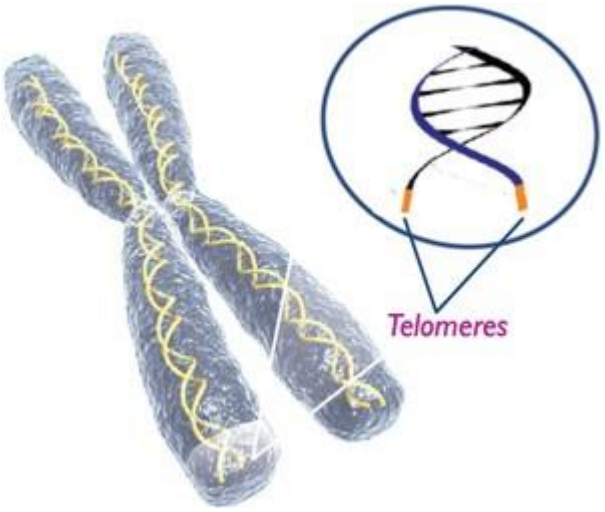
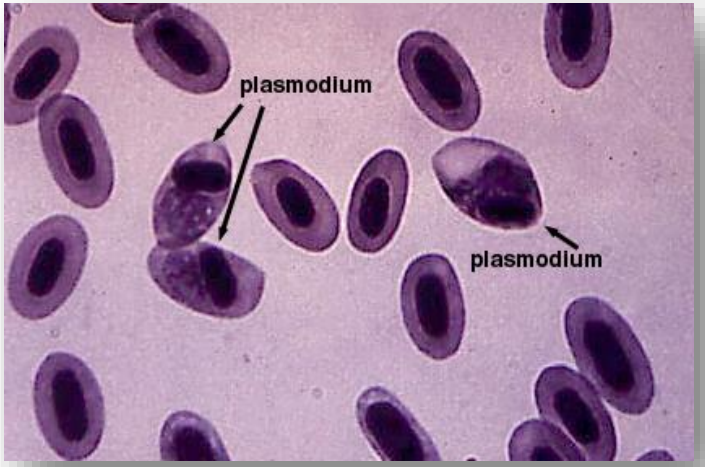
Altruism, infidelity and telomeres

