



No Time to Die: Menopause and the Adaptive Post-Reproductive Lifespan in Vertebrates

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Reproductive Senescence is Linked to Organismal Senescence

Most animals reproduce until they die

That's not true for all organisms, though!



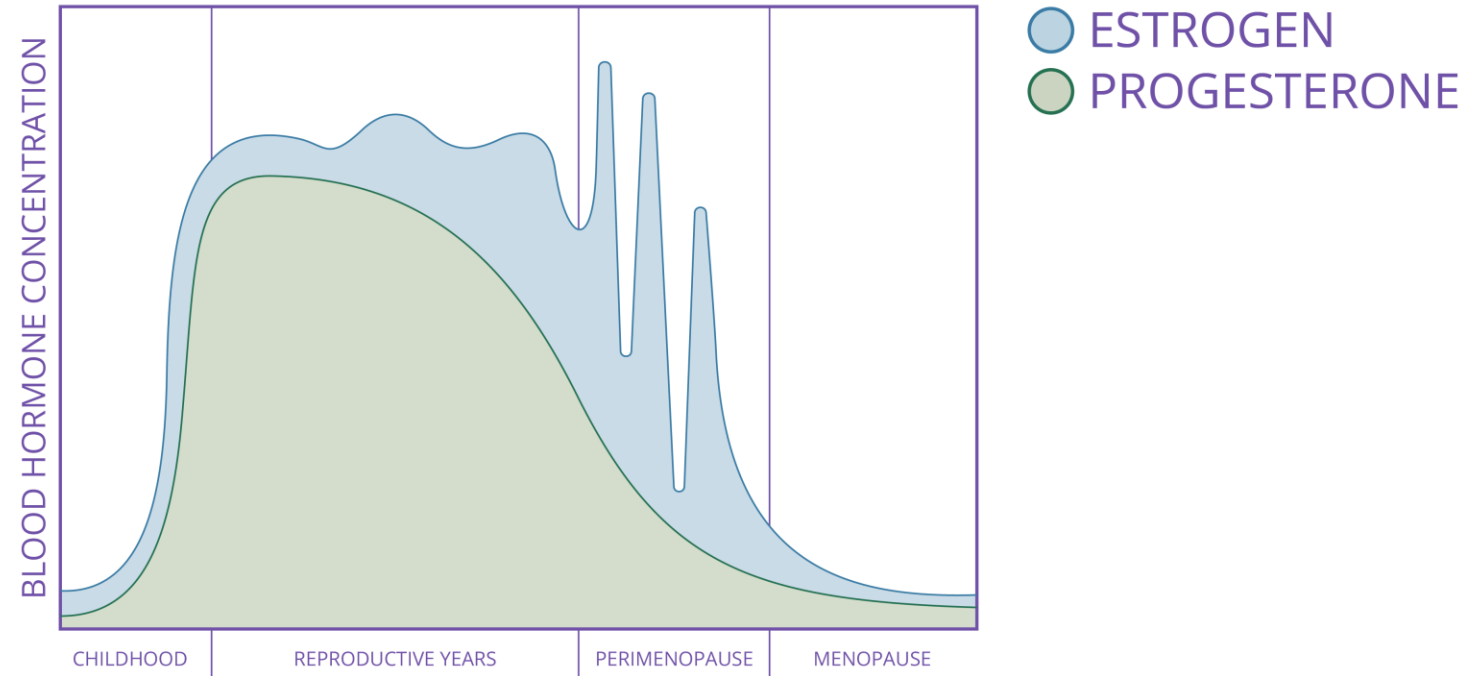
Petunia spp.

