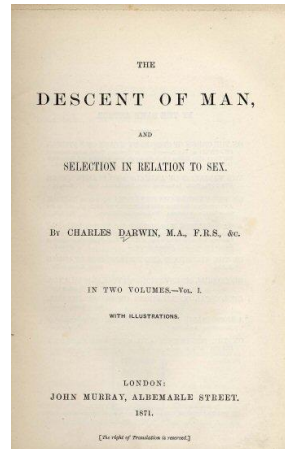
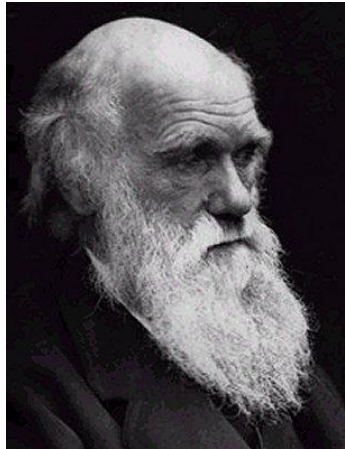


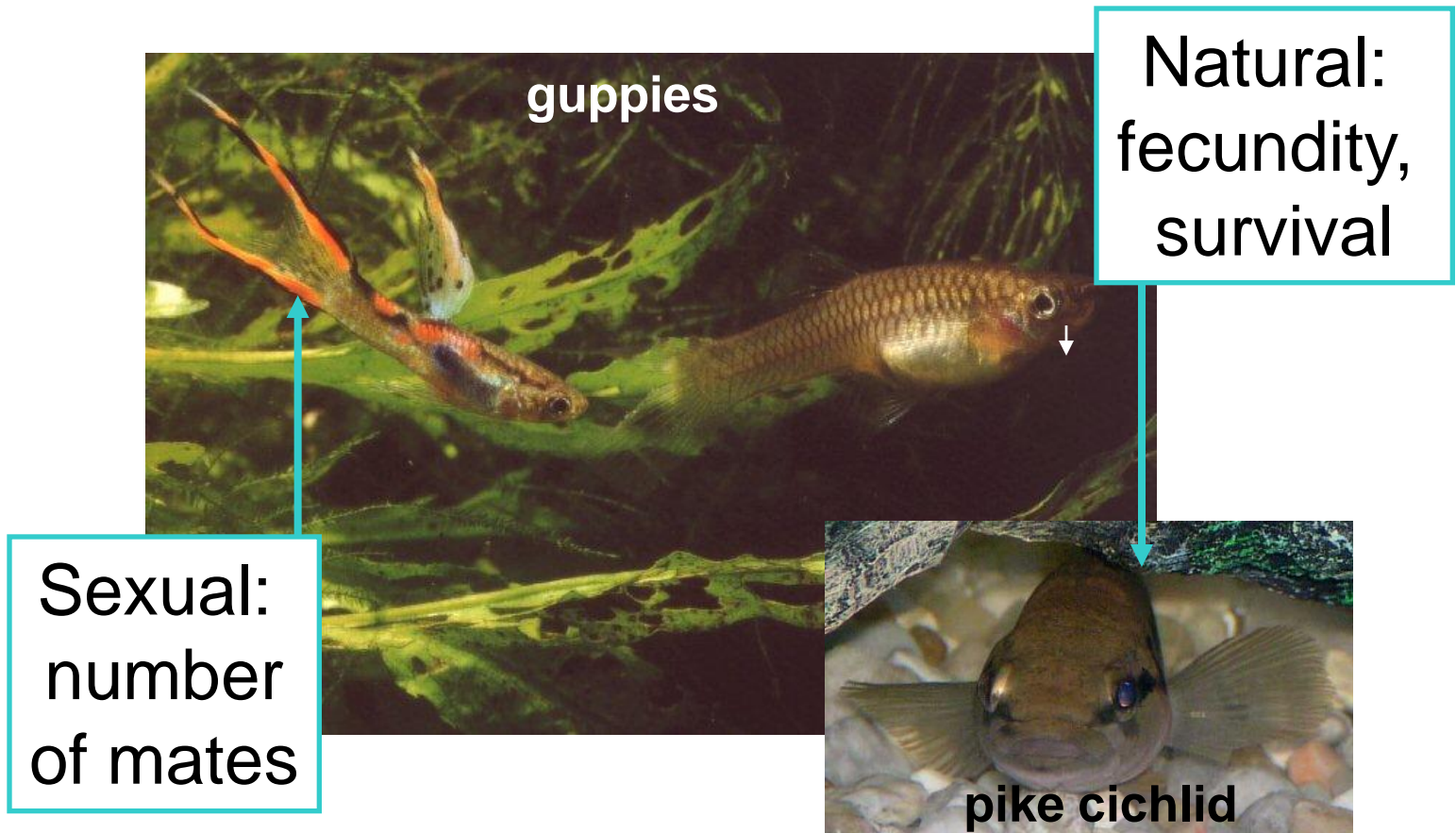
Sexual selection





“The sight of a feather in a peacock's tail, whenever I gaze at it, makes me sick!”

Types of selection

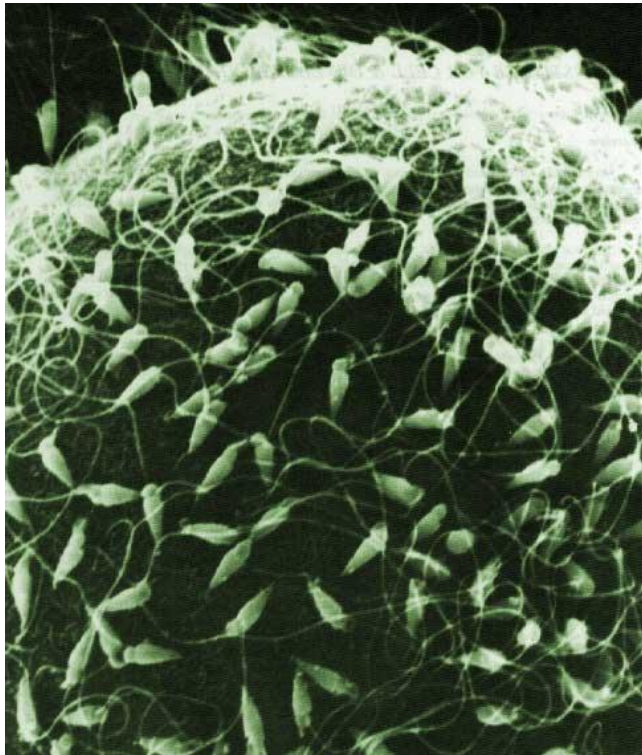


Sexual selection depends on the success of certain individuals over others of the same sex, in relation to the propagation of the species; while natural selection depends on the success of both sexes, at all ages, in relation to the general conditions of life.

