



New techniques and technologies for invasive alien species control – *gathering speed and momentum*

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Invasive alien species

- Ecosystem *disservices*
 - Biodiversity + Ecological infrastructure & Services
 - Fire risk
 - Water security
 - Food security
 - Human safety



Gaps in our management effect

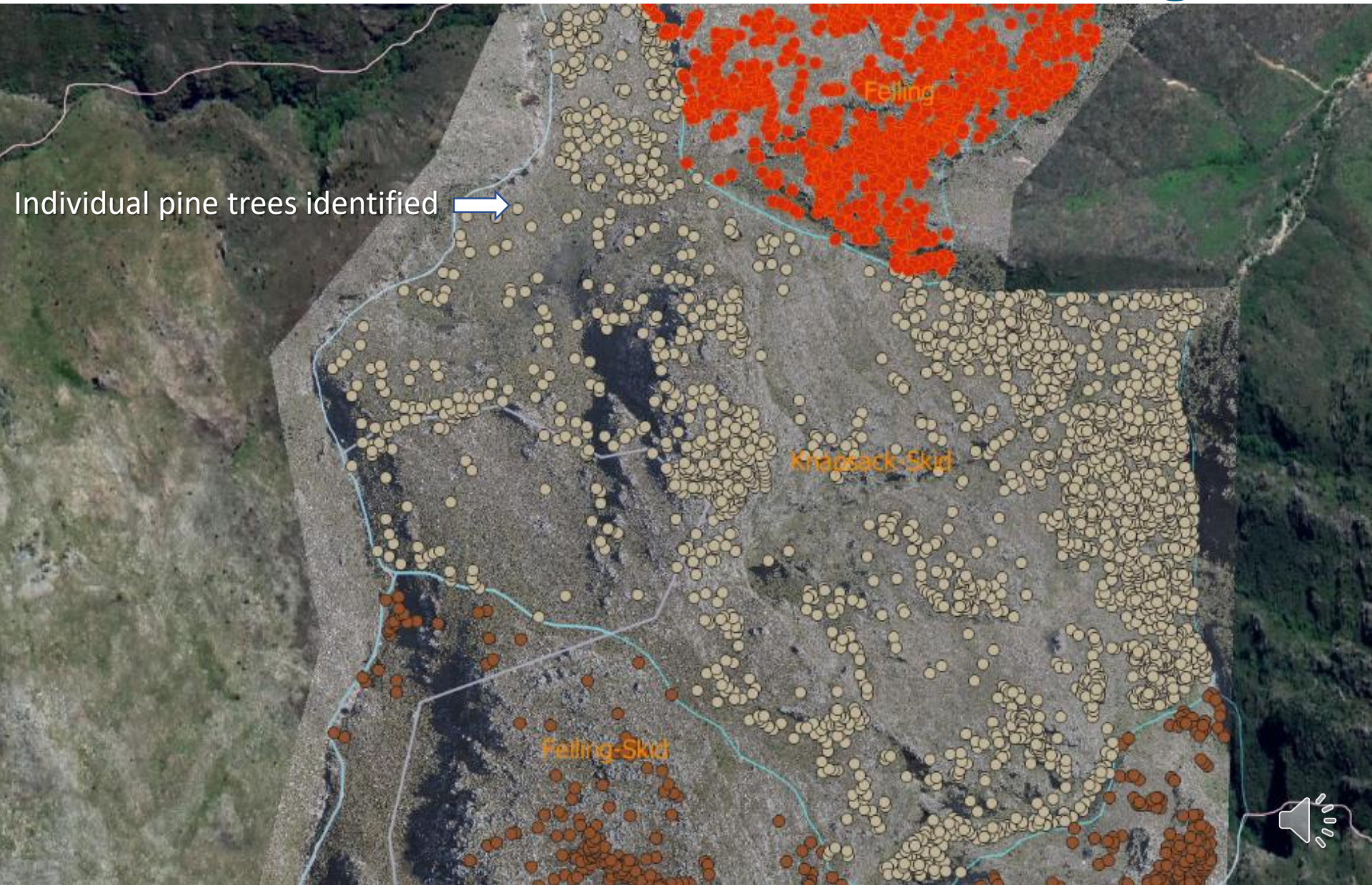
- Limited techniques
- Time – speed is essential
- Funding flows – uninterrupted operations from start – finish essential
- Need new techniques to improve:
 - Effectiveness
 - Efficiency