Menopause

Occurs between 45 and 55

Result of changing hormone levels related to reproductive aging

Menopause has not been documented in non-human animals**



Adaptive Post-Reproductive Lifespans (PRLS)

Post-Reproductive Lifespan (PRLS) refers to the period of an organism’s life following reproductive senescence

Species	Avg. Lifespan (yrs.)	Avg. Age at Final Offspring (yrs.)	% Lifespan post-reproductive
Humans (<i>Homo sapiens sapiens</i>)	80	45	44



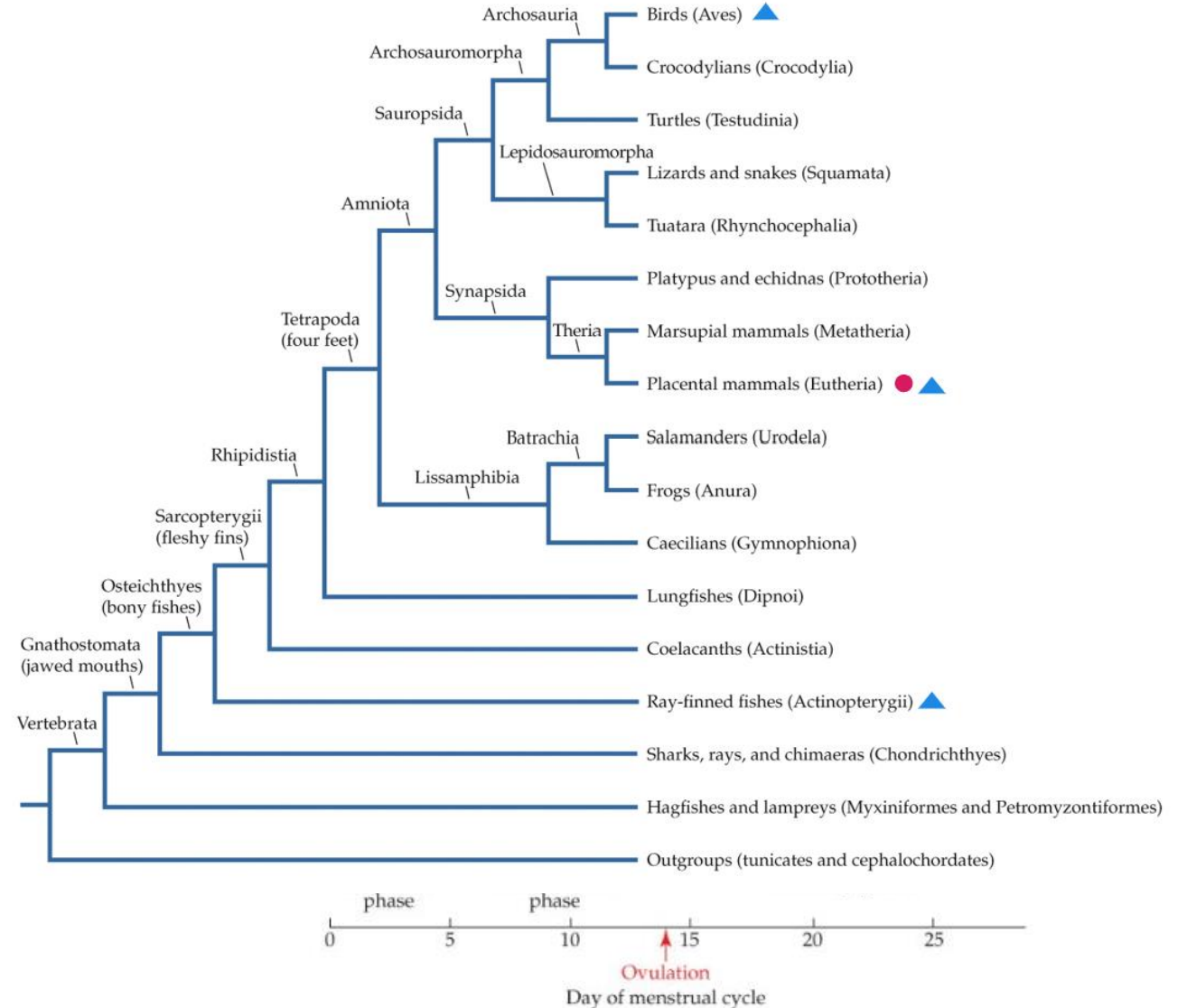
My Research Questions

1. Why are adaptive PRLSs seemingly so rare?
2. What other species could potentially have an adaptive PRLS?

Two Approaches:

Proximate: What are the physiological/internal processes that explain adaptive PRLSs and the transition into them?

Ultimate: What are the evolutionary/ecological factors that led to the appearance and continued existence of adaptive PRLSs?

