

Indigobird species...

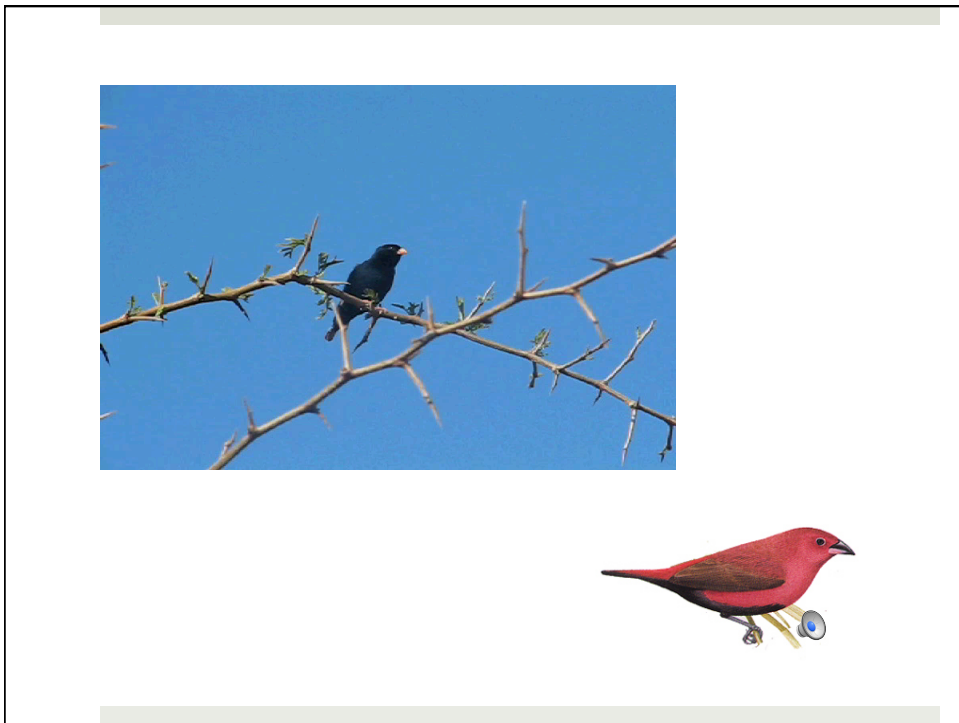
- ✧ ...are highly host-specific, most species parasitizing a single estrildid finch host species
- ✧ ...mimic the nestling mouth colors and patterns of their respective hosts

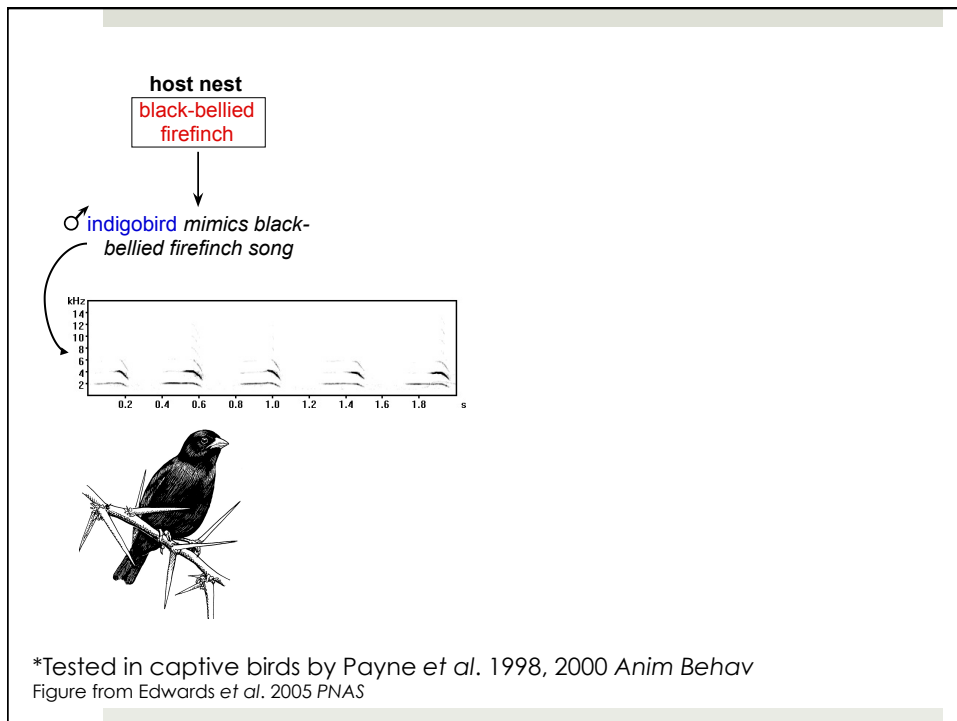
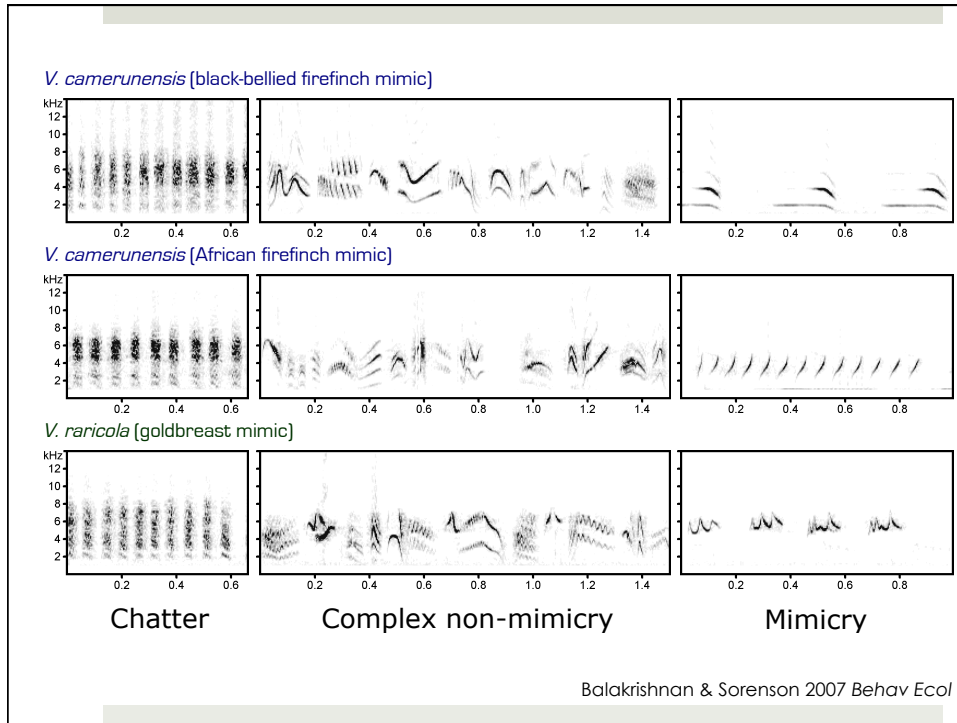