David S Richardson
Lewis Spurgin

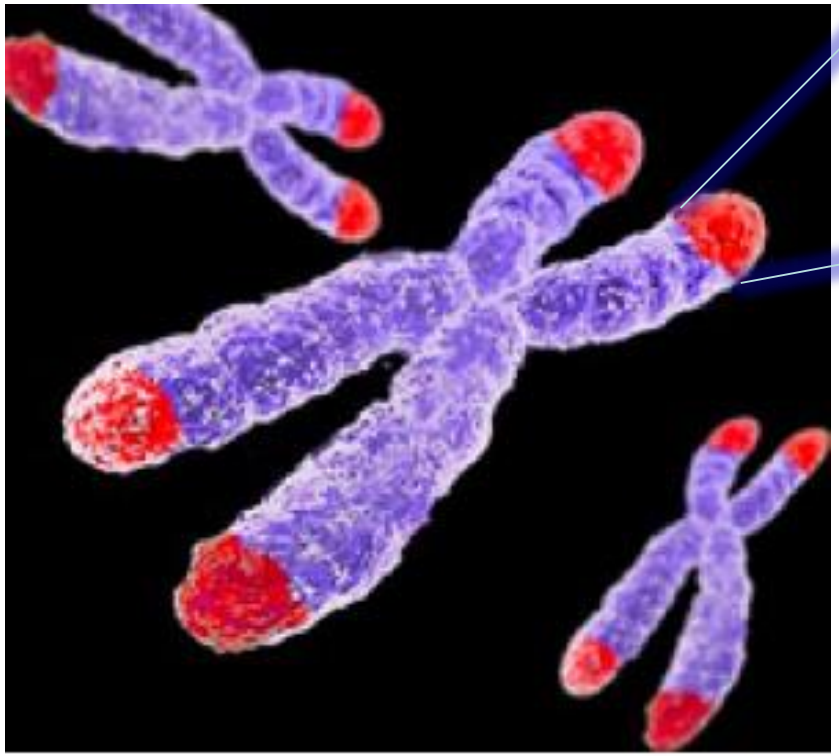


Cost and trade-offs in the struggle to survive and reproduce



Cost and trade-offs in the struggle to survive and reproduce

Telomeres



…TTAGGGTTAGGGTTAGGGTTAGGG…
…AATCCCAAT CCCAATCCC AATCCC…

$(TTAGGG)_n$
in vertebrates

1. **Inheritance**
2. **Replication History (age)**
3. **Oxidative Damage**

Telomeres as biomarkers of cost and quality in a wild population

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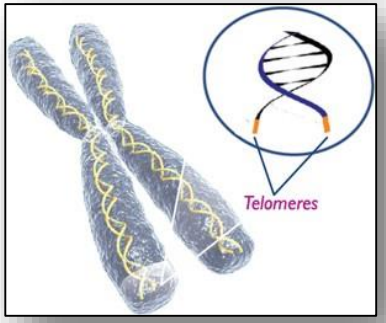
If you measure telomere length in individuals and control for chronological age:



Telomeres as biomarkers of cost and quality in a wild population

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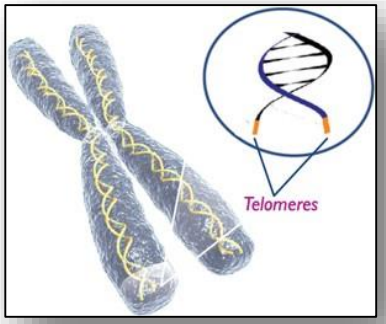

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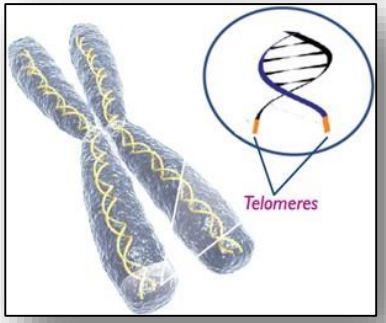

If you isolate telomere shortening during specific experiences:

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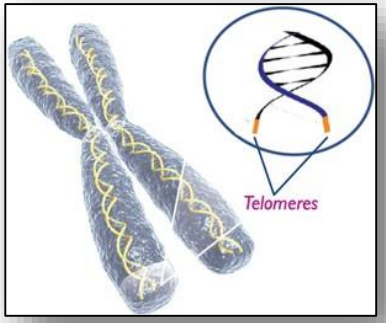

If you isolate telomere shortening during specific experiences:

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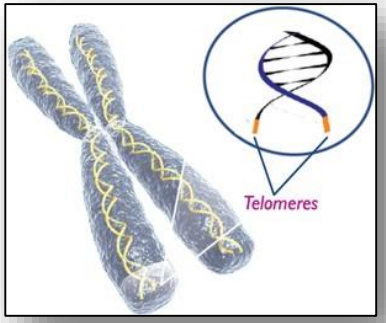
Telomeres as biomarkers of cost and quality in a wild population



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If you isolate telomere shortening during specific experiences:

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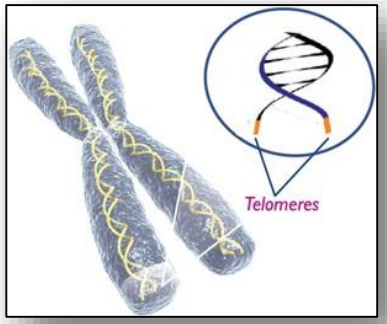

If you isolate telomere shortening during specific experiences:

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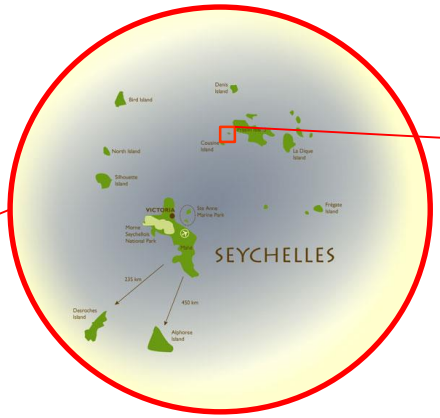
If you control for age and telomere shortening factors:

