butchers paper)**

**Definition** - predicting potential weediness for quarantine

### **Models**

- Australian WRA (AQIS)
- APHIS USA - not used for quarantine
- New Zealand - modified version of the Australian WRA

### **What should be in a system?**

Key factors:

- adaptive/evolving
- quantitative
- transparent
- rapid
- flexible
- robust
- website
- easy to use
- include invasiveness, impact, distribution

### **Strengths**

- systems already developed
- allows early intervention
- proactive - allows for a permitted list (Australia and New Zealand)
- highlights important factors first]
- 'precautionary principle' built in
- can test/evaluate scoring method
- current systems transparent
- interactive - highlights inadequacies in information about plants
- has had a lot of peer input and review
- consider both weedy and non-weedy traits

### **Weaknesses**

- emphasis on weediness - not always known
- not quantitative - no estimate/probability of an answer being wrong
- can't be generic for all stages of invasion
- many weediness characters not verified
- difficulty in testing system
- problems with dealing with "sleepers" and plants requiring further evaluation
- indefensible with WTO (international disputes)

### **Gaps**

- AQIS 3rd tier needs development
- GMOs need to be dealt with in a better way

- doesn't address economic impact
- system doesn't help with prioritisation - at state/regional level
- more work needed on verifying predictive factors used in models

### **Actions**

- research - weedy and non-weedy species of same genus - see how they differ
- improve access to existing data
- identify a validation process and who should manage it
- improve collaboration

### **Issues**

- need better management of systems
- need monitoring, feedback loops
- ➔ to allow for adaptive management
- more \$\$ - evaluation, validation of systems
- need better integration between insect pest, disease, weed scientists/policy makers on risk assessment
- need to include potential benefit in system