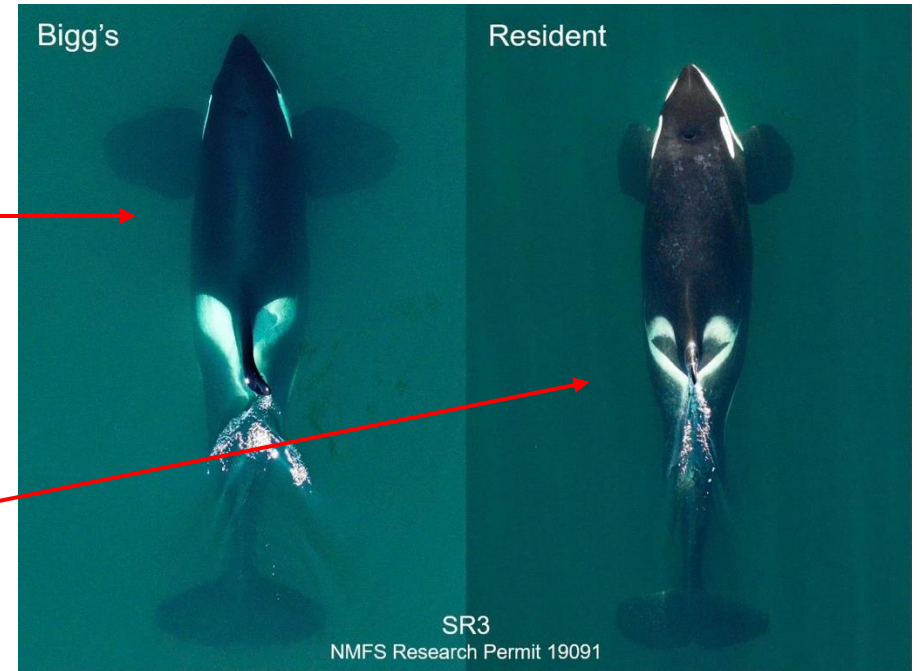


Hypotheses for Adaptive PRLS Evolution

Group Composition and the Grandmother Hypothesis

The Ecological Knowledge Hypothesis