- ✧ ...are morphologically distinct (in juvenile mouth markings and adult male morphology) but only slightly differentiated in neutral genetic markers



- ✧ ...learn and mimic host songs, resulting in assortative mating and providing a mechanism for rapid sympatric diversification by host shift





But...

- ❖ don't the same mechanisms promoting speciation also lead to hybridization?
- ❖ indigobirds from eggs laid in the nest of an “alternate” host will imprint on the “wrong” host and later hybridize with individuals of the indigobird species associated with that host

Association of mimicry song and morphology in 494 male indigobirds*

mimicry song	N male indigobirds <i>Vidua</i>			
	<i>cha.</i>	<i>fun.</i>	<i>pur.</i>	<i>cod.</i>
<i>L. senegala</i>	306	0	0	0
<i>L. rubricata</i>	1	63	0	1
<i>L. rhodopareia</i>	2	0	84	0
<i>H. niveoguttatus</i>	0	0	0	37

total mismatches 4/494 = 0.8%

*localities in S-C Africa with two or more *Vidua* species

Payne et al. 1992 Proc. PAOC

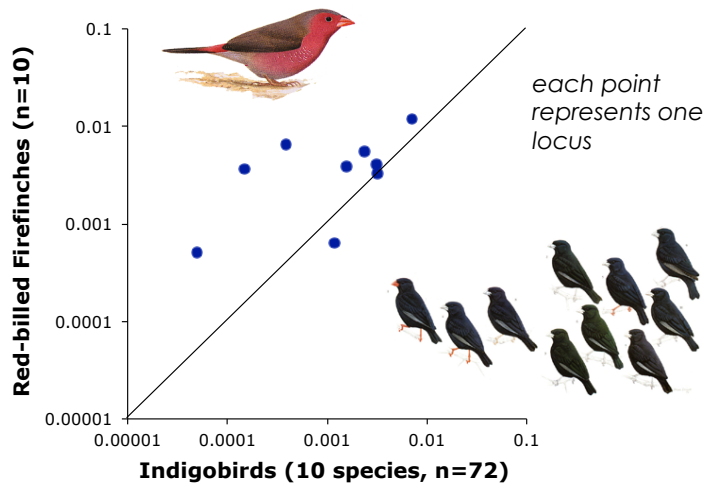
The question:
How “good” are indigobird species?