New techniques: Plants



Satellites, UAVs & Artificial Intelligence



HeliHack



Aerial Basal Bark Application

- Highly directed stream applied from a helicopter
- Can reach any tree
- Very effective in New Zealand
- Can be very efficient
- Limited to lowish densities
- Not registered for pines yet



Ground Basal Bark Application

- Most current knapsack operations use foliar spray
- GBBA directed on stem – limits off-target effects
- Easy, fast application
- Can be applied at multiple densities
- Can get in between stems and obstacles



Ballistic application

- Helicopter & paint ball gun
- Herbicide or Biocontrol



Drill 'n Fill



- Highly directed at target only
- Can be applied in dense infestations
- Not registered for most applications

Biocontrol

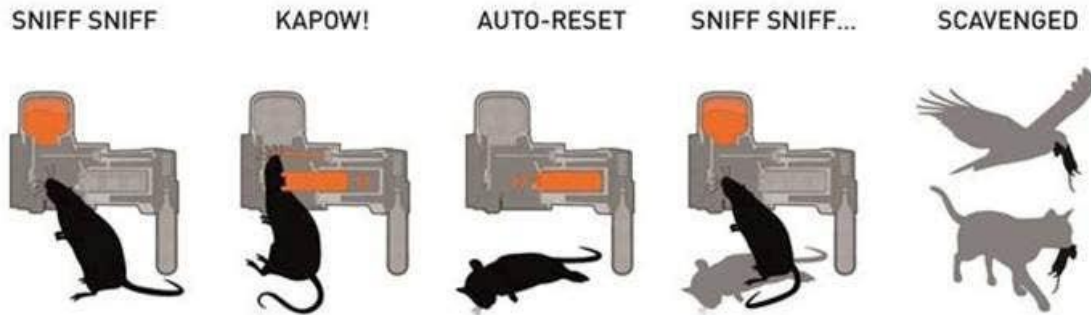
- New agents developed e.g.
 - Stink Bean *Paraserianthes* – agent now available
- New agents to be tested:
 - Pines – new research to be initiated for improved pine management with CBC, FABI & FSA

New techniques: Animals



Traps

- Self-resetting gas operated traps



- No secondary effects on scavengers or predators

Aerial baiting



- Herbicide in pellet form dropped from the air
- Has been successful applied on numerous islands
- A proposal is being developed to control European Rabbits & House Mouse on Dassen Island

Rotenone

- Effective
- Full recovery of indigenous species
- Not registered for general use yet



Biocontrol

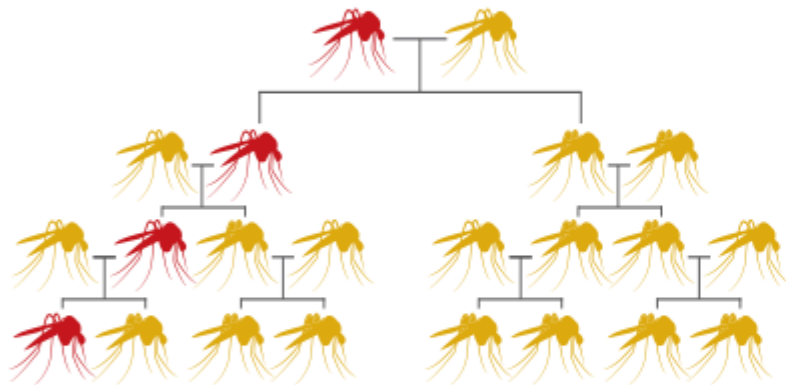


www.fabinet.up.ac.za/pshb

- Rabbits – Myxoma virus, Rabbit Haemorrhagic Disease Virus & pathogenic Calicivirus
- Polyphagous Shothole Borer Beetle - the ultimate challenge?