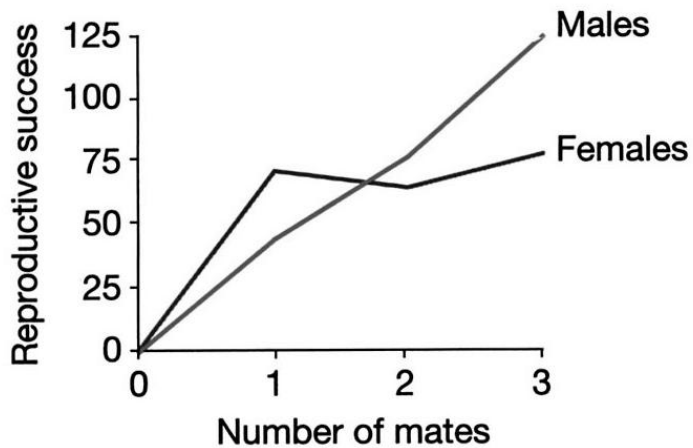
-- Charles Darwin

Gametic investment

Sex differences in gamete investment, production



Bateman's principle



Generalities from Bateman's principle

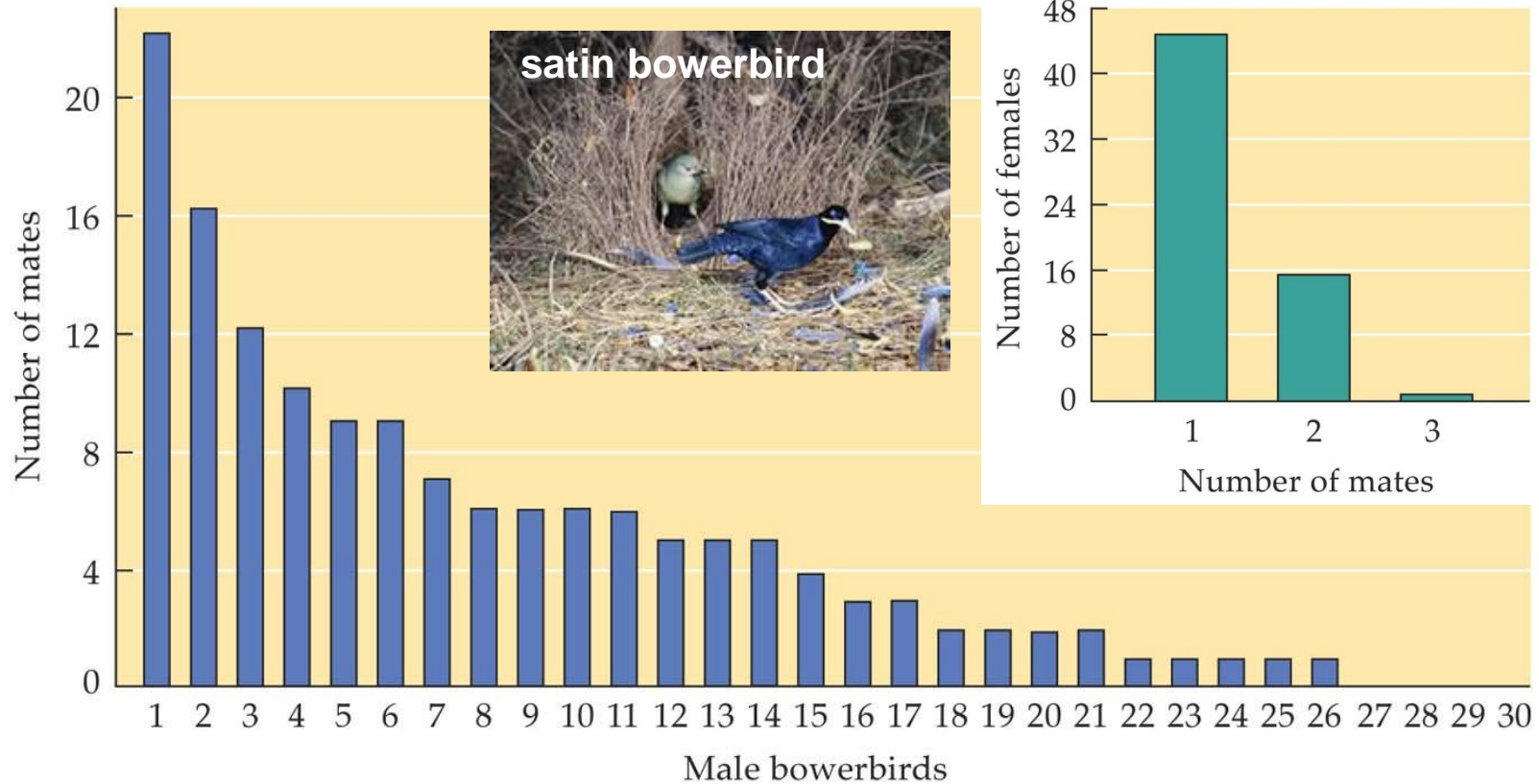
Males compete for access to females

Females choose among males



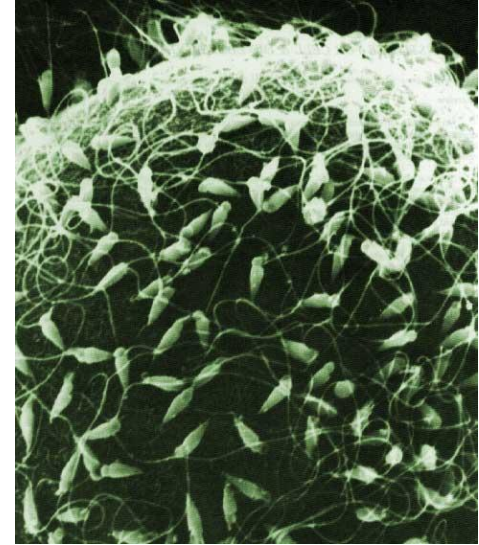