= Measure of individual quality



Seychelles Warbler

Acrocephalus sechellensis

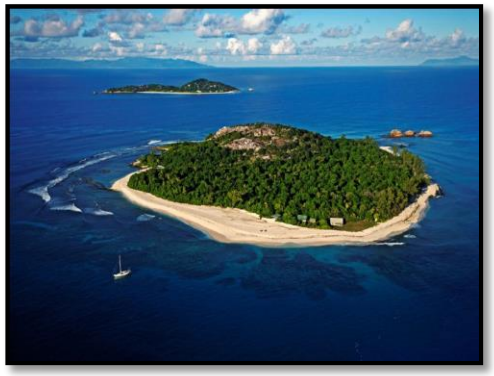
ICBP

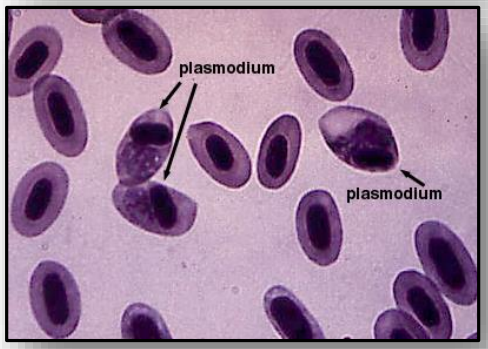
BirdLife INTERNATIONAL

NATURE SEYCHELLES

RSPB

The SW system: a closed population





- Cousin island (studied since 1985)

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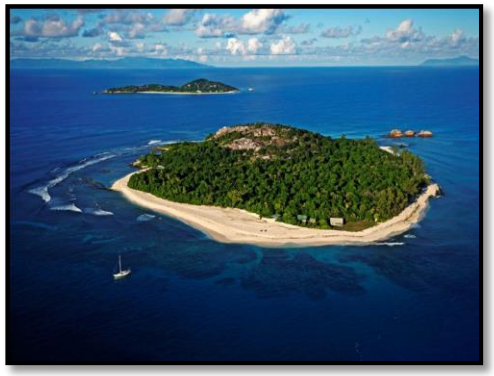

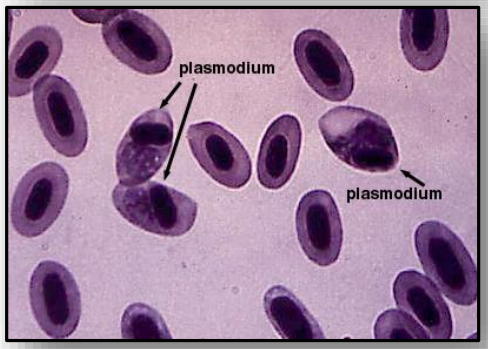

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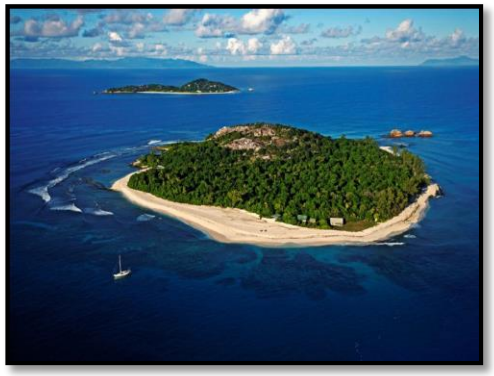

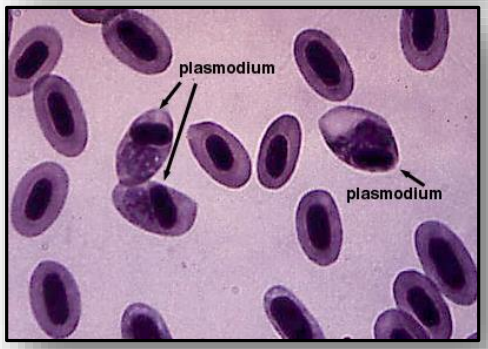

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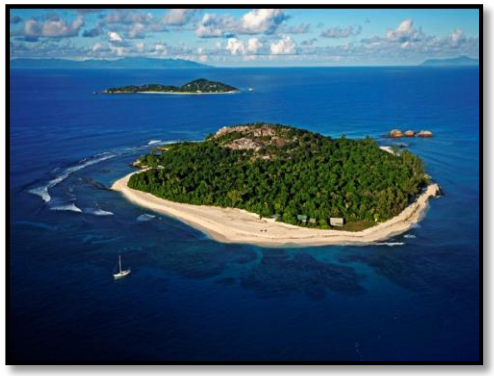

