Dynamics testing

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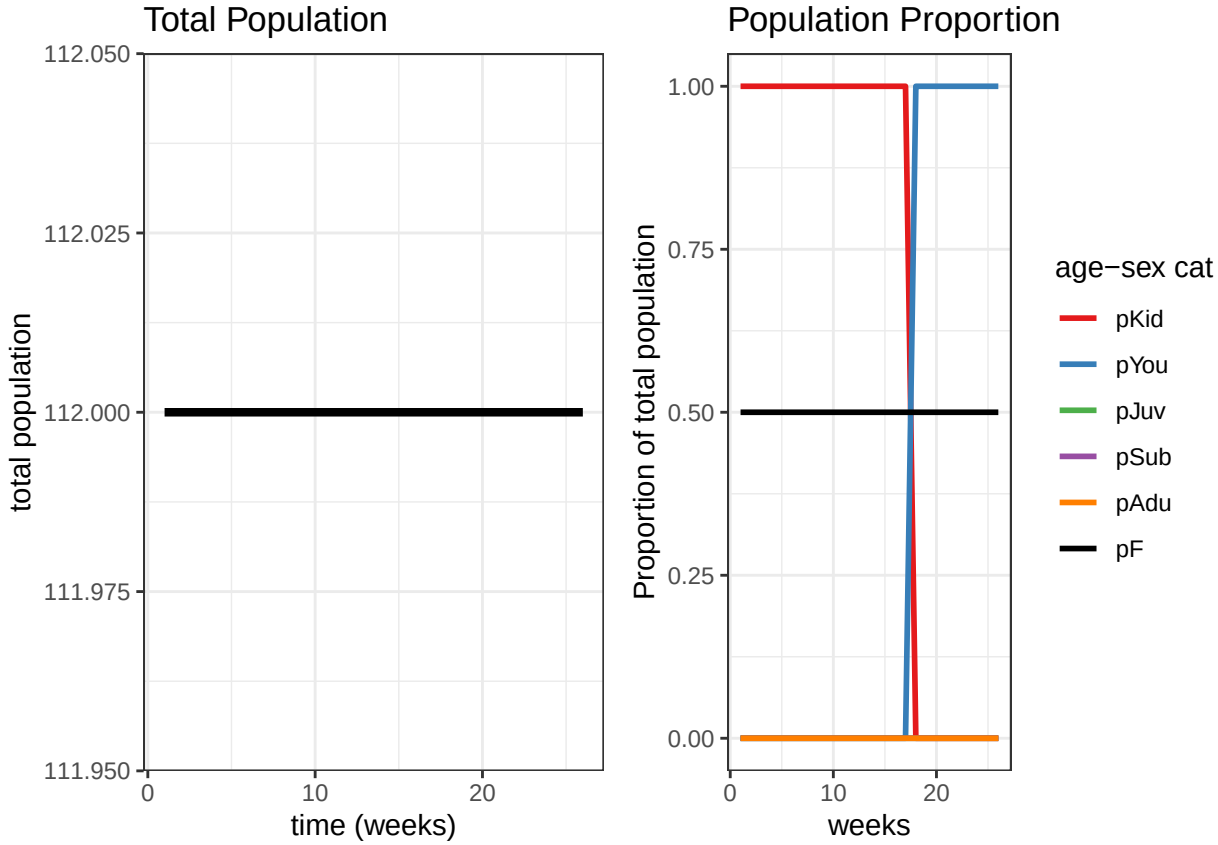
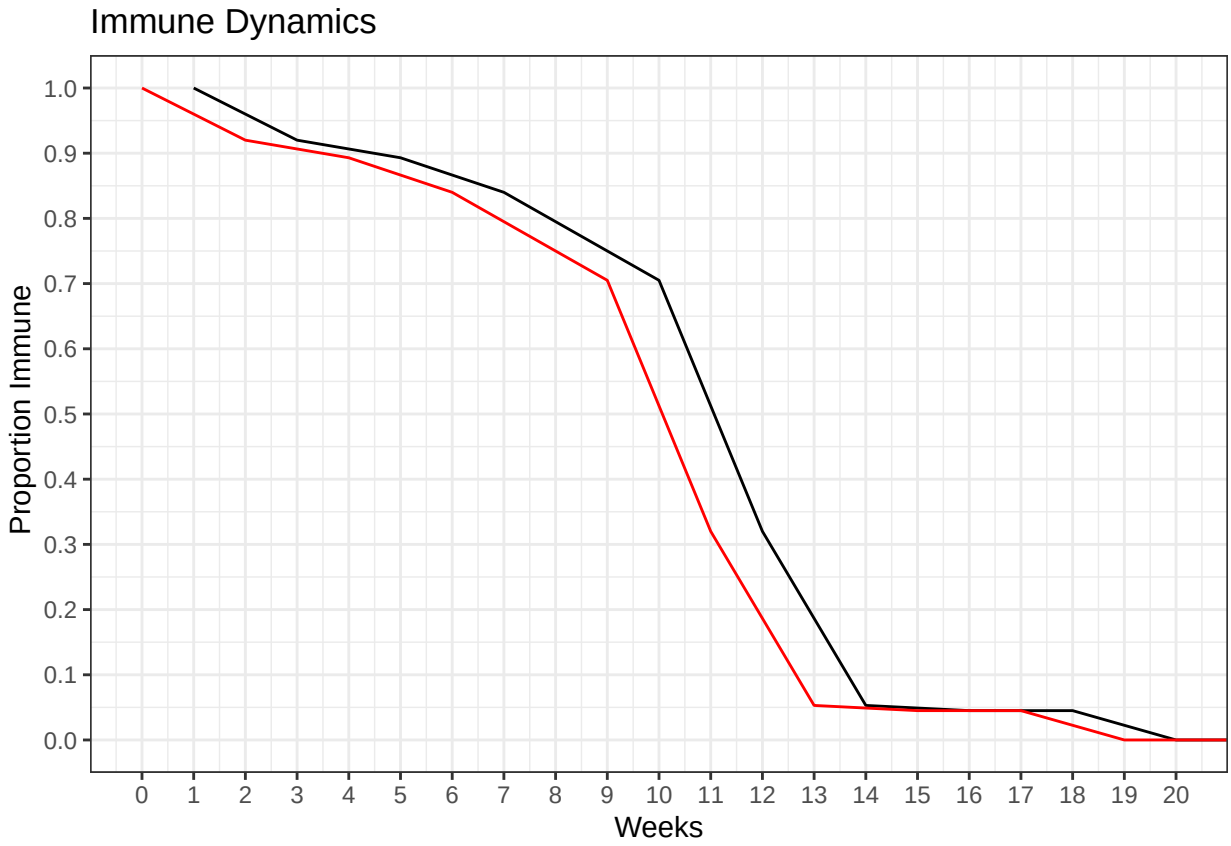
Dynamics Model Testing

