**Demography of a carnivore, the red fox, Vulpes vulpes: what have we learnt from 70 years of published studies?**

**Devenish-Nelson et al., 2012**

The demography of populations within a species, such as the red fox (Vulpes vulpes), shows significant intraspecific variability. Despite being one of the most studied mammals due to its widespread distribution and economic significance, gaps in understanding key demographic parameters remain. Population models generally suggest a tendency for positive growth, with the survival and fecundity of younger individuals contributing most to this. However, long-term studies spanning 70 years have been unable to fully analyze how factors such as harvesting regimes, population density, and weather influence these parameters. Frequently, modelers must rely on data from other populations to fill in gaps, leading to concerns about substituting interpopulation data.

Examples from other species, like roe deer and wild boar, illustrate how distinct environmental conditions, such as climate and predation, result in population-specific demography. Similarly, different phases of growth in Sierra Nevada bighorn sheep populations have shown distinct variations in vital rates.

Red foxes inhabit diverse environments, from tundra to urban areas, and exhibit demographic traits that vary with age and environmental conditions. Deterministic models have suggested some consistency in demographic traits across populations, particularly regarding age-specific contributions to population growth. Foxes mature early, typically at around 10 months, and produce a single litter annually.

Life-history theory places red foxes at the faster end of the reproduction-survival tradeoff spectrum due to their early maturity, short lifespan, and relatively large litter sizes. Elasticity analysis indicates that the youngest age class has the greatest impact on population growth, and both fecundity and survival play crucial roles. Fecundity, however, tends to be more variable than survival, as it is influenced by factors such as food availability, body mass, and social conditions.

A key challenge remains in accounting for variability and uncertainty in vital rates, especially when different sampling methods (e.g., driven shoots, night shoots, trapping) may introduce biases into demographic data.