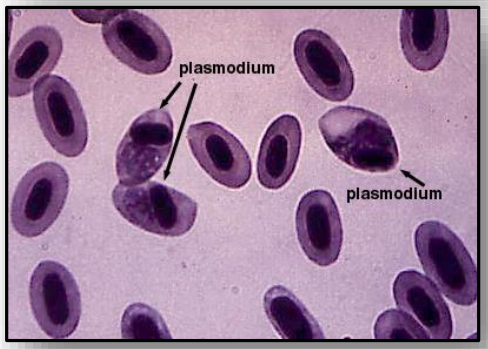

- Cousin island (studied since 1985)
- Small, isolated and enclosed population
- > 97% birds colour ringed
- **Repeatedly blood sampled since 1994**
- Exact chronological age known
- 18 year pedigree being completed
- Life history parameters known
- Other experiences – e.g. malaria infection

The SW system: mostly intrinsic mortality

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Understanding fundamental biological questions

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Altruism

The evolution of cooperative breeding

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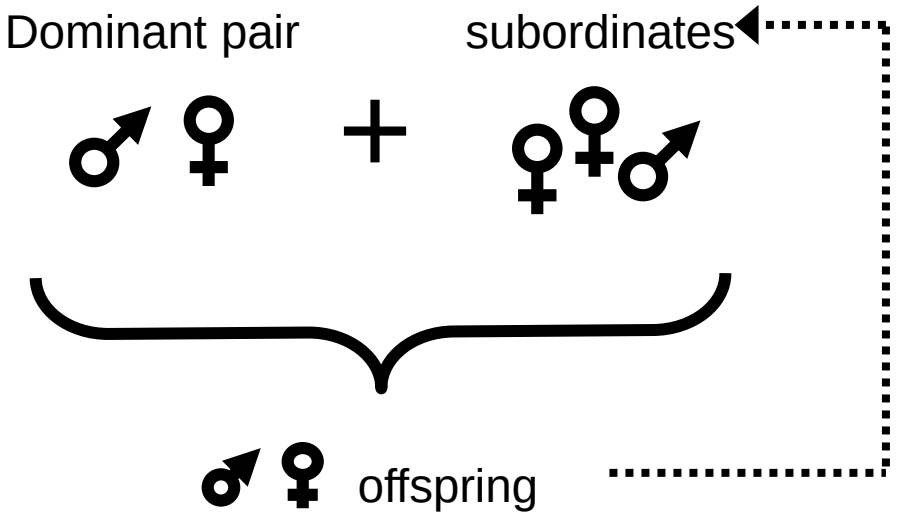

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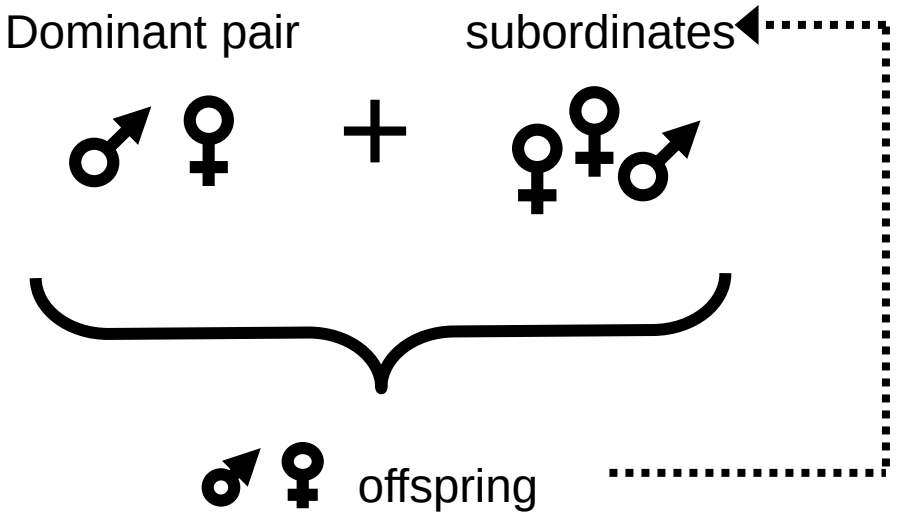
The evolution of cooperative breeding



letters to nature

Nature **358**, 493 - 495 (06 August 1992); doi:10.1038/358493a0

Importance of habitat saturation and territory quality for evolution of cooperative breeding in the Seychelles warbler