Maternal Immunity

- Run model with conditions to replicate Bodjo et al paper where offspring immunity dynamics are drawn from.
- Tested duration of maternal immunity in 112 lambs up to 150 days after birth, born to ewes vaccinated with the homologous PPR vaccine "Nigeria 75/1" at day 90 and day 120 of pregnancy.
- Parameters:
  - set 112 lambs to immune compartment
  - set rest of population to 0
  - set mortality, offtake, and all demographic rates (except immune decay) to 0
  - plot proportion immune for first 6 months of simulation
  - plot should mirror the immune decay from Bodjo raw data

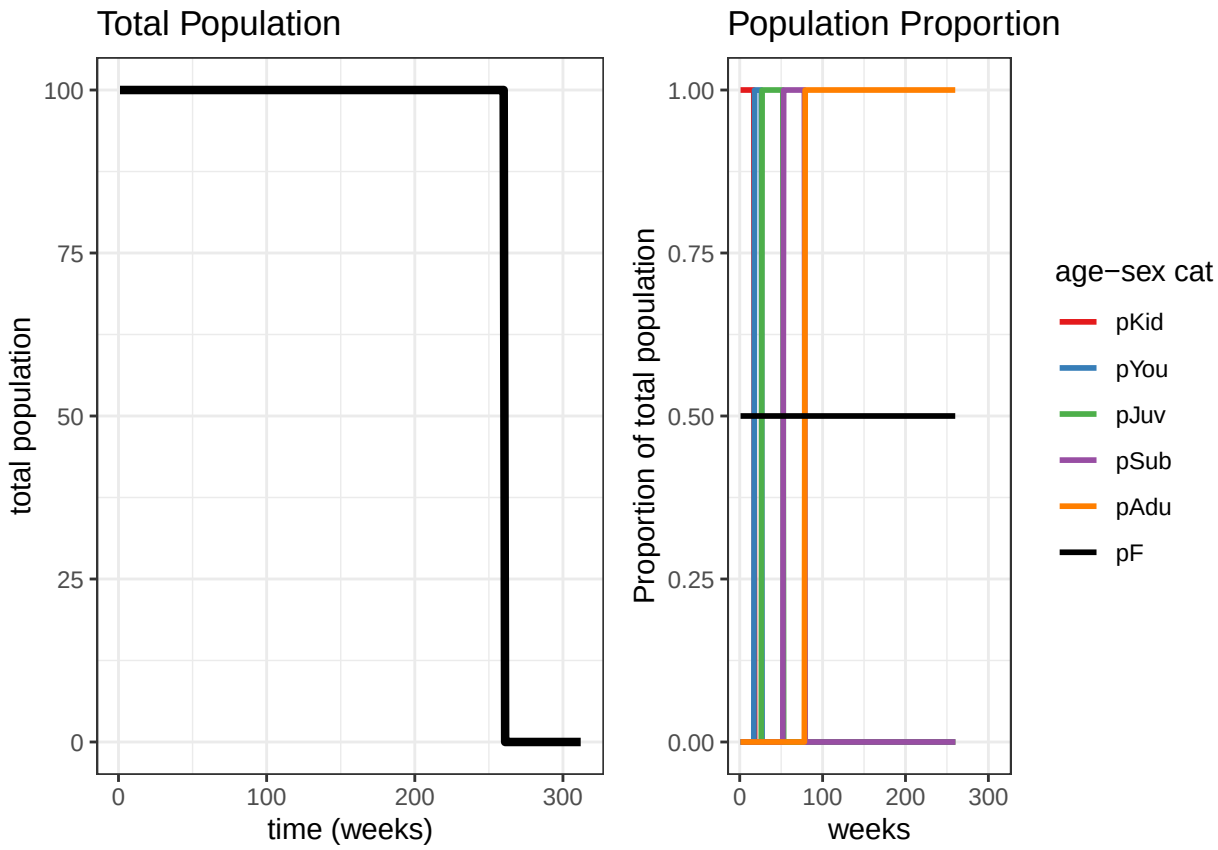




Basic Model

- With all other parameters set to 0
- Set population to 100 animals
- All animals begin in S1 age group (susceptible offspring)
- With a life-span of 5 years for males and females
