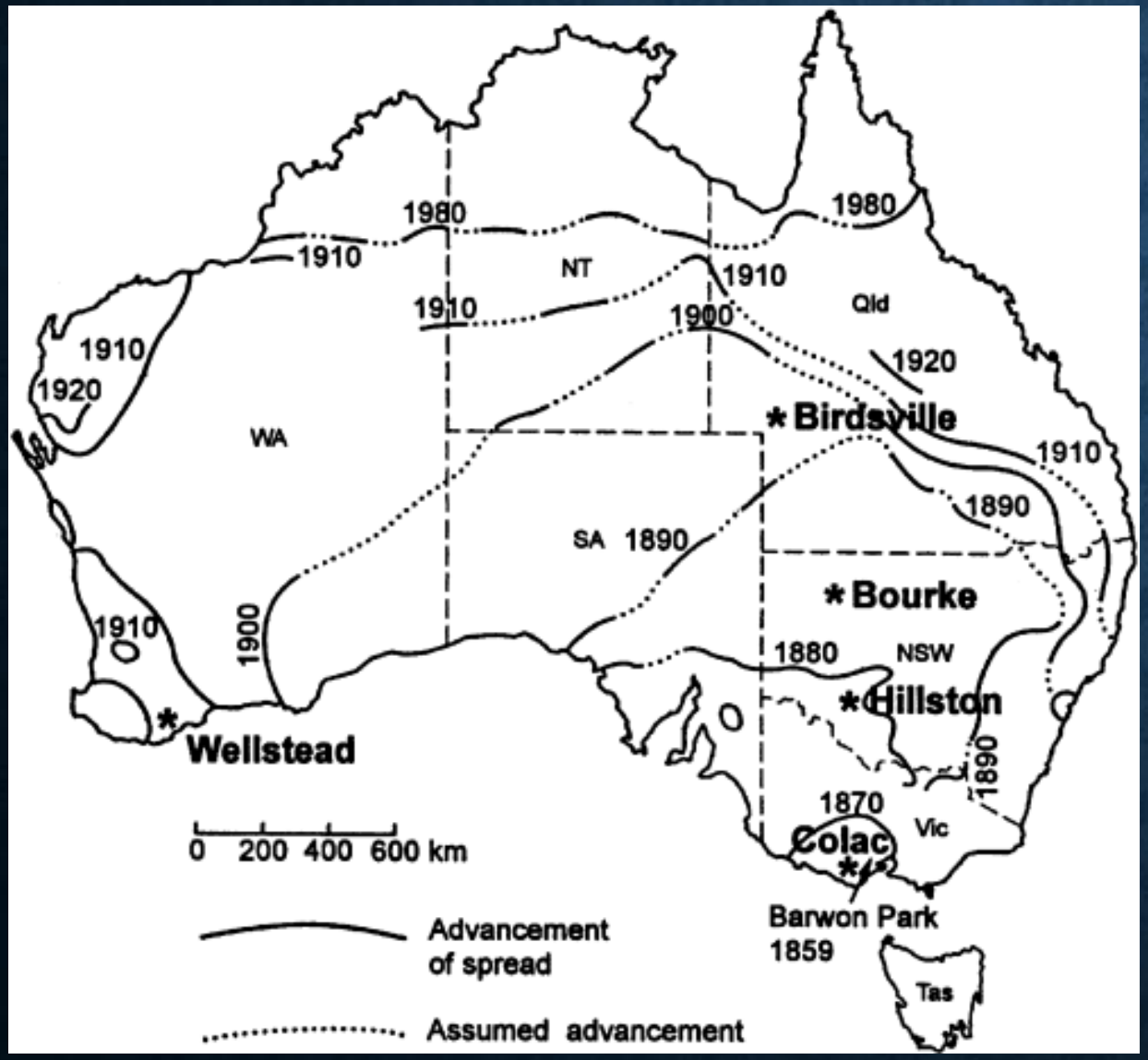
INVASIVE EUROPEAN RABBITS IN AUSTRALIA

Michael Evans

OBJECTIVES AND GOALS

- Examine why rabbits are so successful in Australia
- Understand variability in rabbit survival amongst age classes and climate conditions
- Were founder effects experienced?
- Examine potential control methods

BACKGROUND AND INTRODUCTION



- Oryctolagus cuniculus
- Originally from Iberian Peninsula. Now found nearly worldwide
- Introduced from England in 1788
- Released into wild in 1859
- Large growth rate and dispersal led to roughly 600 million rabbits within 100 years
- Outcompeted native bilbies which are now endangered.
- *Cause extensive crop damage and soil erosion. Responsible for extensive plant extinction*