Consequences of Bateman's principle

Higher variance in mating success in males

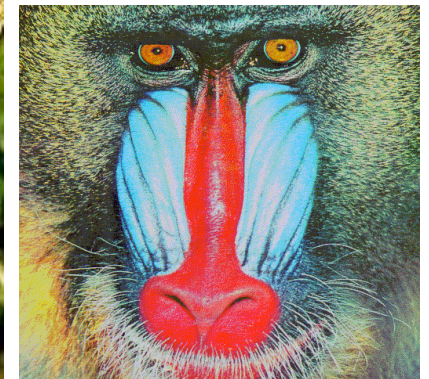


Sexually selected traits

Primary sexual traits =
necessary for reproduction

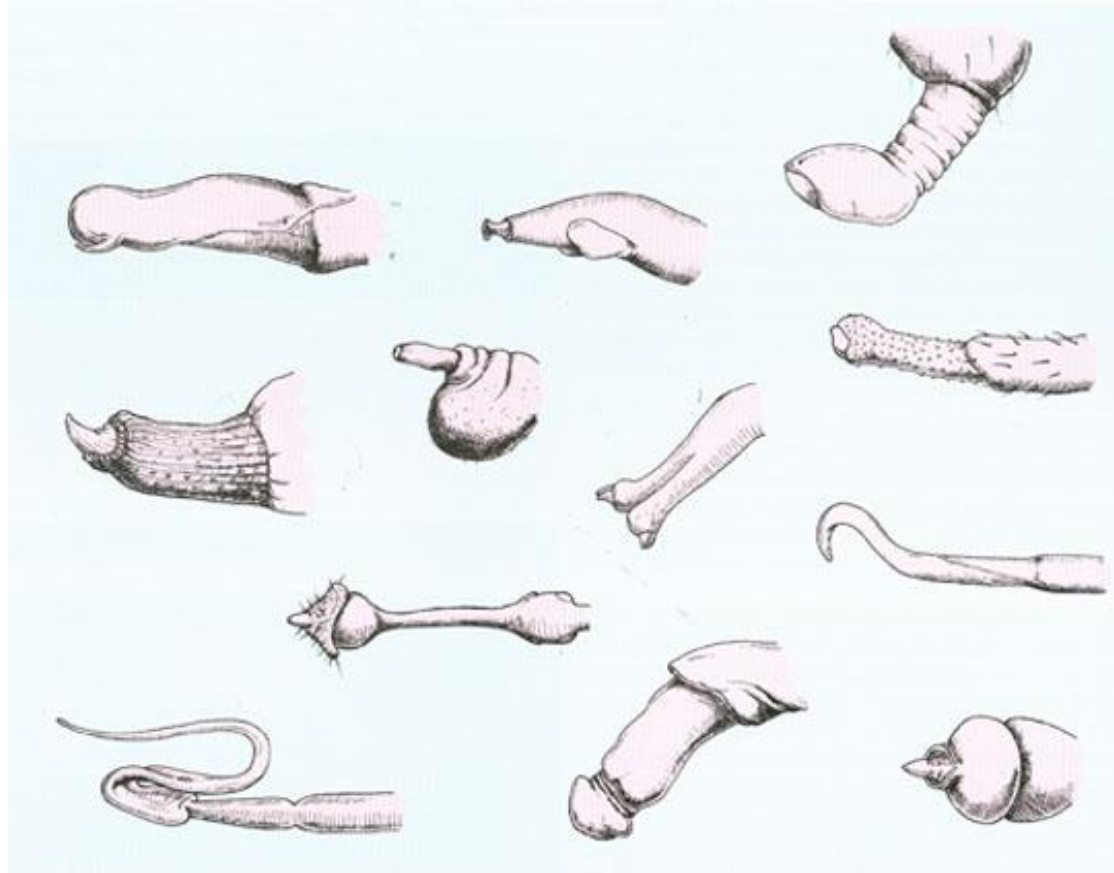


Secondary sexual traits =
increase the probability of
mating or the number
of mates obtained