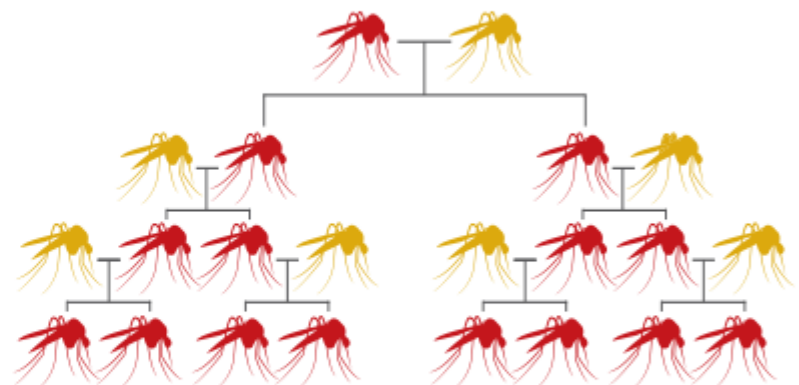
Gene drives

Normal inheritance



Altered gene does not spread

Gene drive inheritance



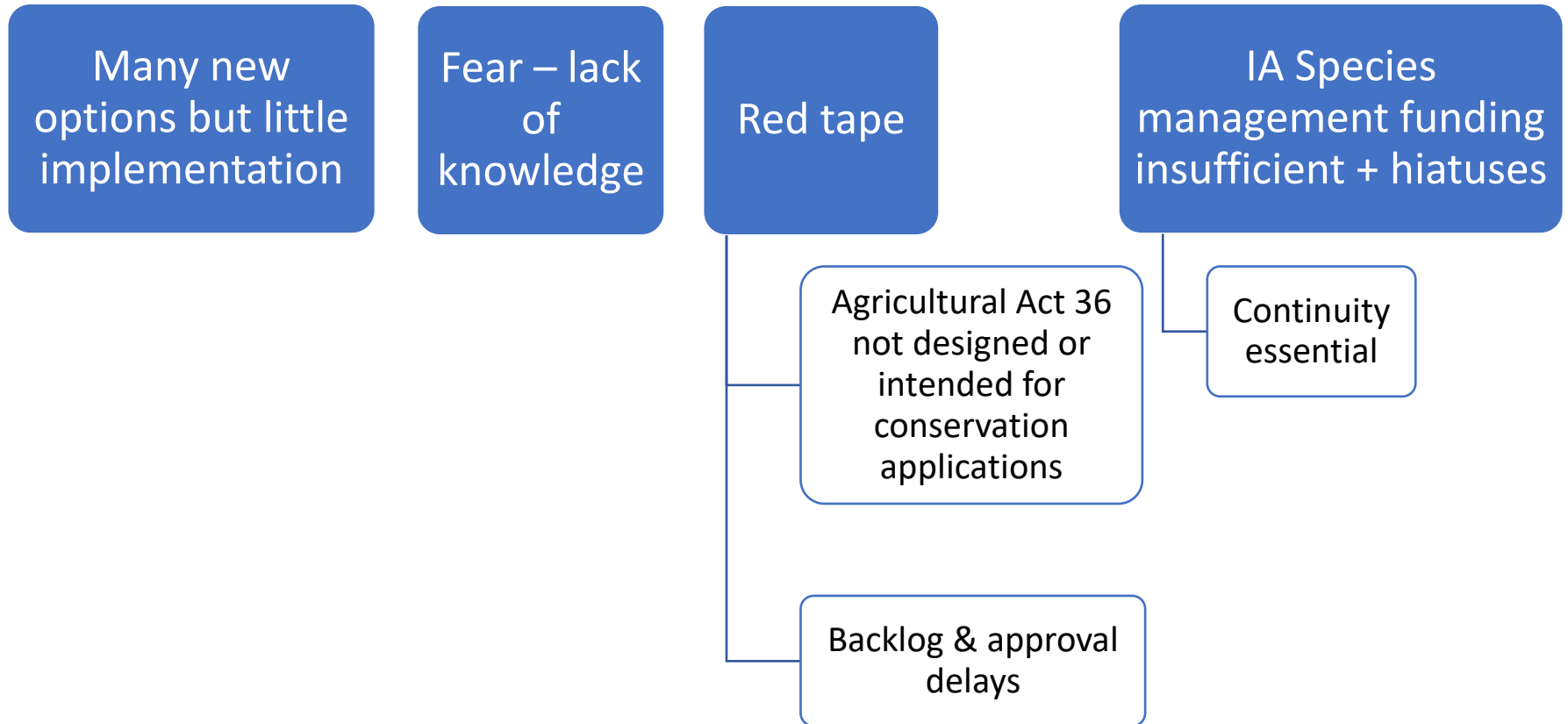
Altered gene is almost always inherited

Gene drives

- Promising for animals in closed populations e.g. islands
- Not ready for deployment yet although reversible systems have been designed
- Even more challenging with plants:
 - Seed banks & selfing



Obstacles to uptake & implementation



Gathering momentum & speed



There are **advances** and we need to pick up on them where appropriate



Integrate methods - tackle the problem comprehensively, decisively & speedily



Forum for us to collaborate and drive for solutions & overcome obstacles?



Need **ownership, drive and funding** – together we will gain momentum



Monitoring: progress/lack thereof & negative effects



Adaptive management response

THANKYOU