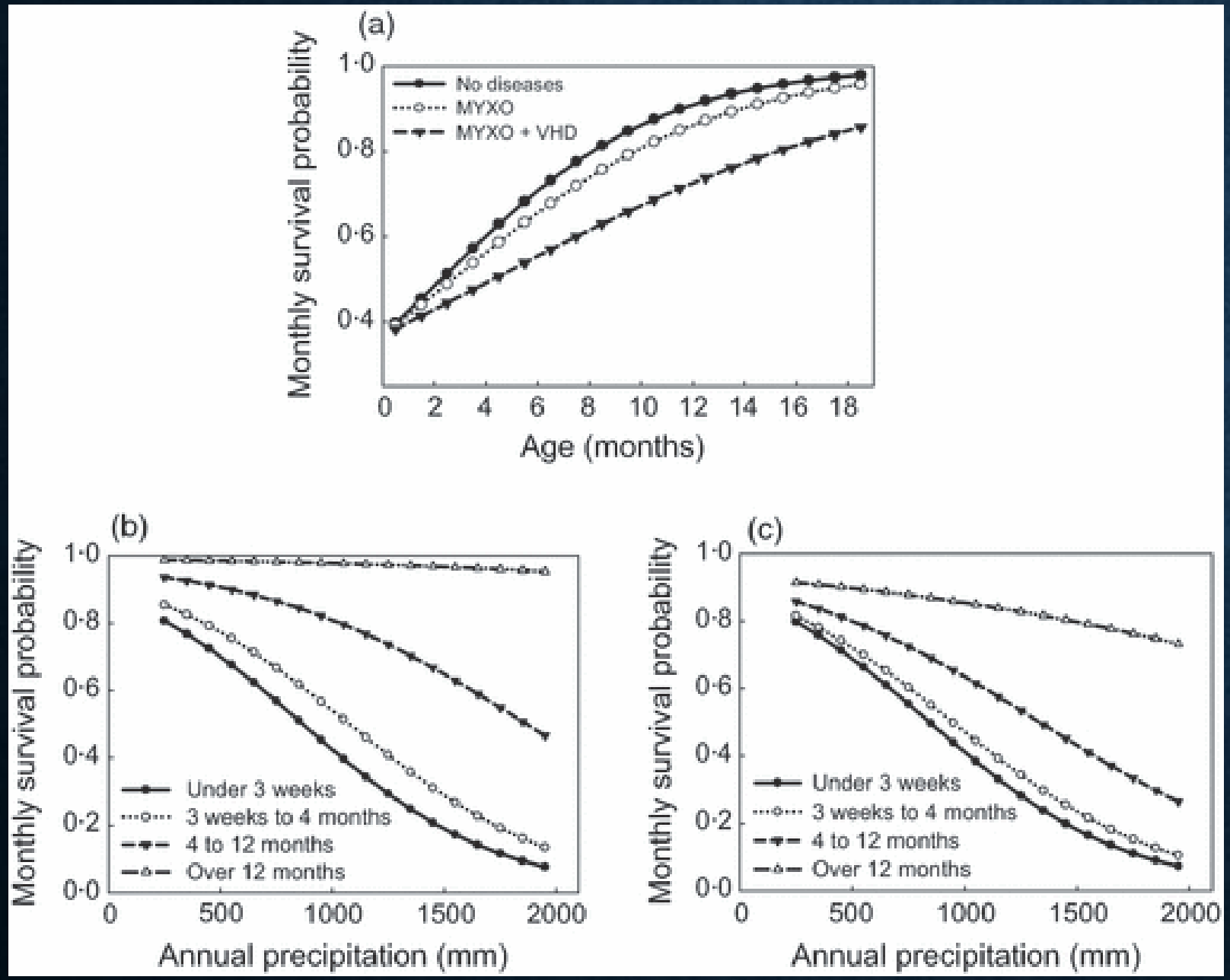
Stodart & Parer 1988

REPRODUCTION

- Mostly monogamous. Dominant males are polygynous
- First reproduction at 4 months
- Litter size of 2-12 rabbits, although 9+ is rare
- Potential for 4-7 litters in one year. Average gestation time is one month
- One pair can produce 30-40 offspring in one year
- Lifespan of roughly 9 years
- Recover quickly from droughts

POPULATION CONTROL METHODS

- Limited predation through foxes and eagles
- Rabbit-proof fence construction in 1901. Currently three in western Australia.
- Hunting for sport and food
- Myxoma virus in 1950 led to myxomatosis. Led to decline but gradual increase due to resistance.
  - Less virulent strain currently
- Rabbit haemorrhagic disease spreads beginning in 1995. Referred to as RHD.
  - Mortality of roughly 90%
  - Transferred orally, nasally, conjunctively
  - May be transferred to their predators