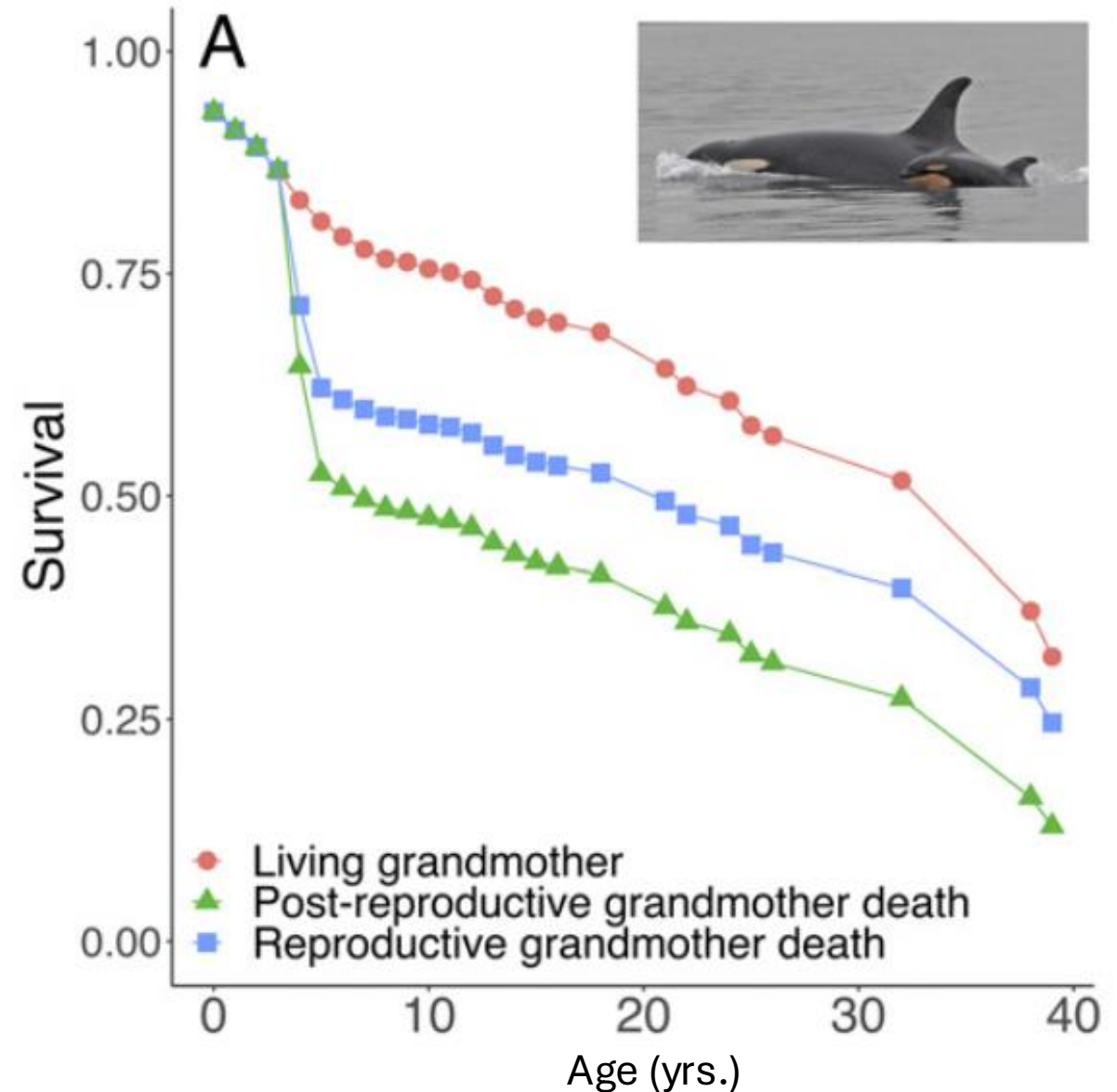
Intergenerational Reproductive Conflict and Resource Limitation



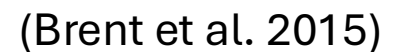
Group Composition and the Grandmother Hypothesis