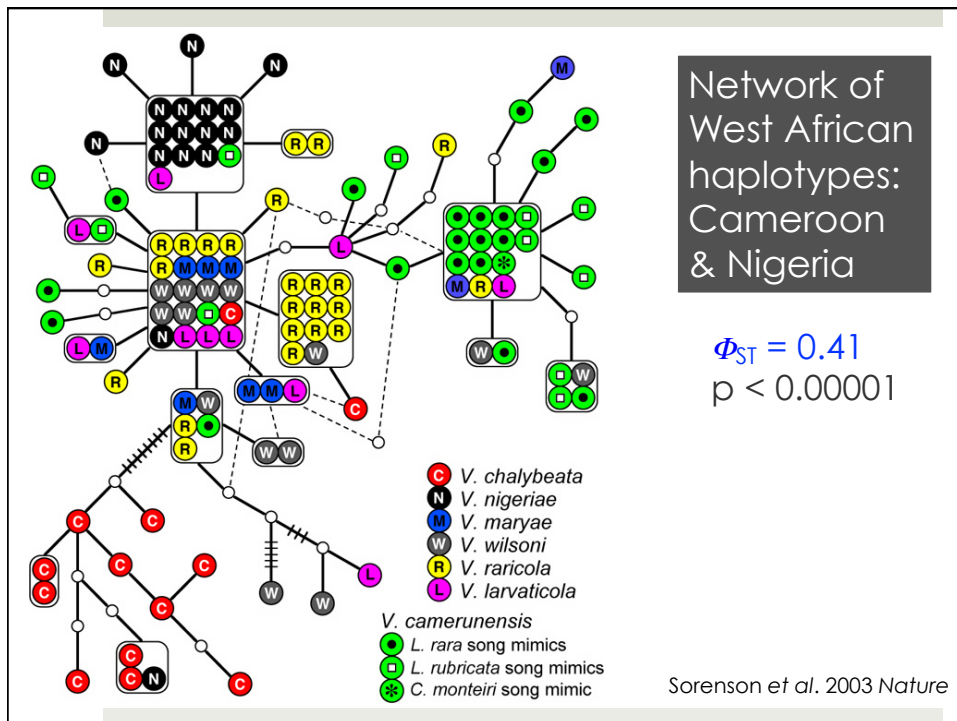
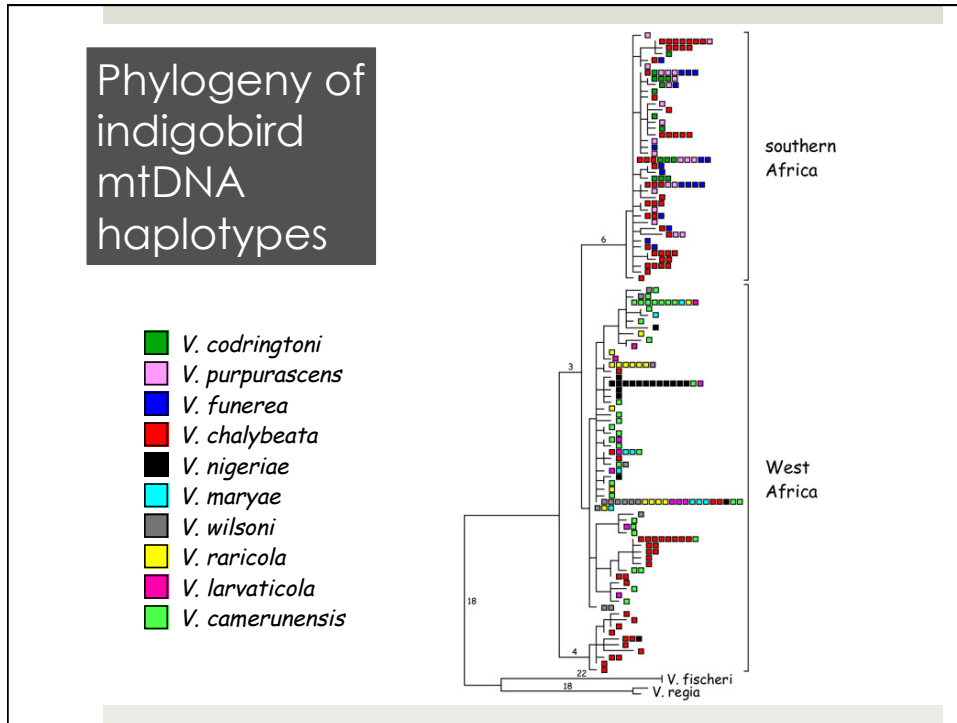
- ❖ Are indigobirds early in the process of evolving into fully distinct and reproductively isolated species?
- ❖ Or, are they stuck in a perpetual state of incomplete speciation due to imperfect isolating mechanisms?

