Saturday

8:00-9:00 Breakfast

9:00-10:00 Featured Talk
Dick Hudson Ecology & Evolutionary Biology, UCI
Fun with coalescents

10:15-12:15 First Session
Jonathan B. Geller Hopkins Marine Station, Stanford
Within and between species variation in mitochondrial rDNA in Mussels
Robert Gibson Biology, UCLA
What leks have told us about sexual selection
Kristina Jones Botany, UC Davis
Fertility selection in plants: a model with non-random mating
Michael Fugate Dept. Biology, UCR
Genetic relationship between populations of 4 species of fairy shrimp
William Klitz Integrative Biology, UCB
Unraveling of complex genetic traits
Gerrit Platenkamp Botany & Plant Sciences, UCR
Quantitative genetics of seed characters in baby blue eyes

12:30-1:30 Lunch

2:00-3:20 Second Session
Trevor Price Biology, UCSD
Evolution of a color pattern
Lily Lion Dept. Biology, UCSD
Evolution of song in Phylloscopus warblers
Adam Richman Dept. Biology, U. Oregon
Evolution of ecological segregation in the Old World leaf warblers
Austin Burt Biology, UCSC
The selective advantage of mate choice

3:20- 4:00 Coffee break

4:00-6:00 Third Session
Sean Rice Integrative Biology, UCB
Evolutionary dynamics with two levels of selection
Enrique P. Lessa MVZ, UCB
Surveying DNA sequence variation using gradient gel electrophoresis
Manyuan Long Center for Population Biology, UCD
Molecular evolution of ADH pseudogene in D. yakuba and teissieri
Bradley Shaffer Zoology, UCD
The genetic basis of convergent evolution in amphibian metamorphosis
Joanna Mountain Genetics, Stanford
Nuclear DNA polymorphisms and human evolution
John Wakeley Integrative Biology, UCB
Substitution rate variation in non-recombining DNA sequences

6:30 Dinner

8:00-8:40 Forth Session
Scott Edwards Biochemistry & MVZ, UCB
mtDNA of babblers: coalescence across Pleistocene water barriers
Gordon Fox Ecology & Evolution, Arizona
Inferences in multilocus genetics: Wright meets the Hamiltonian

Sunday

8:00-9:00 Breakfast

9:00-10:00 Featured Talk
Brian Charlesworth Ecology and Evolution, Chicago
Fun with Sex

10:15-12:15 Fifth Session
Jaume Bertranpetit Genetics, Stanford
PCA of gene frequencies and the history of human populations
Kevin Laland Integrative Biology, UCB
Sexual selection with a culturally transmitted mating preference
Robert Podolsky Botany & Plant Sciences, UCR
Patterns of variation in two populations of Clarkia dudleyana
Laura Galloway Botany, UCD
Environment-dependent heritability of reproductive isolation in Mimulus
Valeria Souza Ecology & Evolutionary Biology, UCI
Paradoxical fitness effects due to recombination in bacteria
Luis Eguiarte Botany & Plant Sciences, UCR
Population genetics of tropical plants

12:30-1:30 Lunch

2:00-3:40 Sixth Session
Michael Travisano Zoology, Michigan State
Adaptation and divergence during long-term evolution
Fred Janzen Ecology & Evolution, Chicago
Natural selection on body size in hatchling snapping turtles
Maria Orive Integrative Biology, UCB
Effective population size in clonal organisms
Edmund D. Brodie III MVZ, UCB
Correlational selection in garter snakes and its genetic implications
Philippe Jarne
Population structure & mating systems in freshwater hermaphrodite snails

People who could talk, but who claimed they didn't care one way or the other:
Alan Rogers Anthropology, Univ. of Utah
Population growth makes waves in distribution of pairwise differences
Gord Hines Math & Stat, Univ. of Guelph
Sex as an investment strategy
H. Allen Orr Center for Population Biology, UCD
A genetic model of speciation: hybrid sterility in Drosophila

