



The development of an age structured model to describe the transmission dynamics of Cystic Echinococcosis in Argentina.

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BACKGROUND

- Cystic Echinococcosis (CE) is a Neglected tropical disease, caused by the cestode parasite *Echinococcus granulosus*. It has a global distribution, but most commonly affects poor pastoral communities. It is endemic in South America and causes a substantial socioeconomic burden.
- Dogs are the definitive host, while sheep and goats are intermediate hosts. Humans are accidental dead end hosts and do not contribute to onward transmission.
- In livestock CE causes a loss of productivity (wool and milk production) and also offal condemnation at slaughter. In humans morbidity and mortality is seen in untreated patients. Epidemiological data are sparse. Some countries have no formal control and surveillance programmes in place. Others, such as Argentina, have established programmes running in both humans and livestock.

METHODS

The model simulates transmission dynamics in a population of dogs & sheep within a single farming unit, reproducing a pastoral sheep farm in Rio Negro, Argentina. It simulates a cohort of sheep over 5 years, as well as dogs over 4 years, as shown in figure 1. Demographic parameters of sheep and dogs are included based on the local farming system. Seasonal viability of eggs is also included.

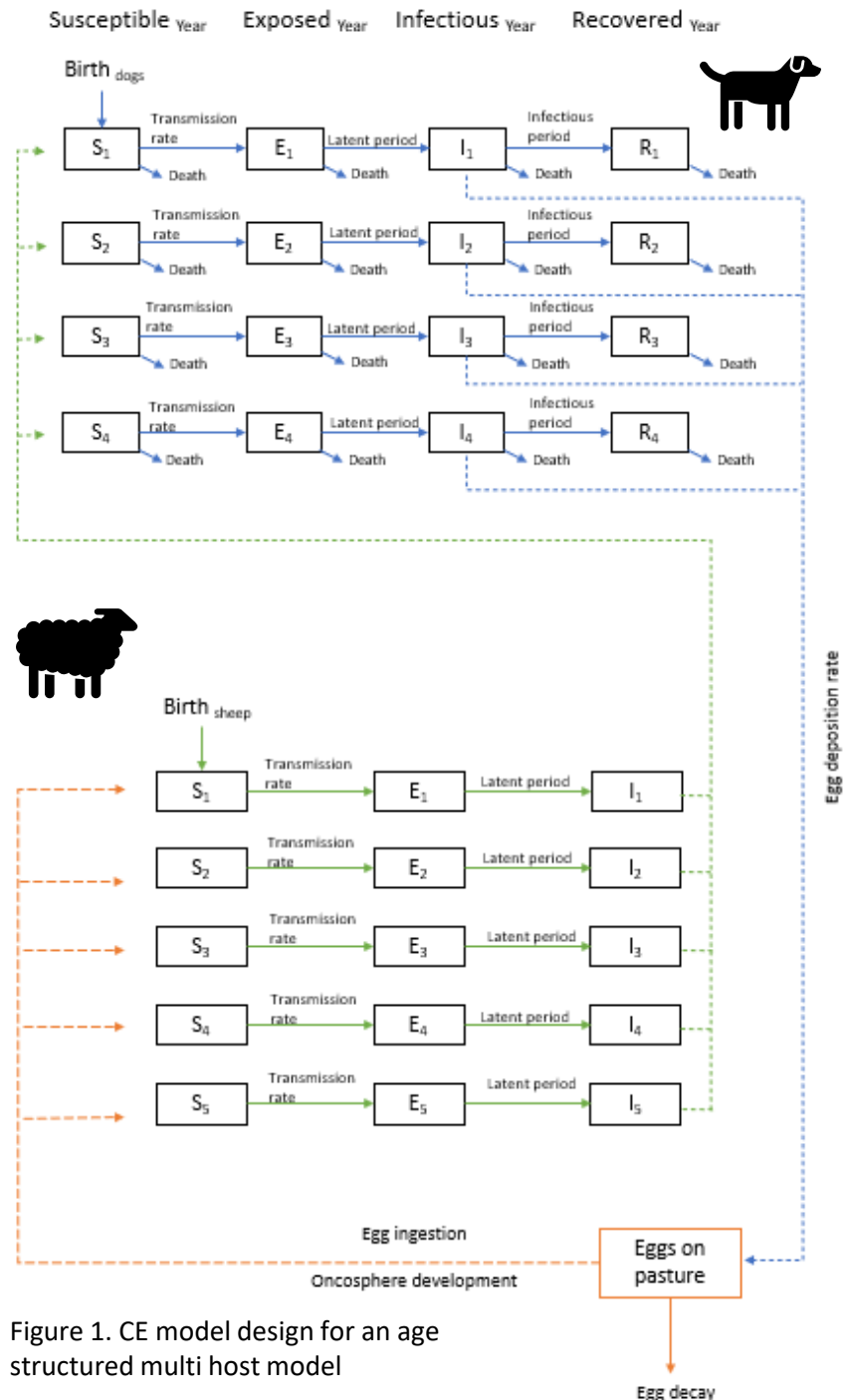


Figure 1. CE model design for an age structured multi host model

Ovine population

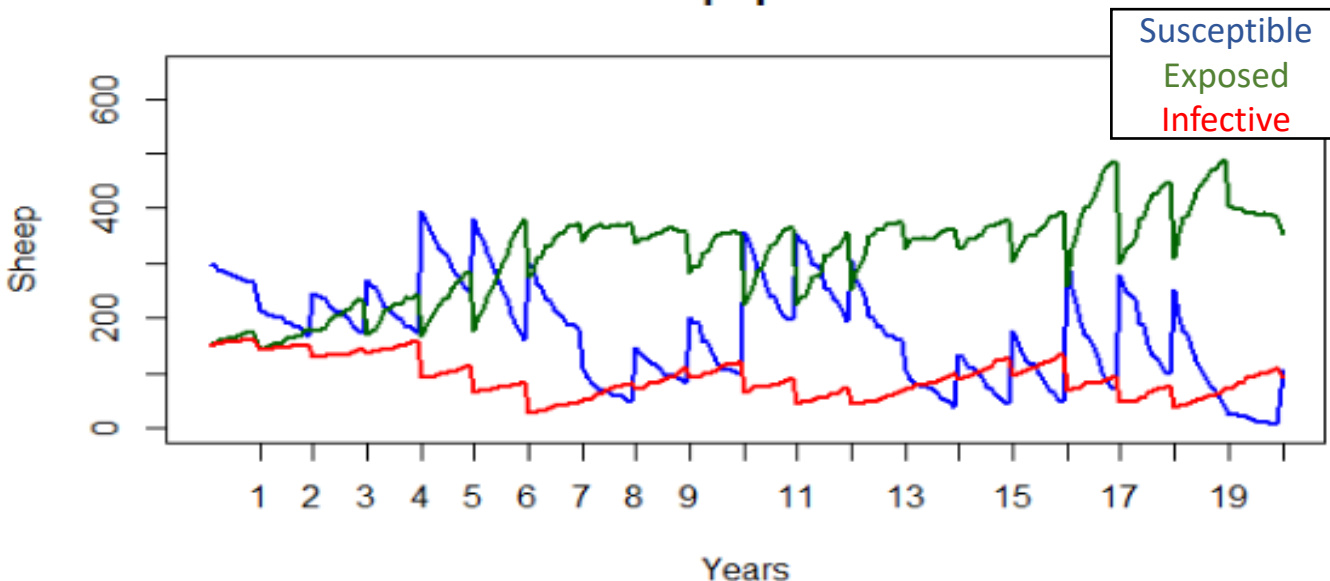


Figure 2. Example of CE dynamics observed in the sheep population over 20 years without any intervention

PRELIMINARY RESULTS

Model results provide additional insights into the epidemiology of CE in the region. We can observe dynamics over time, such as spikes in susceptibility with the annual introduction of new lambs, as shown in figure 2. We can also simulate and evaluate different control options for long term CE control.