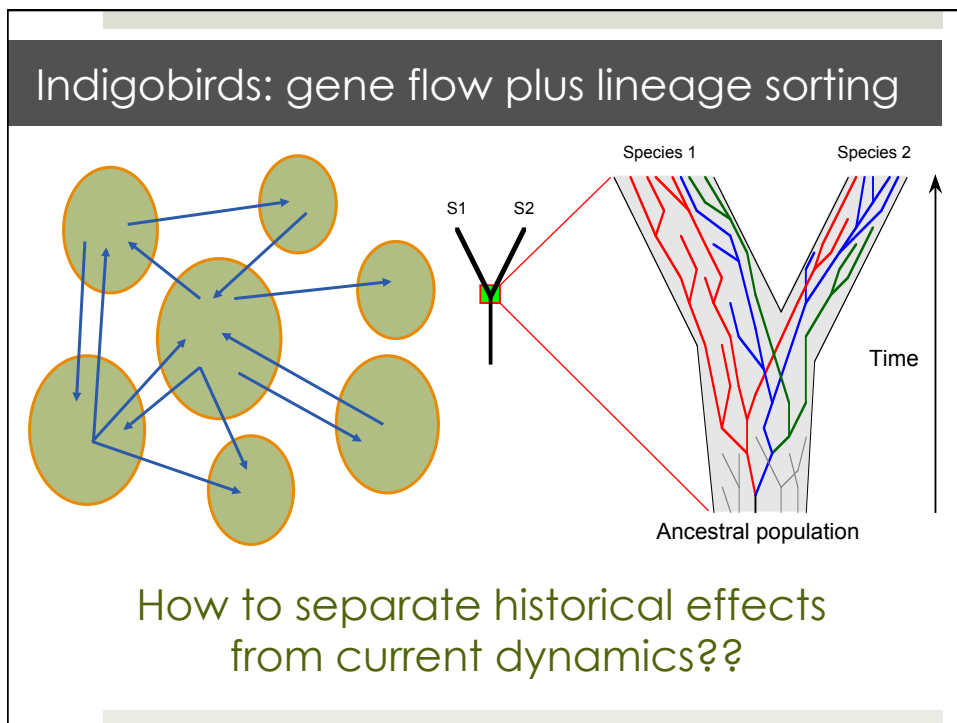
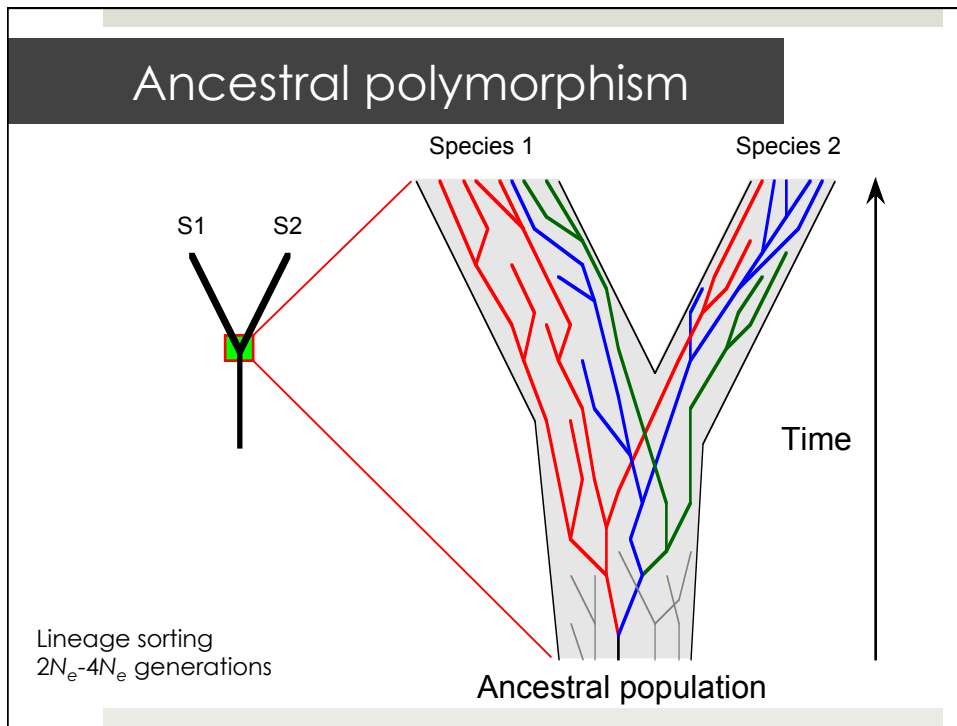


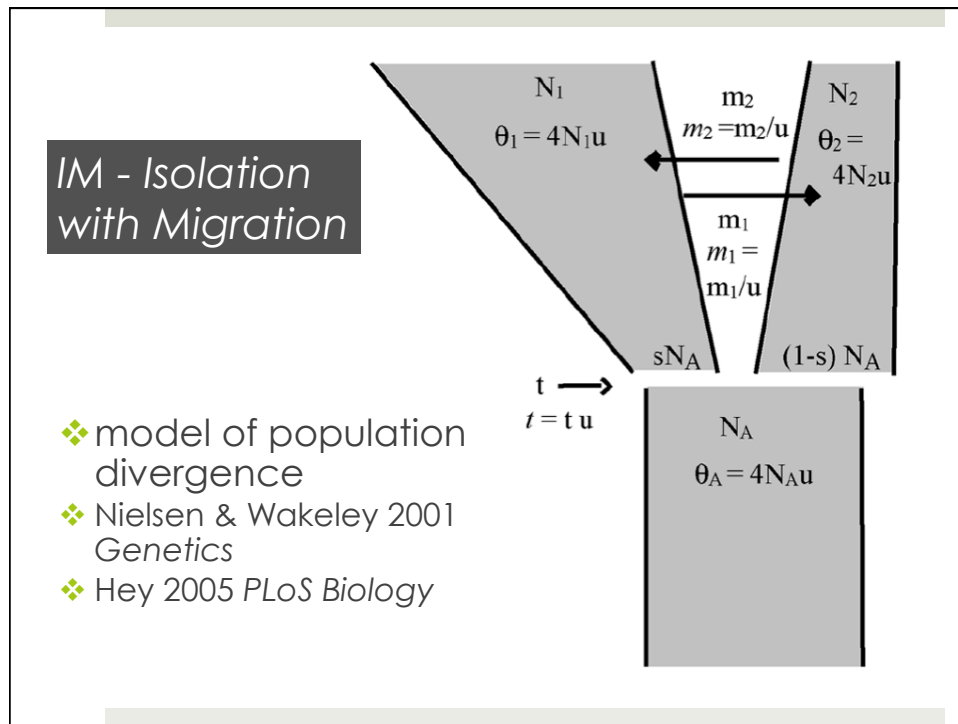
Field Identification of Indigobirds: Pilleri, Bull. ABC Vol 3 No 1 - 25

Higher nucleotide diversity in one species of firefinch than in all 10 species of indigobirds **combined**









Testing hypotheses...

