Forest Research

Is it natural?
Clonal forestry in public/private spaces

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What is clonal forestry?

"Plants that are propagated vegetatively from a genetically superior elite tree constitute a clone. These clonal plants are true to type & uniform with all the desirable qualities of the elite mother plant". (Pragati biotechnologies)

Why public/private plantation forestry needs to be socially acceptability:

1. Forests often viewed as a societal good, regardless of ownership

2. Plantations compete with other uses of forests and agricultural land and the outcomes affect communities

3. Concerns over on-site and off-site environmental impacts (e.g. chemicals, water quality, biodiversity, recreational opportunities)

(Howe *et al.* 2005)

## Potential interested parties or "stakeholders":

- geneticists and breeders
- scientists from other disciplines such as pathology and entomology
- industrial and non-industrial private landowners
- Other industries
- public landowners
- NGOs - conservation groups
- general 'public(s)' who have an increased interest in how forests are managed

(adapted from Stelzer and Goldfarb 1997)

Benefits of clonal forestry

- Genetic gains from selecting and mass-producing best individuals from the best families

- Enhanced plantation productivity & economic benefits

- Increased productivity means that foresters can meet society's wood demands on less land

- More forest land available to meet environmental (e.g. increased biodiversity) and social (e.g. recreation) requirements

- Advantage in that will not largely impact on human health
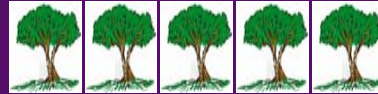
Perceived problems of clonal forestry

- Biological & technological barriers

- Economic considerations & legislative restrictions

- Perceptions

- Reduction in/ loss of genetic diversity (previous crop failures due to narrow genetic diversity)

- Loss of adaptation (long-term survival in a broad range of future conditions)

- Vulnerability to 'new' pests and diseases

- Changes within ecosystems
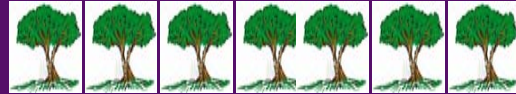
- **Societal issues and questions**

  - What do we view as natural?

    (selective breeding been around for a long time but does mass production put people off?)

  - Who benefits from clonal forestry and how? In the short-term and long-term.

    (with GM trees people feel there is a focus on economic gains for industry)

  - How are potential long-term consequences being assessed?

  - Who will be responsible in the case of unforeseen harm?

Where confusion might occur

• Clarity over terminology and processes, for example:

• Clonal – Trees selected that grow faster, yield better wood, disease resistant

• GM - Trees modified to grow faster, yield better wood, resist pests and diseases and tolerates herbicides

- Need to understand different perceptions of risk

Finucane (2002)

- Risk is inherently subjective and a social construct meaning different things to different people

- Unknown risk factor – hazard is unknown, unobservable, unfamiliar and has delayed consequences

- Dread risk factor – activity or technology dreaded, uncontrollable, fatal, high risk to future generations, not easily reduced, catastrophic potential

- Need to engage with risk communication - not just one-way transfer of information.

Some tips from GM debate:

- Whether technology is considered 'radically new' or 'merely novel' (e.g. continuation of existing practices) can impact on public perception of risk (renews debate on responsible management)

- Learning about scientific evidence may have little or no impact on risk perception, particularly where there is conflict over decision-making processes or where values differ

- Who will accept responsibility and avoid 'denying the dangers'?