JAN KOMDEUR*

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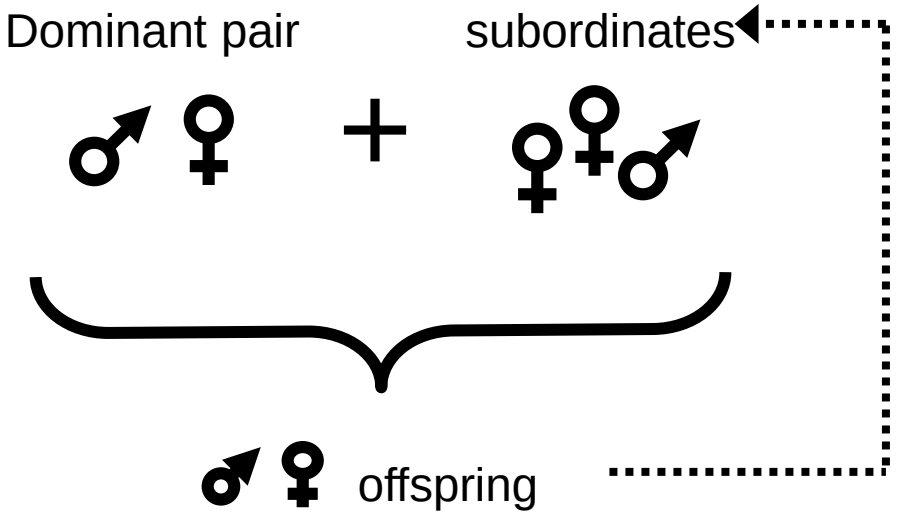

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Extreme adaptive modification in sex ratio of the Seychelles warbler's eggs

JAN KOMDEUR*†‡, SERGE DAAN*, JOOST TINBERGEN* & CHRISTA MATEMAN§

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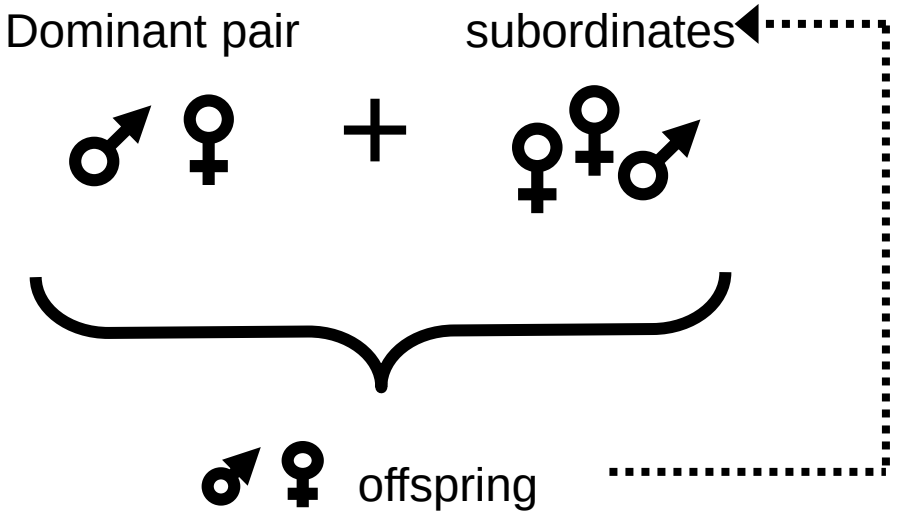

