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Indiana Invasive Aquatic Plants Working Group: Science Perspective

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Science Serving Society

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NOTRE DAME
<http://aquacon.nd.edu>



- Doug Keller initiated working group
- Kristin TePas and Pat Charlebois (IL-IN SeaGrant) have facilitated the working group
- I joined in 2007 as a scientist with experience in risk assessment for aquatic invasive species
- ND/science role:
 - Present options for scientific risk assessment
 - Develop tool to be appropriate for Indiana
 - Calibrate tool for Indiana invaders

Goal of IN Risk Assessment



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Species in region, or likely to enter region (e.g., through trade)



RA

High risk

Low risk

Species not permitted for importation, sale or possession

BLACK LIST

Species allowed for importation, sale and possession

WHITE LIST

Goal of IN Risk Assessment



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Species in region, or likely to enter region (e.g., through trade)

RA

High risk

???

Low risk

Species not permitted for importation, sale or possession

BLACK LIST

Further study required

GREY LIST

Species allowed for importation, sale and possession

WHITE LIST

1. Accurately discriminate between high and low risk species (few 'grey' species)
 - True positives keep high risk species out of trade
 - False positives keep low risk species out of trade
 - True negatives allow low risk species to enter
 - False negatives allow high risk species to enter

Some errors are inevitable, but should be minimized

Working Group agreed that the tool should.....

2. Be based on scientific evidence
3. Provide consistent results, regardless of the person conducting the assessment
4. Provide results quickly
5. Be well documented
6. Be proactive



- Asks five broad questions about the risk posed by plant species
- Based largely on expert opinion and an unspecified amount of data gathering
- Response to each question is negligible, low, medium or high risk
- Responses combined to an overall ranking of negligible, low, medium or high risk



Pros

- Allows RA to include any data or information deemed relevant by the assessor

Cons

- Likely to get different results from different users (individual bias)
- When should a user stop collecting data (i.e. potentially very costly)?
- Overall result is not very informative
- Accuracy will depend strongly on user



- Australian government has mandated since 1997 that all new plant species proposed for introduction to Australia be assessed and placed onto black or white lists
- Tested successfully around the world
- 49 questions, not all of which need to be answered
- Response to each question gets a score (usually +/-1)
- Sum scores for result, leads to a black, white or grey listing

Pros

- Consistent results
- Internationally accepted
- 'Out of the box' functionality
- Clearly defined stopping point in search for data (usually takes 1-2 days/species)
- Accuracy shown to be good in a number of regions (Australia, New Zealand, Hawaii, Florida)
- Easy to document

Cons

- Designed primarily for terrestrial species
- Would need modifications for IN

RA options considered - NZ Aquatic Plants WRA

- Similar in style to the Australian WRA, but asks fewer questions
- Designed specifically for aquatic plants
- Response to each question gets a score (usually 0-5)
- Sum of scores is the result

Pros

- Consistent results
- 'Out of the box' functionality
- Clearly defined stopping point in search for data (usually takes 1-2 days/species)
- Accuracy good in NZ testing
- Easy to document
- Designed specifically for aquatic plants