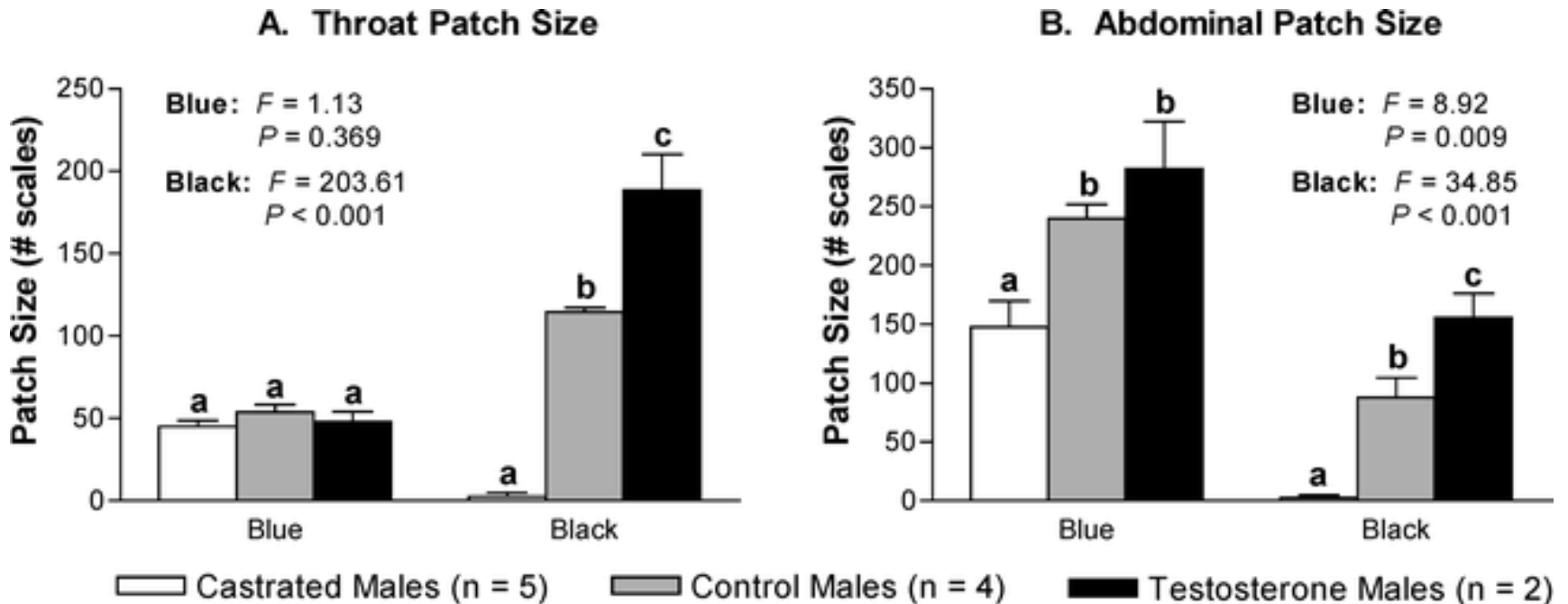
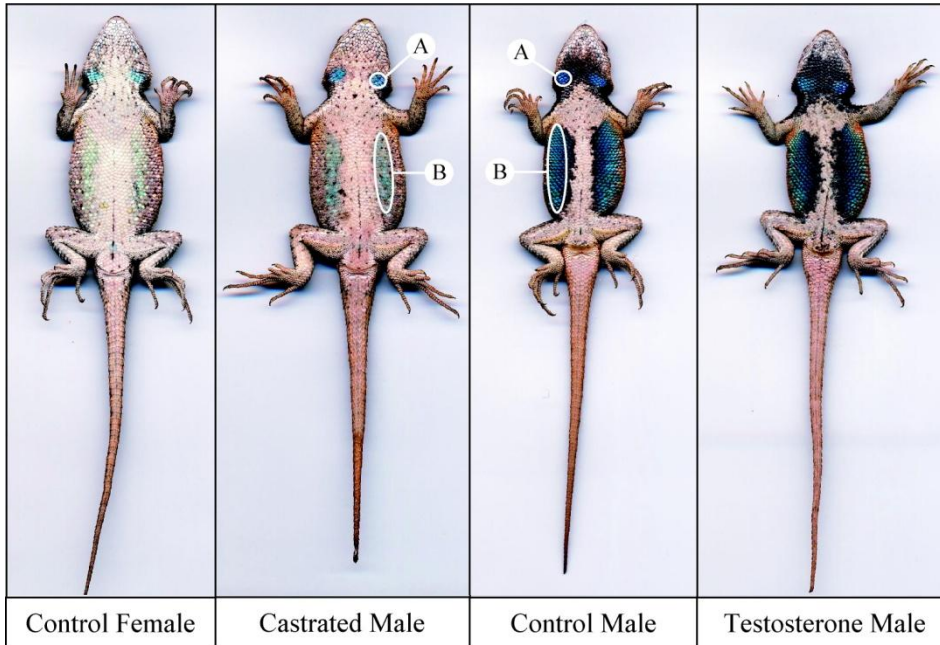
Sexually selected traits

Gamete production (primary) +
gamete delivery (secondary)