Participants

Robin Bush Dept. Ecology, UC Irvine
Brigette de Saint Phalle Biology, UC Santa Cruz
Steven Frank Ecology & Evolutionary Biology, UC Irvine
Jonathan B. Geller Hopkins Marine Station, Stanford
Robert Gibson Biology, UCLA
Monty Slatkin Integrative Biology, UC Berkeley
Lianne Voelm Genetics, UC Berkeley
Mark Grote Integrative Biology, UC Berkeley
Trevor Price Biology, UC San Diego
Karen Marchetti Zoology, UC Davis
Hugh Salamon Integrative Biology
Kristina Jones Botany, UC Davis
Peter Hecht Molecular and Cell Biology, UC Berkeley
Michael Fugate Dept. Biology, UC Riverside
Lily Lion Dept. Biology, UCSD
Mark Tinkle Dept. of Biology, UC San Diego
Magnus Nordborg Dept. Biological Sciences, Stanford
William Klitz Integrative Biology, UC Berkeley
Glenys Thomson Integrative Biology
Gerrit Platenkamp Botany & Plant Sciences, UC Riverside
Bill Rice Biology, UC Santa Cruz
Adam Richman Dept. Biology, U. Oregon
Ana Maria Valdes Integrative Biology, UC Berkelely
Austin Burt Biology, UCSC
Vassiliki Koufopanon Biology, UCSC
Damian Gessler Biology, UCSC
Sean Rice Integrative Biology, UCB
Enrique P. Lessa MVZ, UCB
Chaoqiang Lai Center for Population Biology, UCD
H. Allen Orr Center for Population Biology, UCD
Charles H. Langley Center for Population Biology
Manyuan Long Center for Population Biology, UCD
Gord Hines Math & Stat, Univ. of Guelph
David Pollock Biological Sciences, Stanford
Peter Godfrey-Smith Philosoph, Stanford
Jaume Bertranpetit Genetics, Stanford
Jonathan Eisen Biological Sciences, Stanford
Yoko Satta Population Genetics, National Institute of Japan
Robert Podolsky Botany & Plant Sciences, UC Riverside
Eric Nagy Botany, UCD
Laura Galloway Botany, UCD
Valeria Souza Ecology & Evolutionary Biology, UCI
Luis Eguiarte Botany & Plant Sciences, UCR
Fred Janzen Ecology & Evolution, Chicago
Maria Orive Integrative Biology, UCB
Edmund D. Brodie III MVZ, UCB
Philip Spieth Plant Pathology, UCB
Scott Edwards Biochemistry & MVZ, UCB
Alan Rogers Anthropology, Univ. of Utah
Gordon Fox Ecology & Evolution, Arizona
Joseph Lorenz Anthropology, UCD
Jamie King Zoology, UCD
Jennifer MacDonald Center for Population Biology, UCD
Tim Prout Genetics, UCD
Bradley Shaffer Zoology, UCD
Joanna Mountain Genetics, Stanford
Pam Wiener Biological Sciences, Stanford
Sally Otto Biology, Stanford
David Goldstein Biology, Stanford
Aviv Bergman Biology, Stanford

John Wakeley Integrative Biology, UCB
Michael Travisano Zoology, Michigan State
Dick Hudson Ecology & Evolutionary Biology, UCI
John Braverman Center for Population Biology, UCD
David Neale Institute of Forest Genetics, USFS
Kim Marshall Institute of Forest Genetics, USFS
Brian Charlesworth Ecology and Evolution, Chicago
Deborah Charlesworth Ecology and Evolution, Chicago
Jane Charlesworth Center for Lizard Biology, Chicago
John Gillespie Center for Population Biology, UCD
David Mirman Genetics, UCD
Paul E. Turner Zoology, Michigan State
Anne Gerber ?
Kevin Laland Integrative Biology, UCB
Eric Rowe Integrative Biology, UCB
Robin Gordon Sacramento Country Day School
Deborah Rogers Forestry & Resorce Management, UCB
Philippe Jarne Ecology & Evolution, Chicago

Dick Hudson : Coalescence

Gene Geneology

Wright-Fisher Neutral Model   2N o o o - - - - - - o o o

① - - o - - -   ① pick F1 randomly ② add mutation

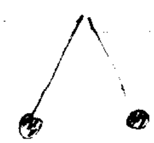
① when did these two have common ancestor

p(same parent) = $1/2N$

p(diff ") = $1 - 1/2N$

p(recent ancestor at t)

② mutation : contant per generation
: 2u/generation



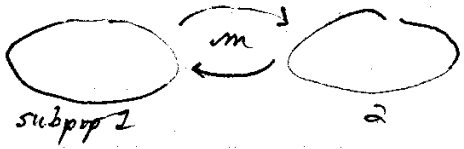
- difference between these two sequences should be
$= E(2ut)$ $t = 2N$ (from above)
$= 4uN$