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ERGEN* & CHRISTA MATEMAN§

Evolution, 56(11), 2002, pp. 2313–2321

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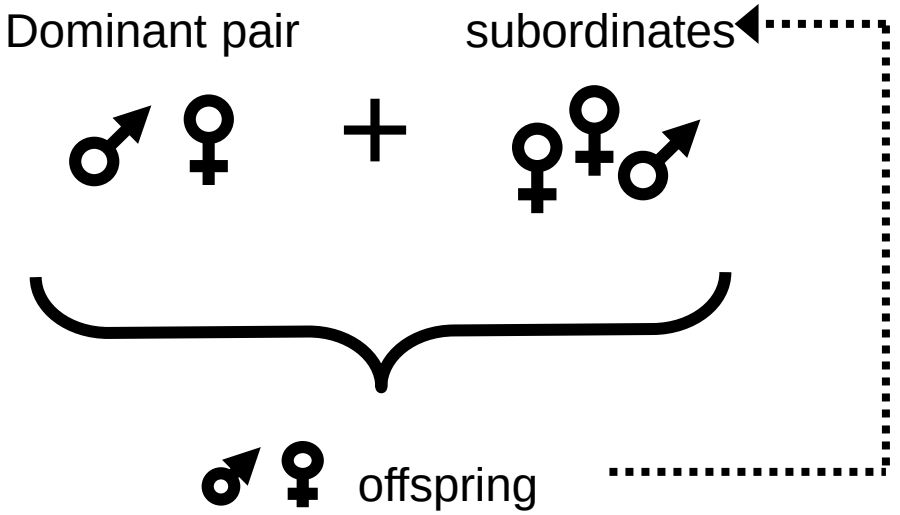

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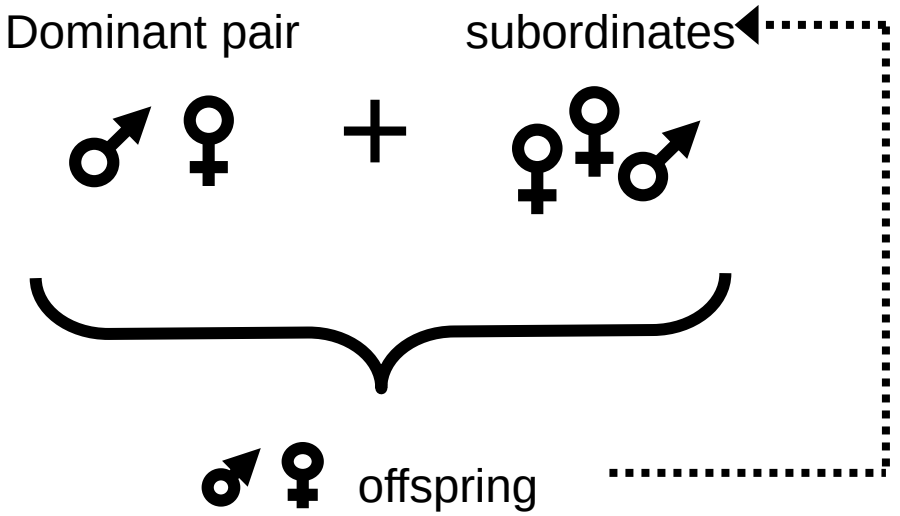

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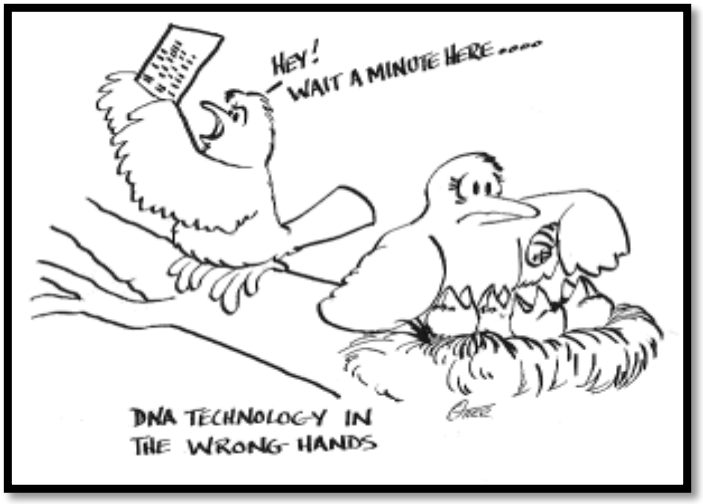
Costs and Benefits