- Wider public debates are constrained by existing legislation

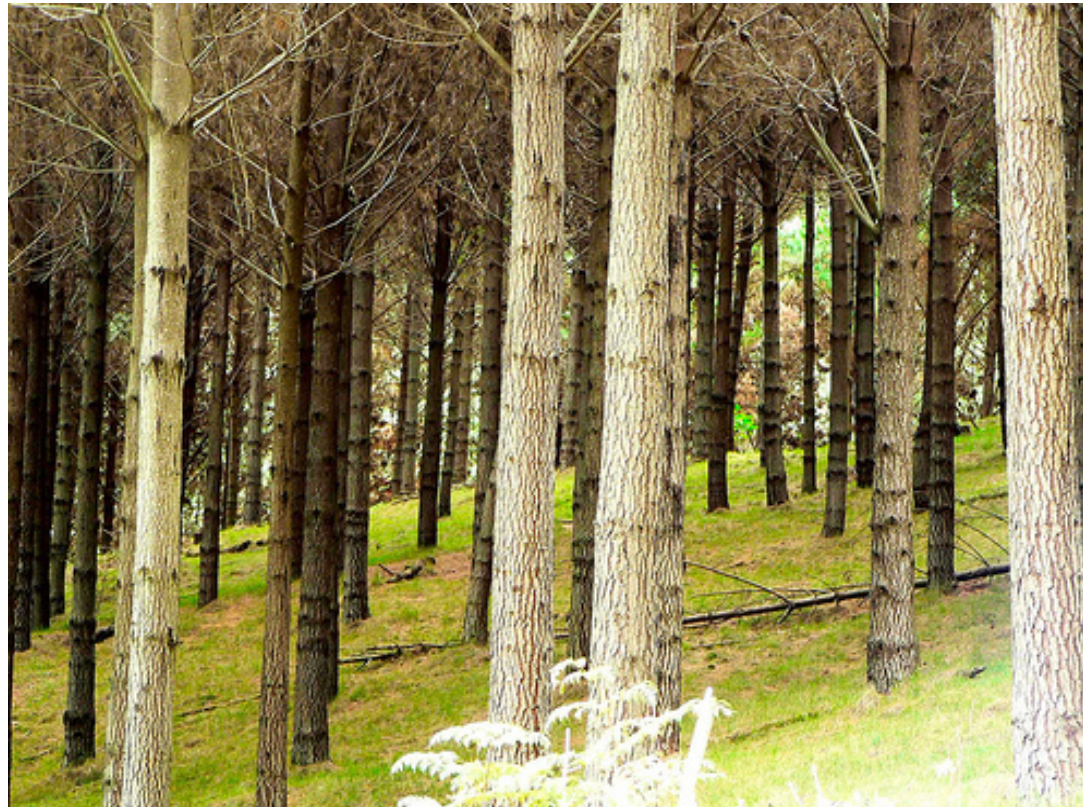- Mass media can inflame public interest by playing up radical aspects

Davies et al(2004)
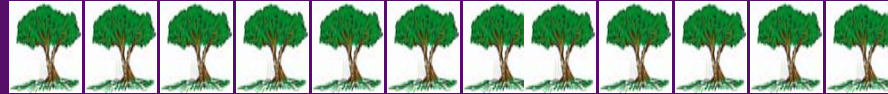
Horrors from the forest

"If you reckon a *Pinus radiata* forest is boring now, imagine how really boring it will be if all the trees are clones…"
Sydney Morning Herald 2002