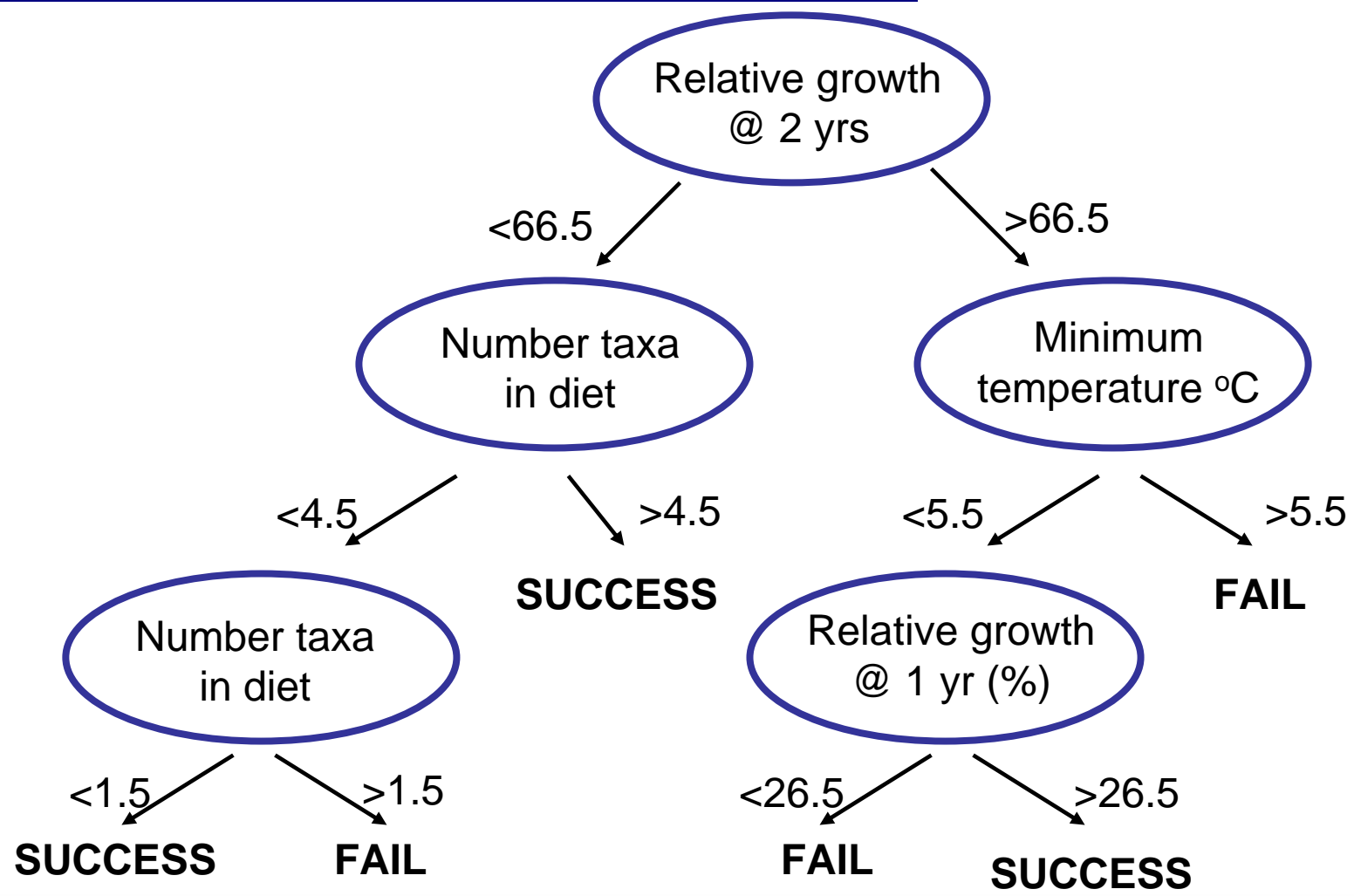
Cons

- Needs modifications and testing for IN

RA options considered - Statistical RA

- Gather data for test species
- Use statistical tools to find patterns in data that are most strongly related to invasion
- For future species, full data does not need to be collected

RA options considered - Statistical RA



Kolar & Lodge 2002 *Science*

RA options considered - Statistical RA

Pros

- Consistent results
- Clearly defined stopping point in search for data, rapid
- Should have high accuracy
- Easy to document
- Designed specifically for aquatic plants in Indiana

Cons

- Requires time (= \$) to put together
- Although accurate, may not look intuitive

Modifications to Adapt for Indiana

- Modify climate-related questions
- Modify dispersal questions (e.g., recreational boating is a larger factor in IN than in NZ)
- Modify some scores

All of this has been done in a collaborative process with the working group



- Tool has been modified for Indiana
- Performing tests using species known to be highly, moderately or not invasive in Indiana
- Preliminary results indicate that invasive species consistently get very high scores, and that non-invasive species get low scores
- Tool may need further modifications based on results of testing:
 - Can we make it perform better based on what we are learning?



- Continue interactions with working group
- Present results to working group
- Indiana DNR will then need to decide what to do with the tool
 - What is the appropriate score to use as a cut-off between species that are and are not acceptable?
 - This final step is a management decision based on the level of risk that IN DNR will accept (importantly, this is not a decision for the scientists)