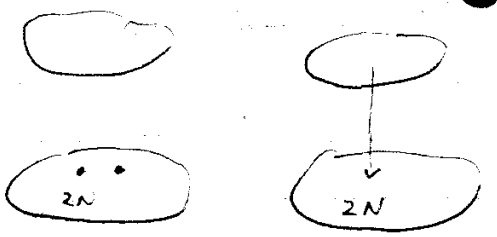
③ prob that sequences are the same
is the prob. that 1st event backwards
is a common anceotor (coalescence)
before a mutation

$$P(S=0) = \frac{1/2N}{1/2N + 2u}$$

$$P(S=j) = \left(\frac{2u}{1/2N + 2u}\right)^j \left(\frac{1/2N}{1/2N + 2u}\right)$$

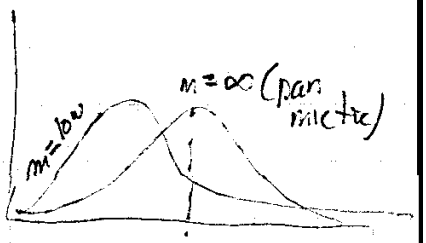
Geographic Structure





P(A came from other pop.) = 2m

E(T common ancestor) = 4N (mean)



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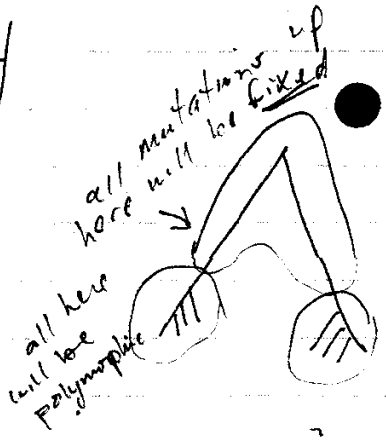
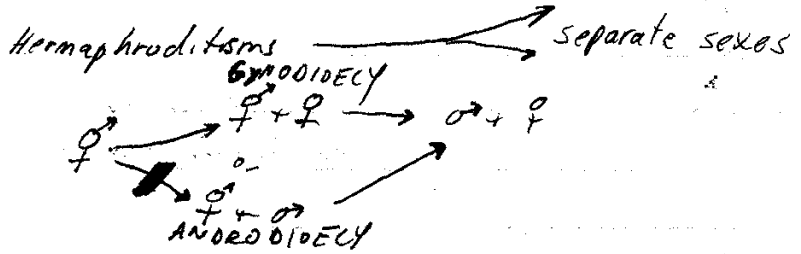
	Synonymous	non-Synonymous
fixed	#	#
polym	#	#



B. Charlesworth : Evolution of Sex Chromosomes



many examples of Gynodioecy but not androdioecy

- must also include cytoplasmic factors because these factors are inherited through ♀ and ♂ fertility is less "important"

- inbreeding avoidance may help explain advantages of gynodioecy

∴ will tend to evolve in plants that are self-compatible

M, F

recessive sterility gene

$F^{aa} + MF^{A-}$

$F^{aa} + M^{A-}$ → M^m F^f ♀

$F^{A-} + MF^{aa}$

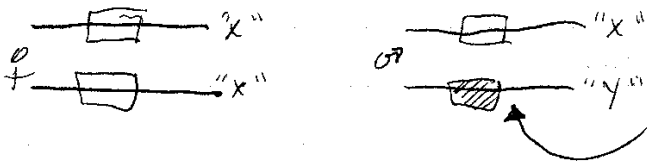
dominant sterility gene

M^m F^{Ff} ♂

- male sterility due to recessive mutation
- female " " " " " " " "

♀ sterility locus	male sterility locus: M/−	M/M
ff	Hem	F
F/−	M	Sterile female

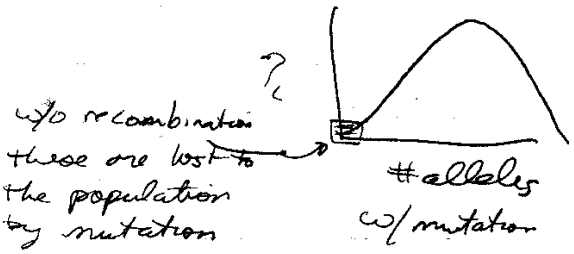
Genes for ♀ ♂ sterility must be linked for invasion will occur



♂ favorable genes would end up here, and recombination would be "reduced"

How does Y evolve to become degenerate

① Muller's ratchet



∴ Y accumulates damage so may "want" to increase dosage of X relative to Y

② Bill Rice's ratchet

~~hitchhiking~~ of deleterious mutations on Y chromosomes may lead to dosage compensation

Transposons on Y chromosomes

① maybe again Muller's ratchet (Tn's inactivate genes)

② ectopic exchange less in Y chromosome

∴ Tn's not lost

Adam Richman

Lily Lid : Evolution of song in Phylloscopus warblers

Song can only be related to history in v.v. closely related organisms.