FRIGHT FACTORS

**GM trees are being grown secretly in UK**

"They are 'somewhere in Dundee'. But they won't say where…"
Independent 2006

Forests in danger from GM super-tree says WWF

"The genie of genetically modified super-trees is already out of the bottle. We must make sure it does not get out of control otherwise such trees could run riot through the forests of the world without us knowing what are the consequences"
Guardian 1999
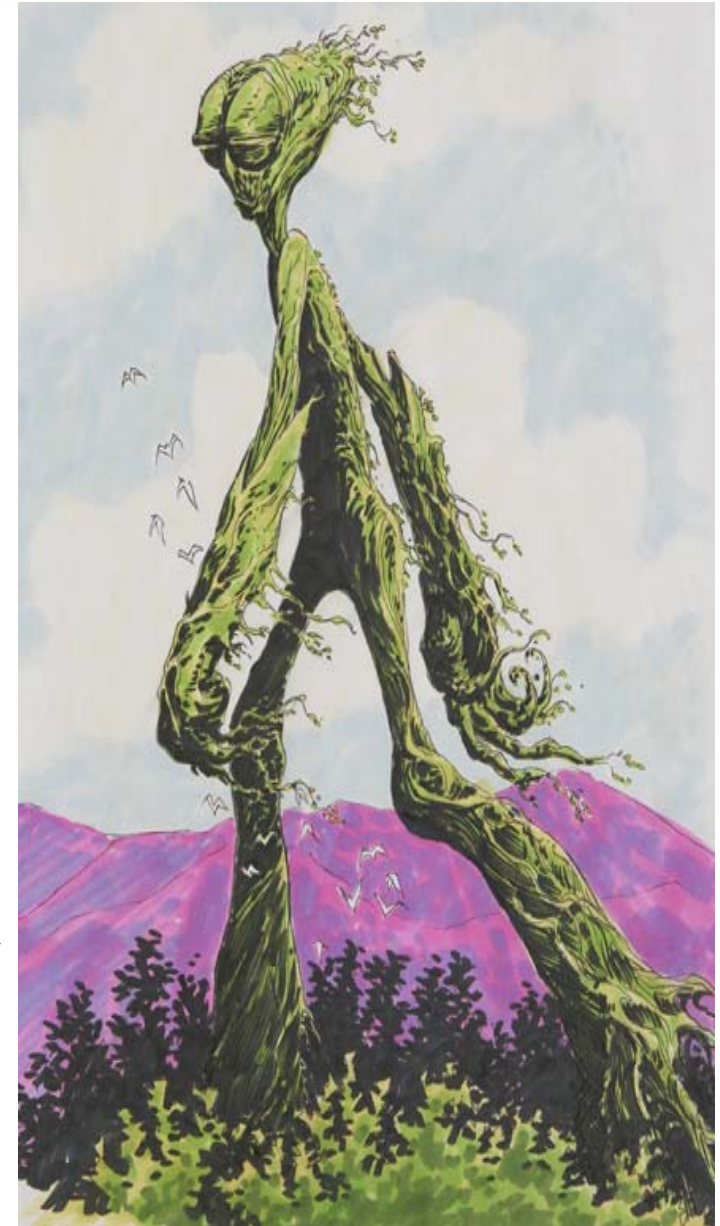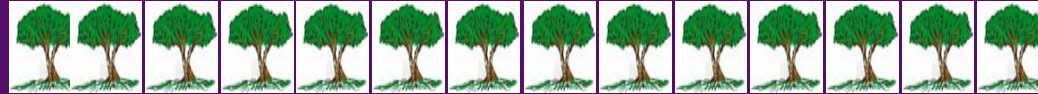
Although not linked to plantation forests, it is possible to tap into public preferences e.g. conservation of heritage trees and urban greening

New York City decides to clone 'historical' trees

"…it has withstood the test of time and indignities of urban life. These trees as a result tend to be hardier species, inherently disease resistant. They are a great reaffirmation of the importance of nature in New York City – trees so good that people are looking to clone them"

The Associated Press 2008

Searching for the perfect Christmas Tree

"A tree out in the forest clones itself. Even in your yard, you can see shoots coming off a tree's root system. That's cloning. That shoot that comes up is identical to the mother plant…we're doing the same thing as mother nature. We're just accelerating it"

East, East Carolina University, 2004

Working towards general acceptability

- Where will the clonal plantation be located? Who are your key stakeholders?
- What is the purpose of cloning - research or wider timber production and/or biodiversity and/or climate change and/or other?
- How will you frame the debate with stakeholders– what are the concerns and how can they be addressed. Where are the points of consensus and potential conflict?
- What will be your collaborative risk-assessment process?
- What would be the benefits of wider public consultation to frame the debate. How do we negotiate this potentially difficult road?

Possible ways forward

- What can we learn from monitoring of stakeholder perceptions and values in other countries?

- Develop plans for stakeholder engagement and involvement in planning of clonal test establishment

- Planting of well planned and long-term demonstration plots

   e.g. demonstrate that selected traits such as volume or wood quality can be improved without sacrificing species adaptability

- Innovative ways to communicating and sharing information, not just refereed journals (e.g. popular articles, media press interaction, open meetings, training, field days, interactive website, information sharing forums etc.)