- Animals should move through age groups until 5 years.

NB: NaN values due to dividing by 0 when population dies out (fix this in `demos_summary.R`)



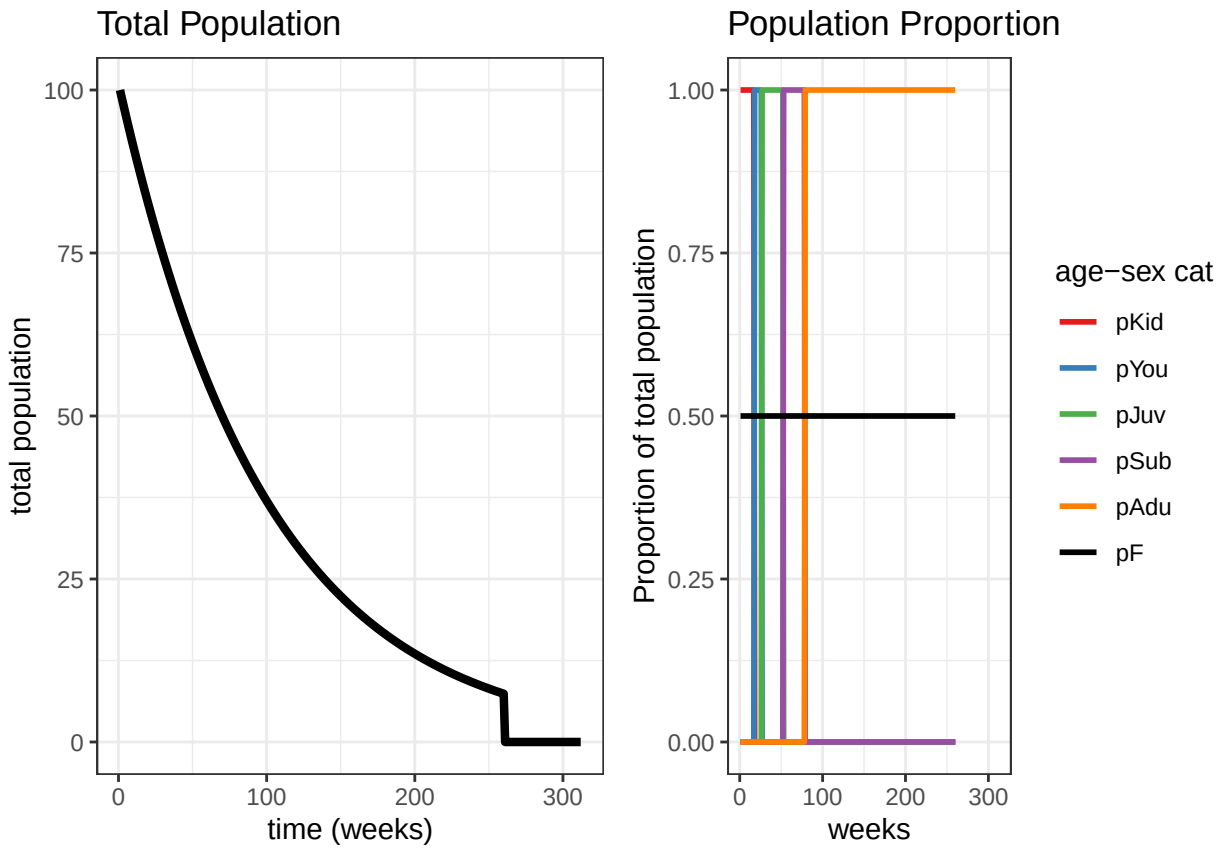
Mortality

- With all other parameters set to 0
- Set population to 100 animals
- All animals begin in S1 age group (susceptible offspring)
- With a life-span of 5 years for males and females
- Set **mortality rate** to 0.01 per week
- Animals should move through age groups until 5 years.
- ...
- ...
- Parameters:
  - set ...
  - set ...
  - set ...

Test validation: what is the gradient of the curve?

- Briefly:
  - mortality rate is 0.01/week in all age groups
  - survival is 0.99/wk
  - 1 year survival = $0.99^5 2 = 0.59$
  - 5 year survival = $0.99^(52 * 5) = 0.07$
  - compare these figure to `output_df` ...

w	sum_pop
53	59.296645
260	7.404835



Births

Population Size

Population Structure