Older females increase their fitness by helping care for their grand-offspring

Grandmothers increase calf survival



Old females are more likely to lead in times of resource scarcity

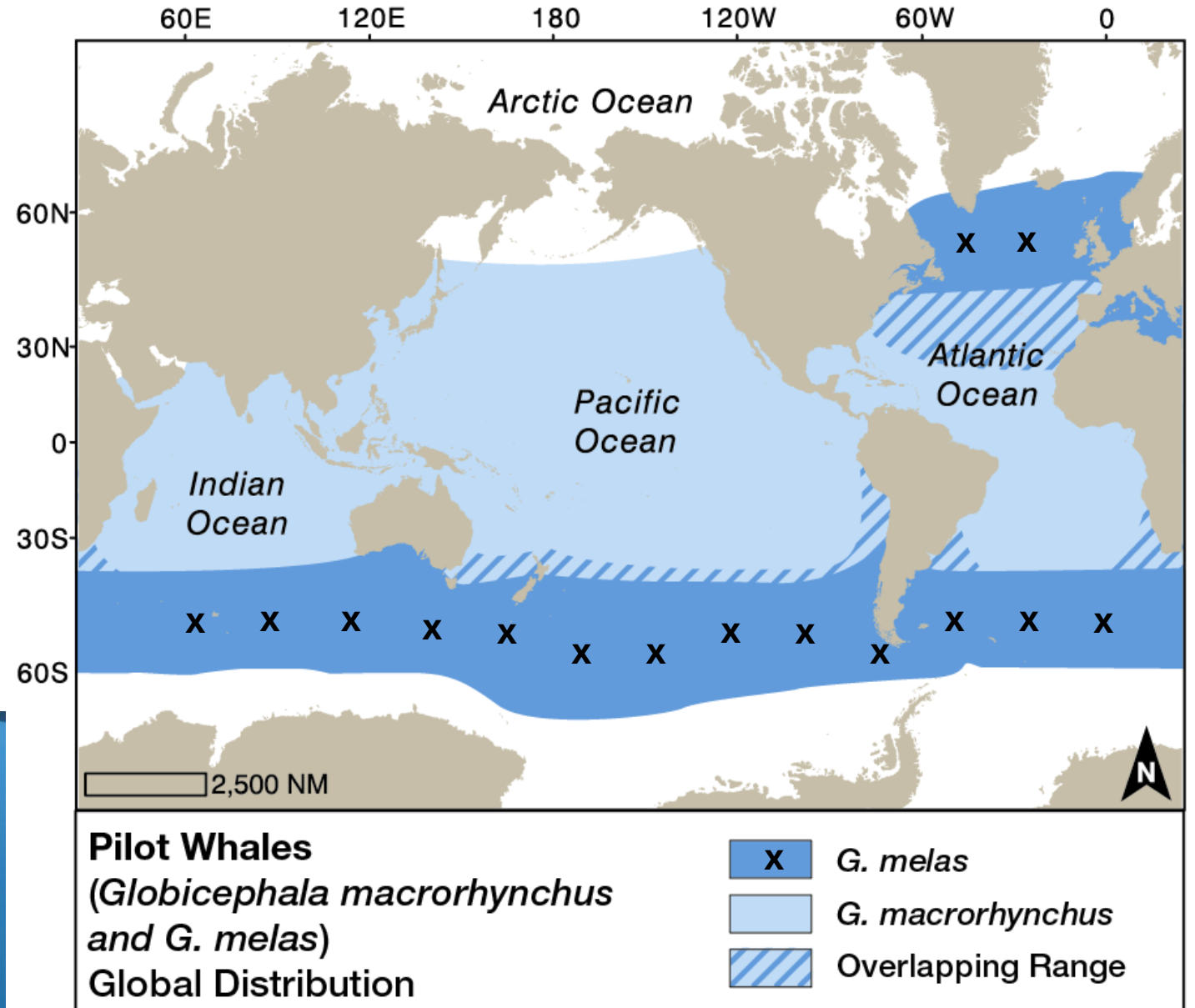


Intergenerational Reproductive Conflict and Resource Limitation

Resource availability depends on regionality

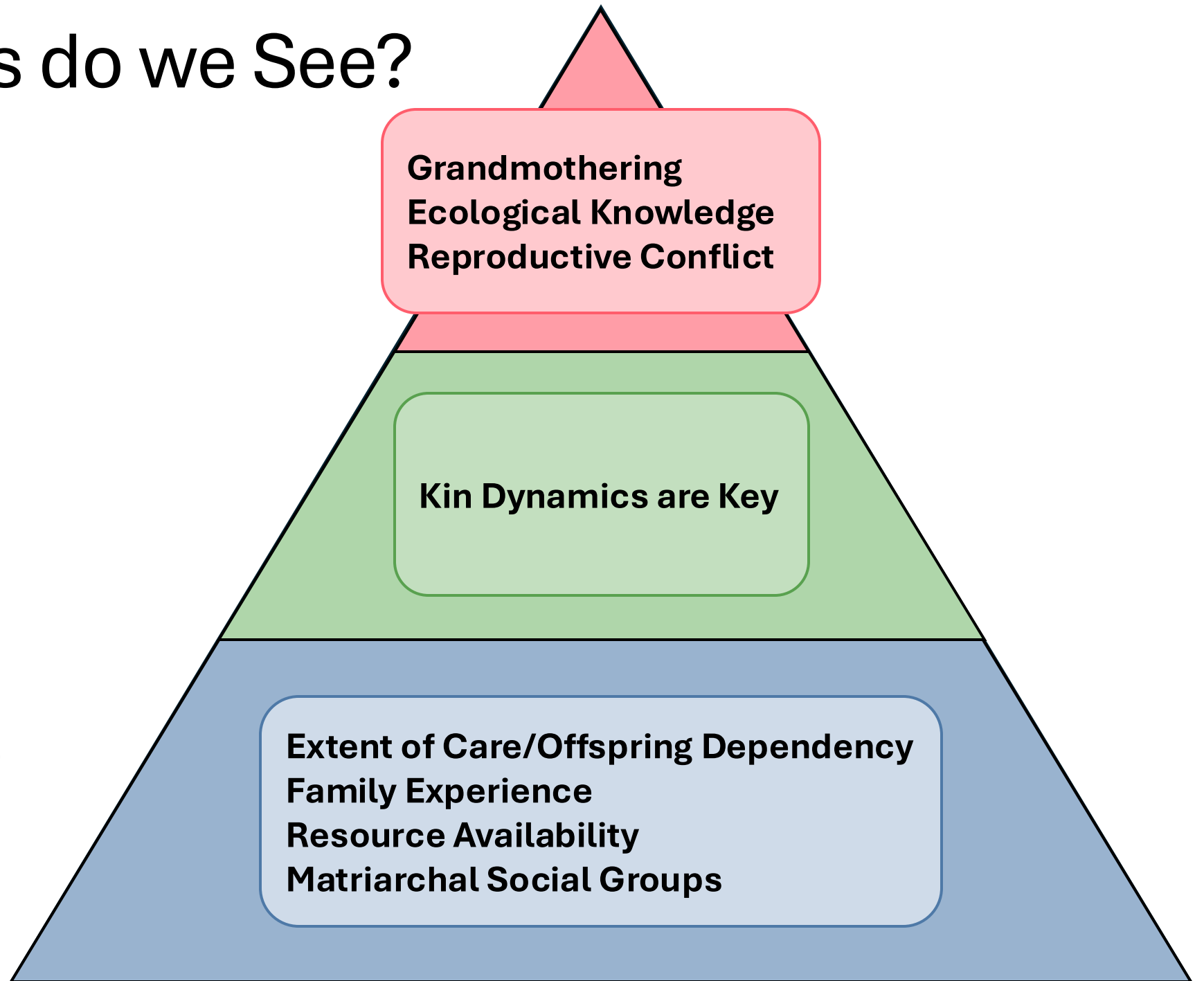
Short-finned pilot whales are more limited in their resource availability

They have higher intergenerational reproductive conflict