Understanding fundamental biological questions

Infidelity

The benefits of (extra-pair) mate choice



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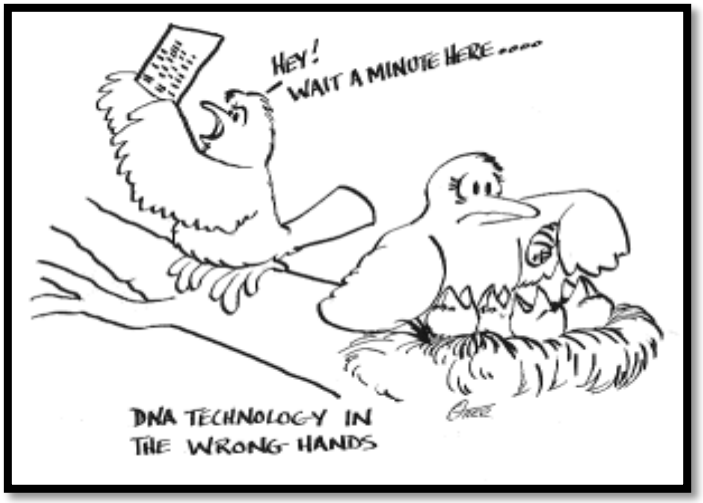

Nature **422**, 580 (10 April 2003) | doi:10.1038/422580a

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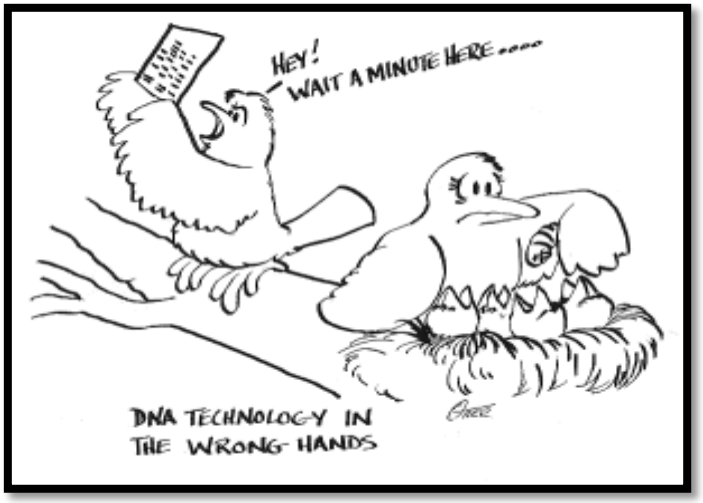

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PROCEEDINGS OF THE ROYAL SOCIETY B

Proc. R. Soc. B (2005) **272**, 759–767
doi:10.1098/rspb.2004.3028
Published online 5 April 2005

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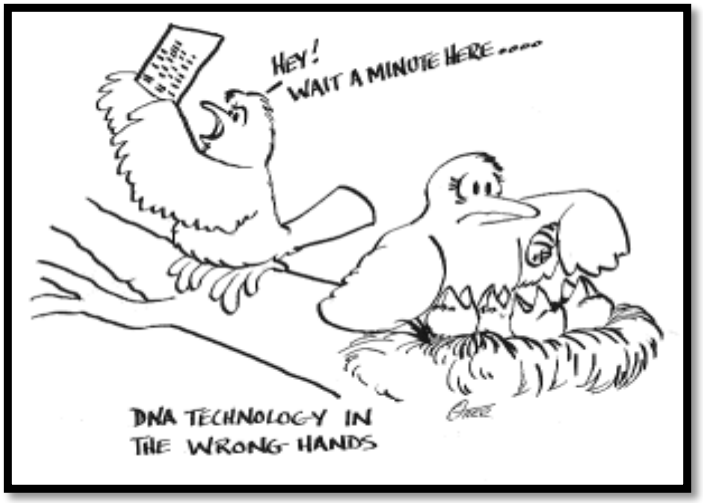

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MOLECULAR ECOLOGY

Molecular Ecology (2010) 19, 3444–3455 doi: 10.1111/j.1365-294X.2010.04750.x

MHC-dependent survival in a wild population: evidence for hidden genetic benefits gained through extra-pair fertilizations

LYANNE BROUWER,*†‡ IAIN BARR,* MARTIJN VAN DE POL,‡ TERRY BURKE,§ JAN KOMDEUR¶ and DAVID S. RICHARDSON***

Overall Aims

Assess **individual variation in telomere length/shortening**

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1. Are telomere dynamics linked to survival / longevity (**Biological ageing)**

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Assess **individual variation in telomere length/shortening**