- ❖ what is the likelihood L (=probability) of the observed data?

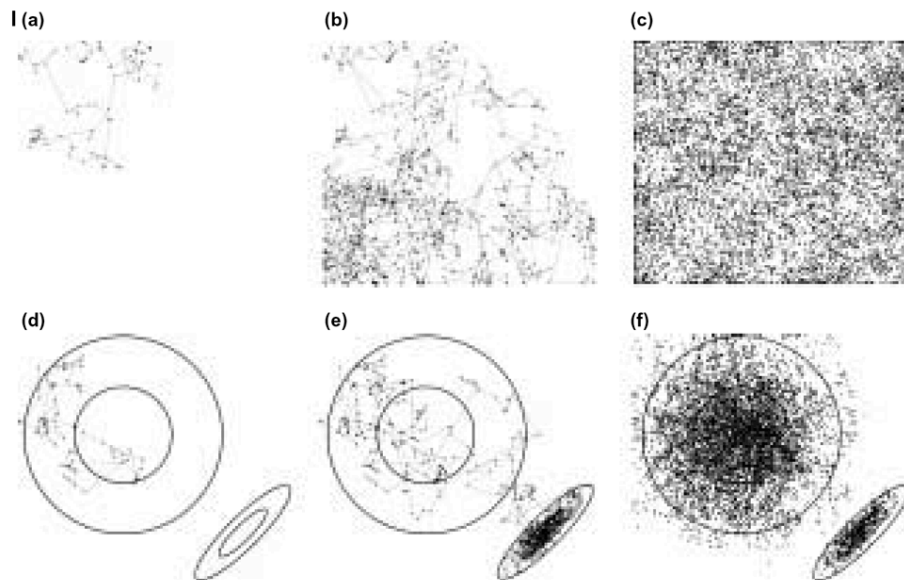
$$L = \sum_G \Pr\{D | G, \underline{\mu}\} \Pr\{G | \underline{\alpha}\}$$

- ❖ L = the sum across all possible genealogies (G) of the probability of the data given the genealogy and a model of the mutation process (μ) times the probability of the genealogy given a set of parameters (α) that characterize the population process

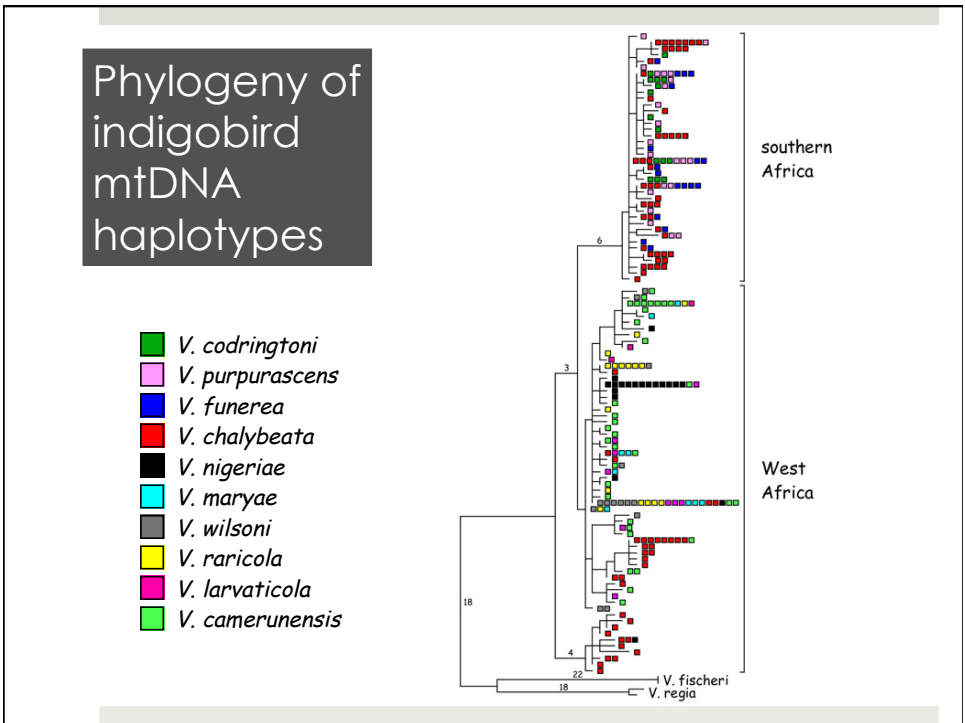
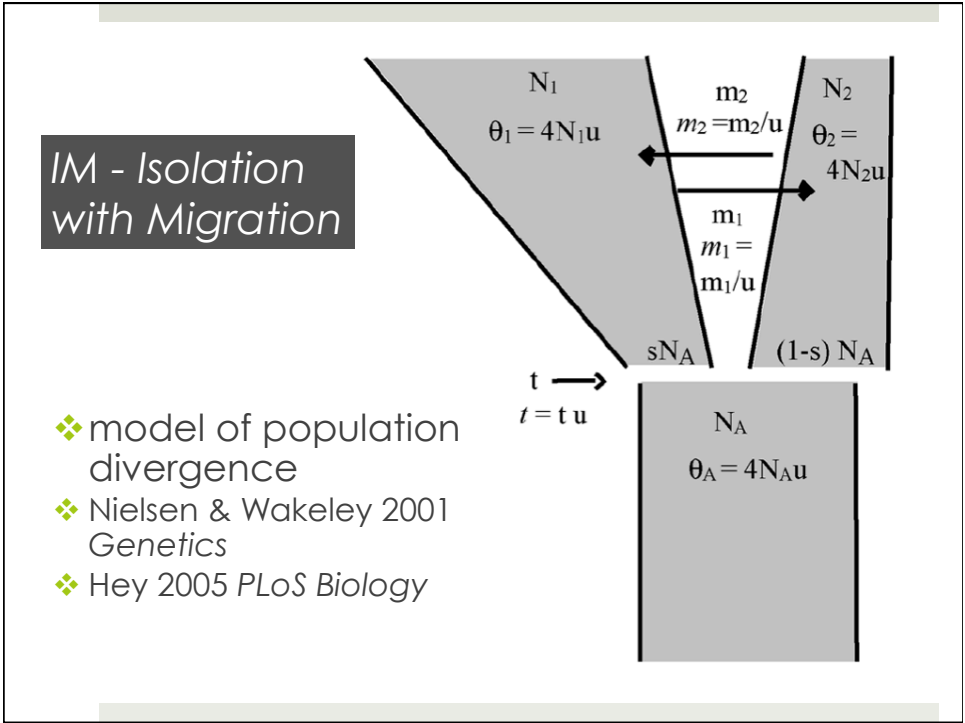
In practice...