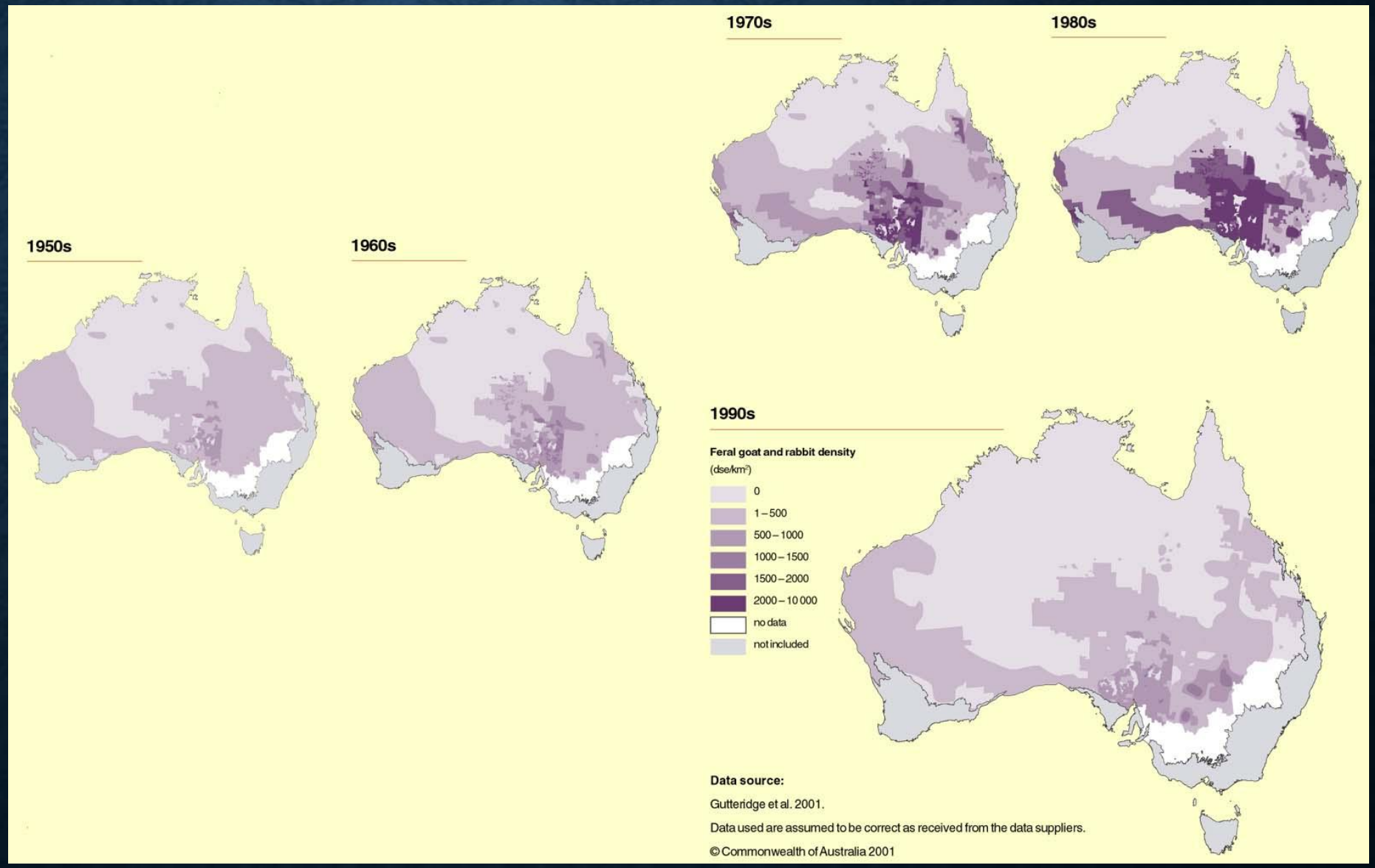


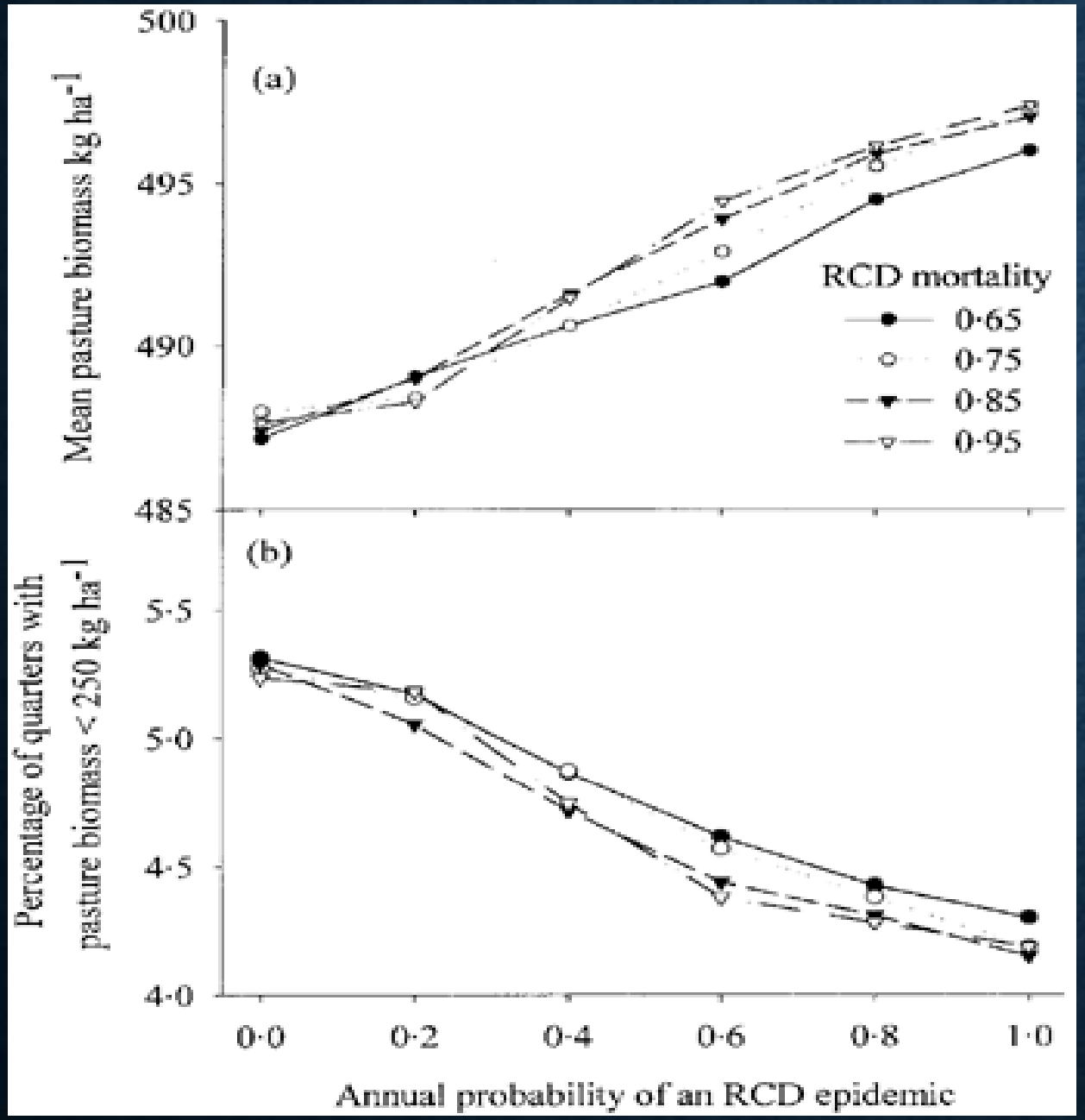
- Thrive in years with less than 1000mm of rain
- Graph B is for populations with myxomatosis while Graph C is for RHD.
- RHD causes lower survival in 4-12 months and over 12 months.

Tablado et al. 2012

RABBIT DENSITY OVER TIME

Decline in population density in the 1990s with the introduction of the Rabbit haemorrhagic disease (RHD)





As probability of RHD increases, pastures have increasing biomass as there are less rabbits due to mortality.

Pech and Hood 1998

NO FOUNDER EFFECT

- Microsatellite arrays used comparing populations in different Australian regions to those in Spain and France. Examined number of alleles, number of unique alleles, rare alleles, and observed and expected heterozygosity.
- No pattern for reduced genetic diversity as a result of sequential founder effects during colonization.
- Hypothesized that rampant population growth caused any genetic drift to be minimized in the founding population.

Zenger et al. 2003

CONCLUSIONS AND FUTURE DIRECTIONS

- Local populations can increase five-fold in one year. Control programs should aim for 95%+ removal.
- RHD offers some form of a control agent against rabbits. Could potentially be modified to increase mortality rates.
- Populations should be monitored for potential resistance to RHD.
- The prevalence with which RHD is transferred to rabbit predators should be examined in-depth.

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