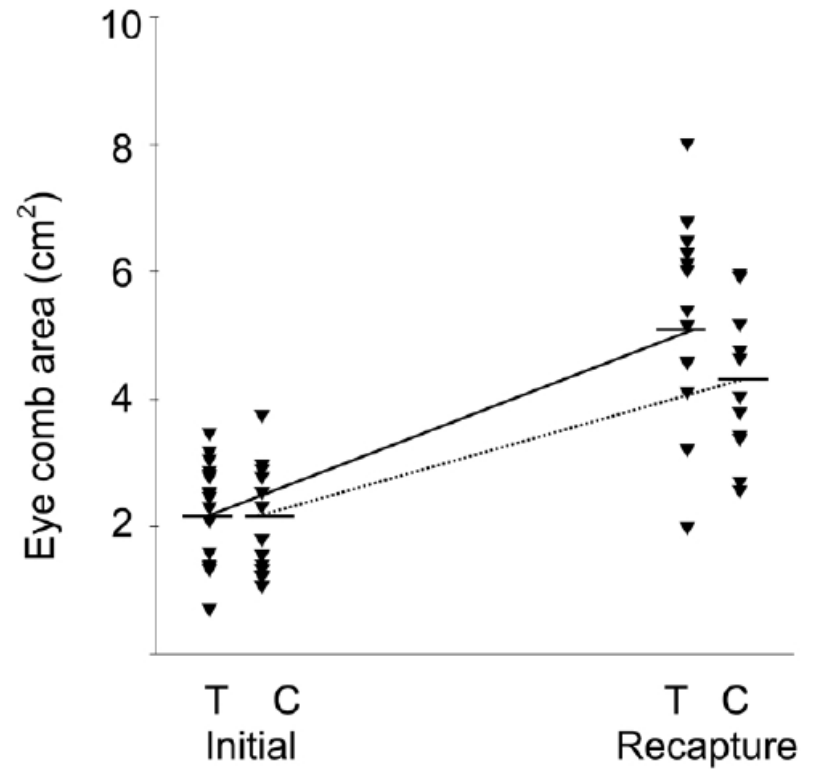


Sceloporus undulatus

Expression of secondary sexual traits often mediated by androgens



Sexually selected traits



Mechanisms of sexual selection

Intrasexual selection
(‘male-male competition’)



Intersexual selection
(‘female mate choice’)



Mechanisms of sexual selection

Intrasexual selection
(‘male-male competition’)



Selects for traits that aid in
combat, territory defense

Intersexual selection
(‘female mate choice’)



Selects for traits that
increase attractiveness

Mechanisms of sexual selection

Intrasexual selection
(‘male-male competition’)



More likely concordant with
natural selection

Intersexual selection
(‘female mate choice’)