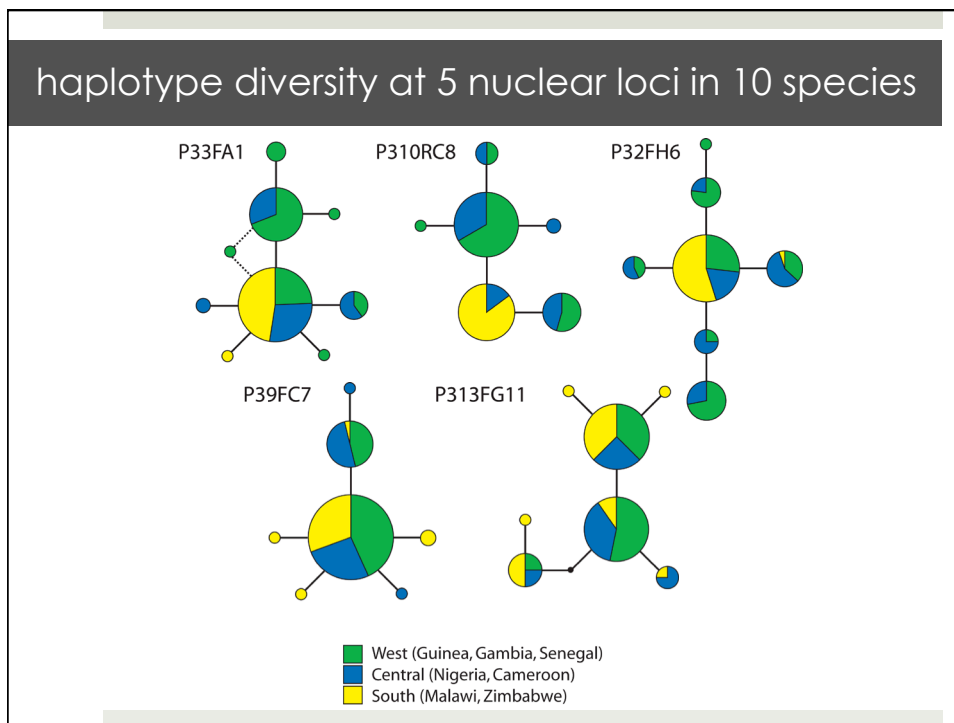
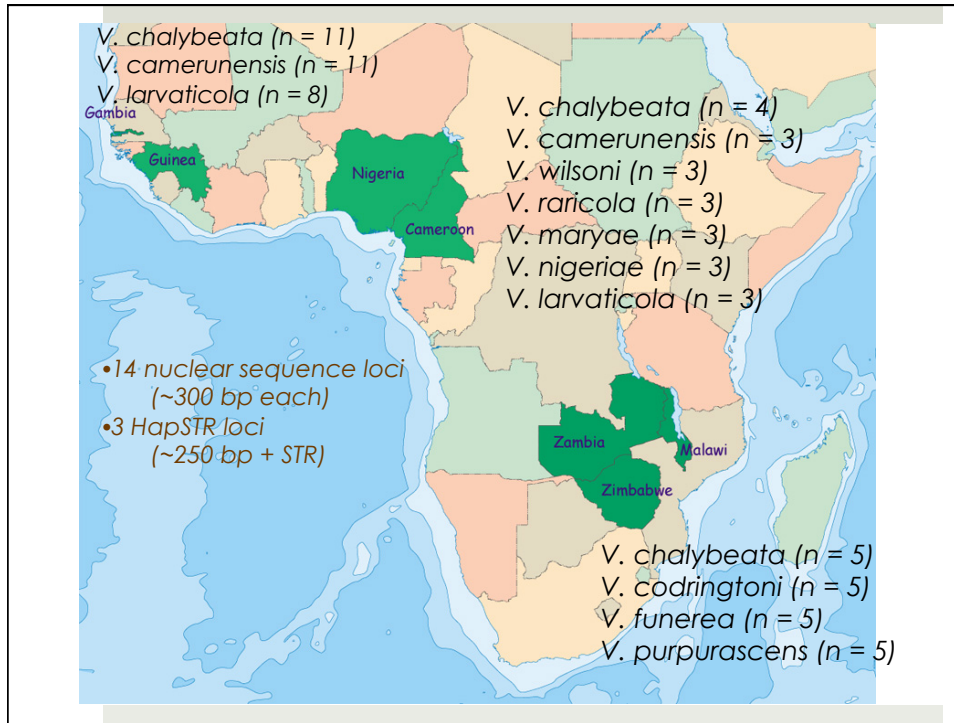
- ❖ for a sample of k alleles, draw random coalescence times according to the exponential distribution
- ❖ estimate the likelihood (probability) of observing the actual data on that genealogy
- ❖ change a parameter, generate a new genealogy, calculate likelihood, **repeat** millions of times