Song may be constrained by environment

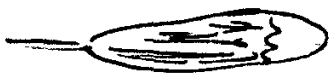
* Trevor Price?

- Origin of new features in evolution

Problem
① selection obscures origin
② no theory of development

Species	Patches		
	Wing	Crown	Rump
A			
B	+		
C	+	+	
D	+	+	+

∴ appears to be pattern of development



- lack of melanin is due to premature melanocyte death.

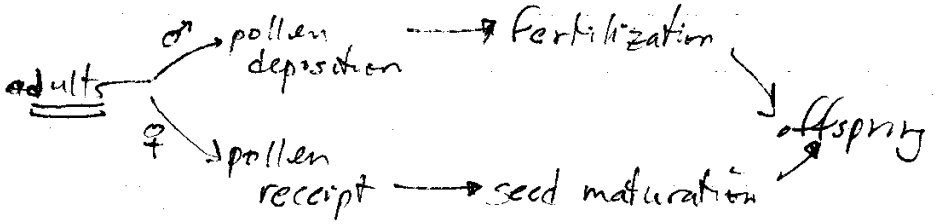
- Development Model
① "activator" of pattern autocatalyzes itself
② also starts "repressor"

① Jonathan Geller : Mitochondrial rDNA variation in mussels

Mytilus edulis complex
galloprovincialis
trossulus

How does ballast work?

② Kristina Jones : selection in plant populations ... Evolution of flowers.



Must incorporate
① non-random mating

Assort. mating acts like disruptive selection

③ Michael Fugate UCR

Genetic relatedness of 4 species of fairy shrimp

Fst = test for

population #	2	3	4	5	6	7	8	9
Fst								

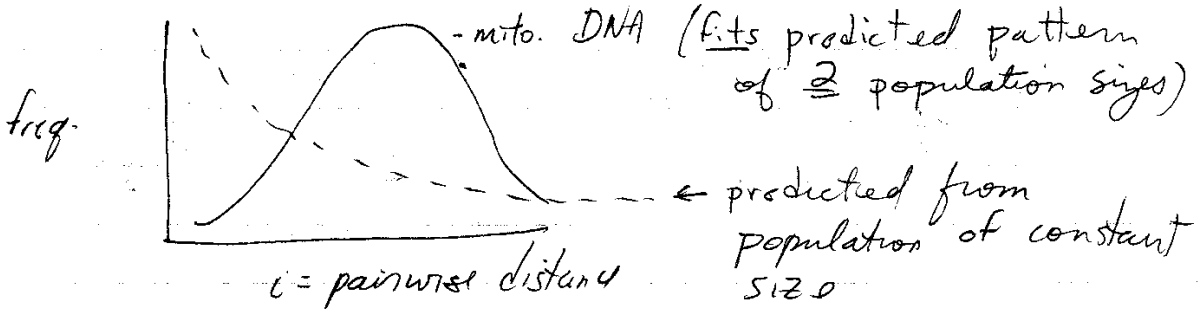
④ William Klitz : unraveling of complex genetic traits

IDOM

Transmition ratio analysis

Gerrit Platenkamp : native plant

Mitochondrial variance within a population as indication of population size.