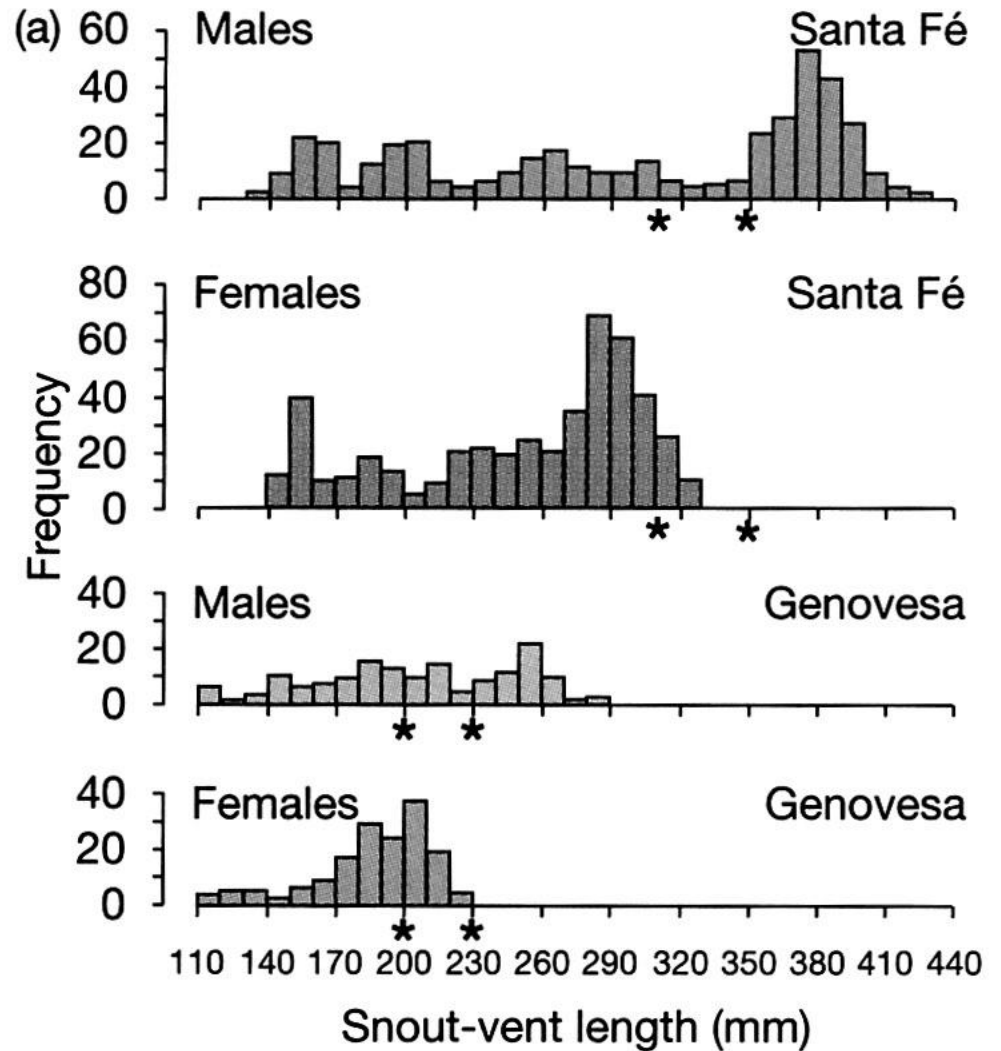


More likely to oppose
natural selection

Consequences of sexual selection



Marine iguanas on the Galápagos



Males larger than optimal range