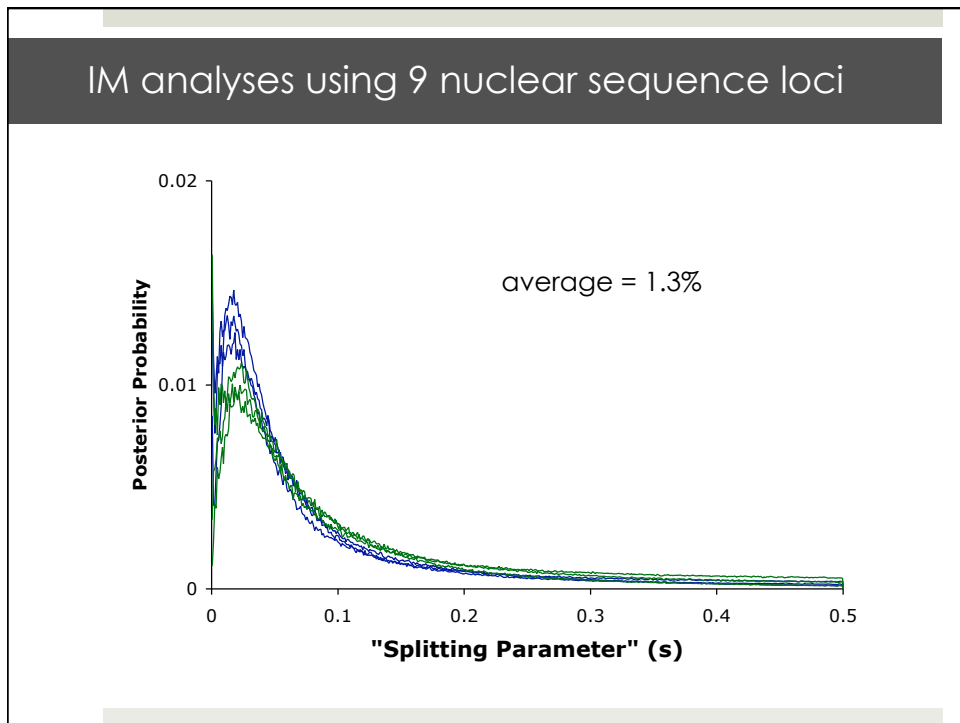
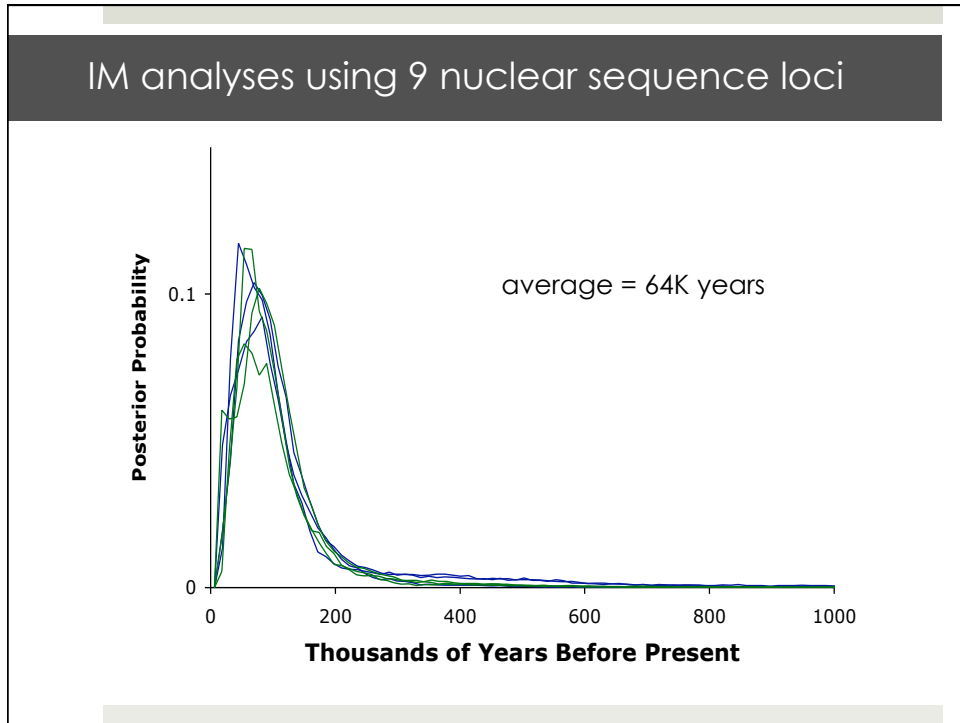
Markov Chain Monte Carlo methods