(McCormack et al. 2023)

What Patterns do we See?



The combination of
these things is rare!

What Other Groups Have Adaptive PRLSs?



Adaptive PRLS likely widespread in odontocetes (toothed whales)



Seychelles warblers may change how we define PRLS



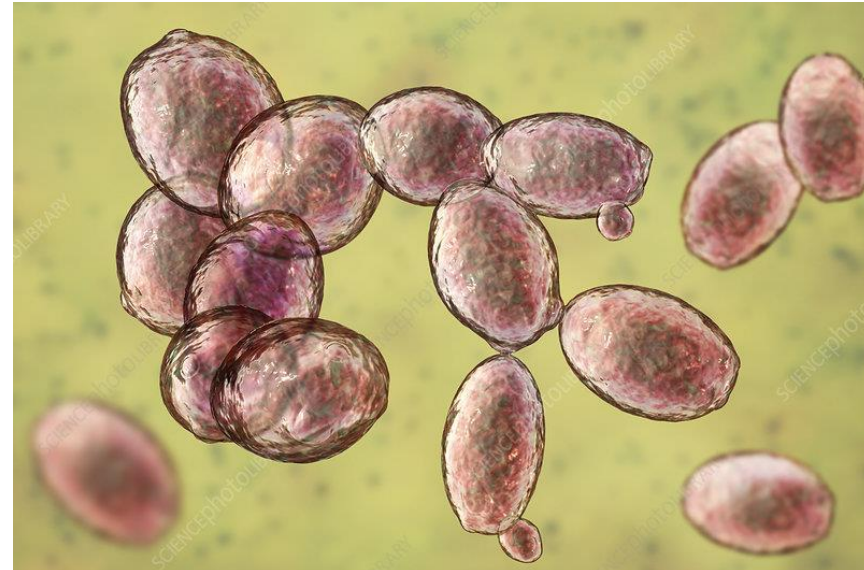
Guppies show potential adaptive PRLSs

What Other Groups Have Adaptive PRLSs?

Reptiles and
Amphibians likely do
not exhibit adaptive
PRLSs



But some invertebrates may!



And Even
Yeast!