1. Are telomere dynamics linked to survival / longevity (**Biological ageing)**
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3. If individuals differ in response to these factors (**Individual quality**)

Results: adult telomere length

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- **Adult telomeres shorten with age**

  Age: $t_{1,211.6}$ =-3.88, P<0.0001

  REML model with bird identity as random effect, R^2 =0.26

  Loss = 120b ± 30.1 SE per year

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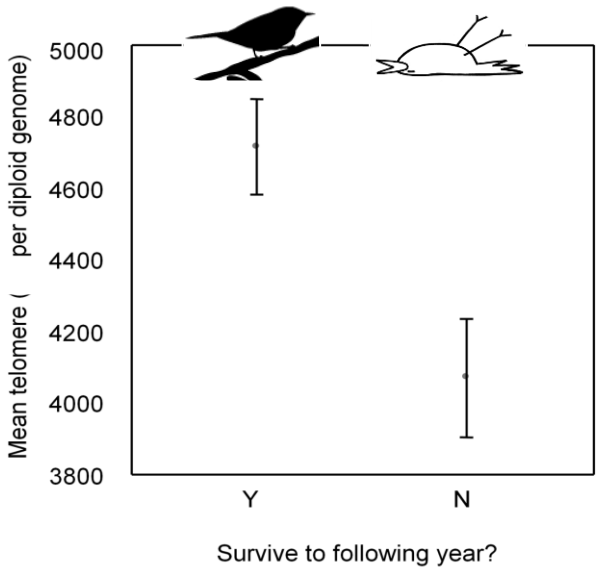

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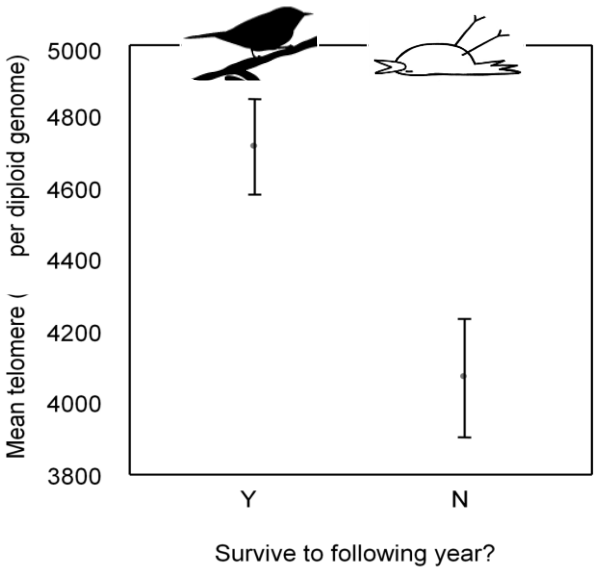
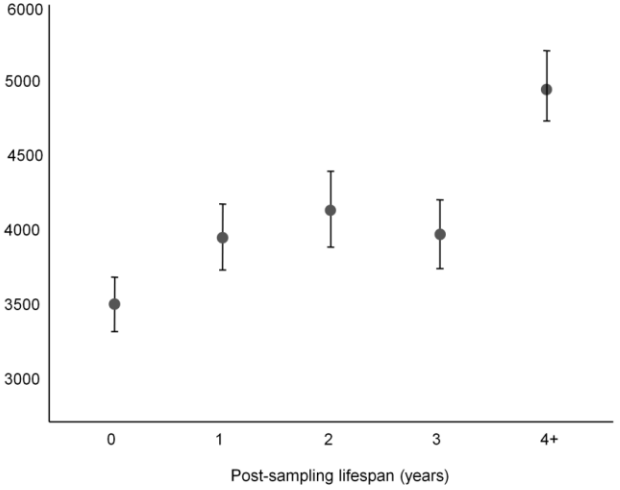
  Last sample used for all individuals

  Age χ^2=6.35, P<0.05

  Telomeres χ^2=3.83, P<0.05





Dr Emma Barrett

MOLECULAR ECOLOGY

Molecular Ecology (2013) 22, 249–259 doi: 10.1111/mec.12110

Telomere length and dynamics predict mortality in a wild longitudinal study

EMMA L. B. BARRETT,* TERRY A. BURKE,† MARTIJN HAMMERS,‡ JAN KOMDEUR‡ and DAVID S. RICHARDSON*§