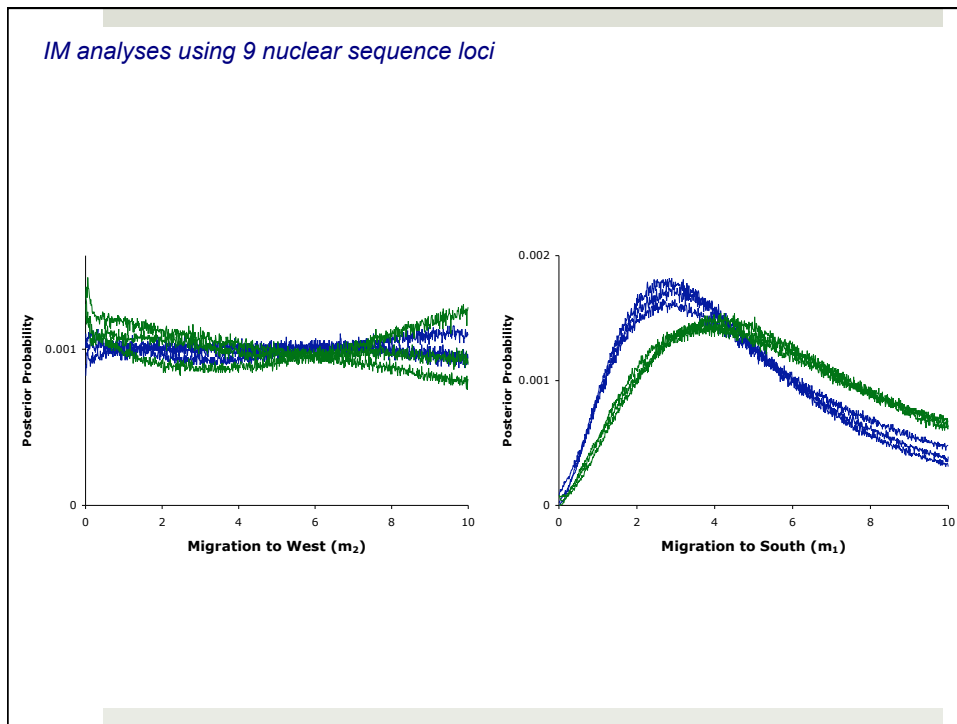


TRENDS in Ecology & Evolution



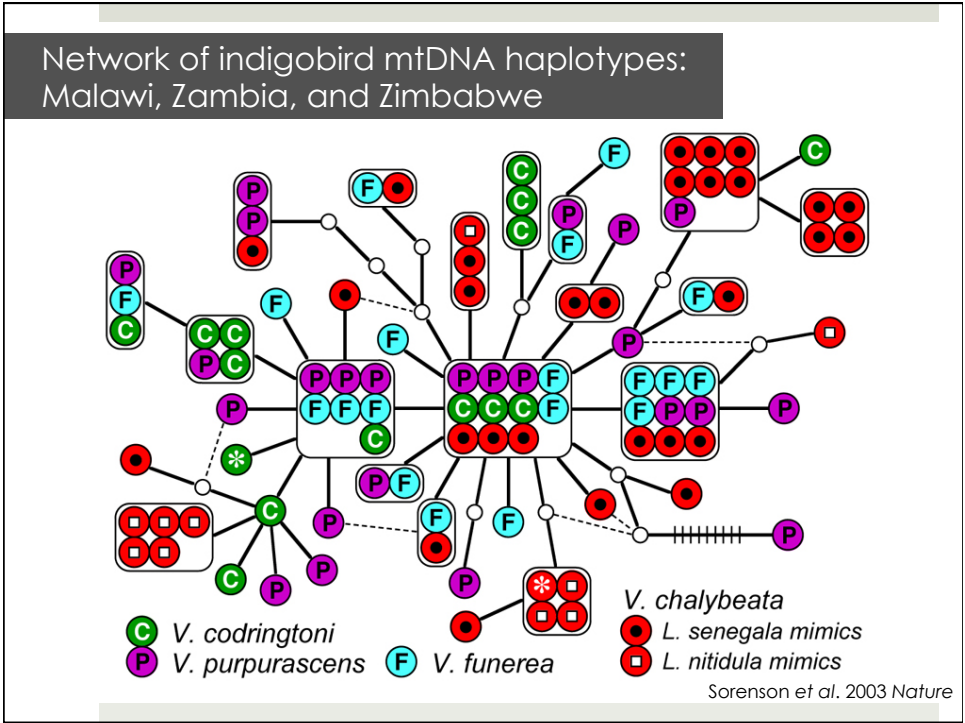






Conclusions 1

- ❖ Indigobirds colonized southern Africa ~105 years ago and subsequently evolved into four distinct species!
- ❖ Coalescent analyses indicate a small founding population for southern Africa followed by substantial expansion



Conclusions 2

- ❖ Relatively greater genetic differentiation among indigobird species in the ancestral region of West Africa suggests that indigobird species may be slowly diverging from each other and evolving into truly independent evolutionary lineages