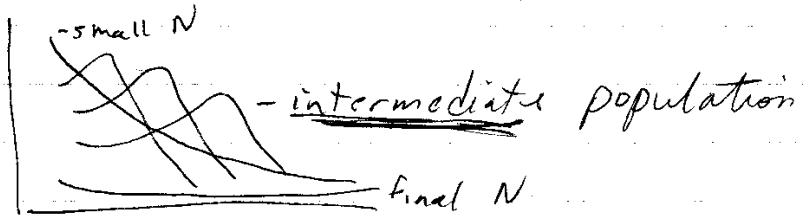
$\theta_0 = 2uN_0$

$\theta_1 = 2uN_1$

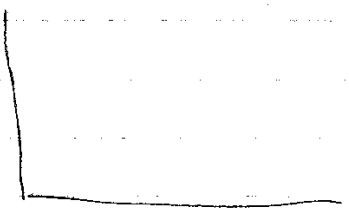
$\tau = 2ut$

N_0 = original population size

u = sum of mutations



Can use to predict t



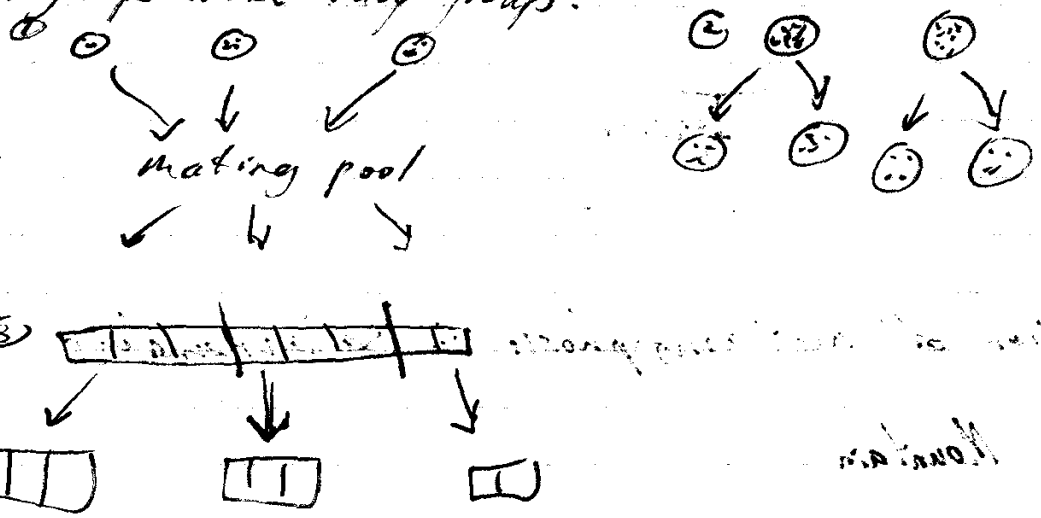
Sean Rice

① Colony of cells w/ asexual reproduction

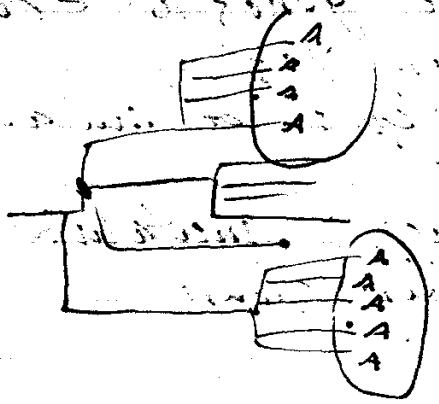
② Individual selection

③ Groups make baby groups at different time scale

How do groups make baby groups?



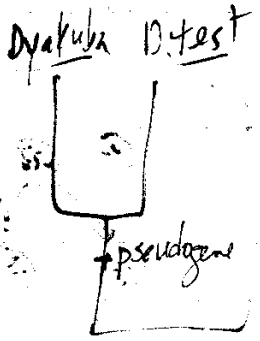
Scott Edwards mtDNA in bubblers



Manyuan Long

ADH: pseudo-pseudogenes in Drosophila

Dyakuba D. test



Evolution of metamorphosis in salamanders

Joanna Mountain

① Directed evolution w/ two alleles

② - add two lac genes to E coli
- do Cairnsian test.
- analyze types of mutation

③ Introduce adjacent mutations to see how they change.

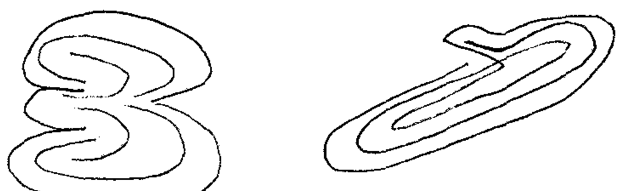
S. Otto Evol. implications of Ploidy Level

see Valero et al in TREE

① haploids have less DNA to copy ∴ can do it faster
② diploids can have heterozygote advantage
③ diploids have copy to aid in repair
④ w/ two copies of every gene deleterious recessive mutations can be masked

WHAT ABOUT GENE DUPLICATIONS IN HAPLOIDS?

→ working hypotheses:



masking ? in haploids due to duplications

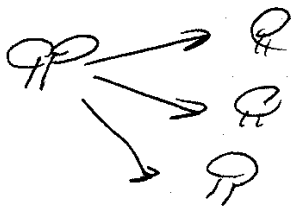
Jaume Bertranpetit : Origin of the Basques

Kevin Leland : Cultural Influences on Sexual Selection

Robert Podolsky

Laura Galloway
Reproductive allocation

Clones: what does that mean in terms of chloroplasts?



test allocation

① if source-sink models hold for allocation then chloroplasts may be very important

Michael Travisano : Adaptation & divergence during long term evolution

when/what is the arabinose mutation

Valerie Souza