Intrasexual selection: precopulatory

Scramble competition = indirect interaction



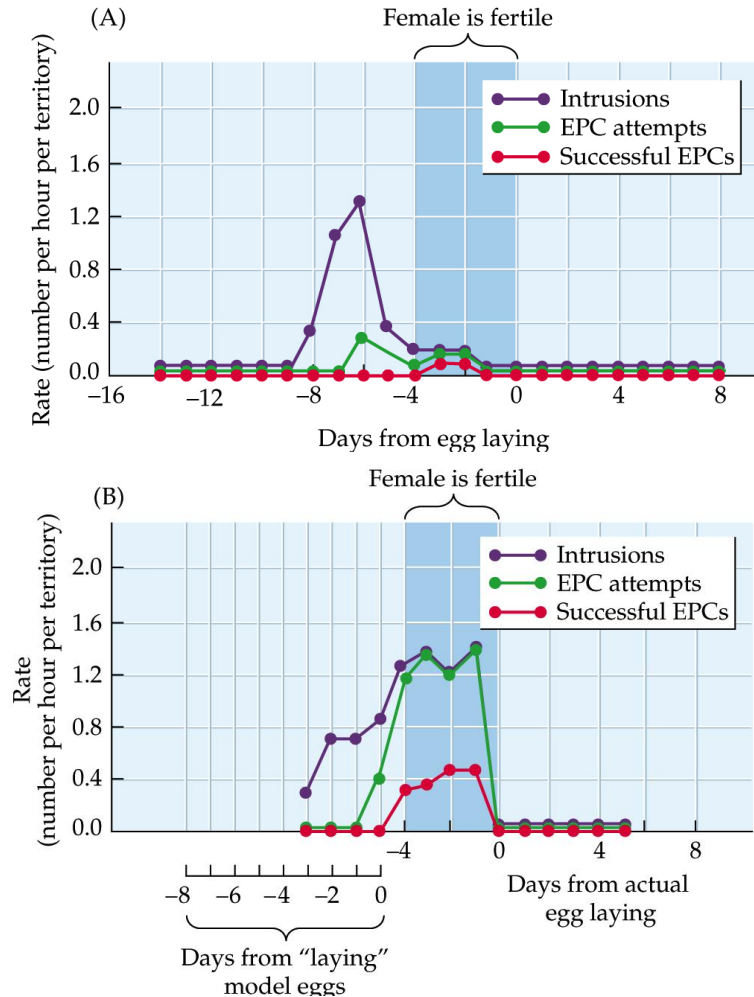
Intrasexual selection: precopulatory

Contest competition = direct interaction



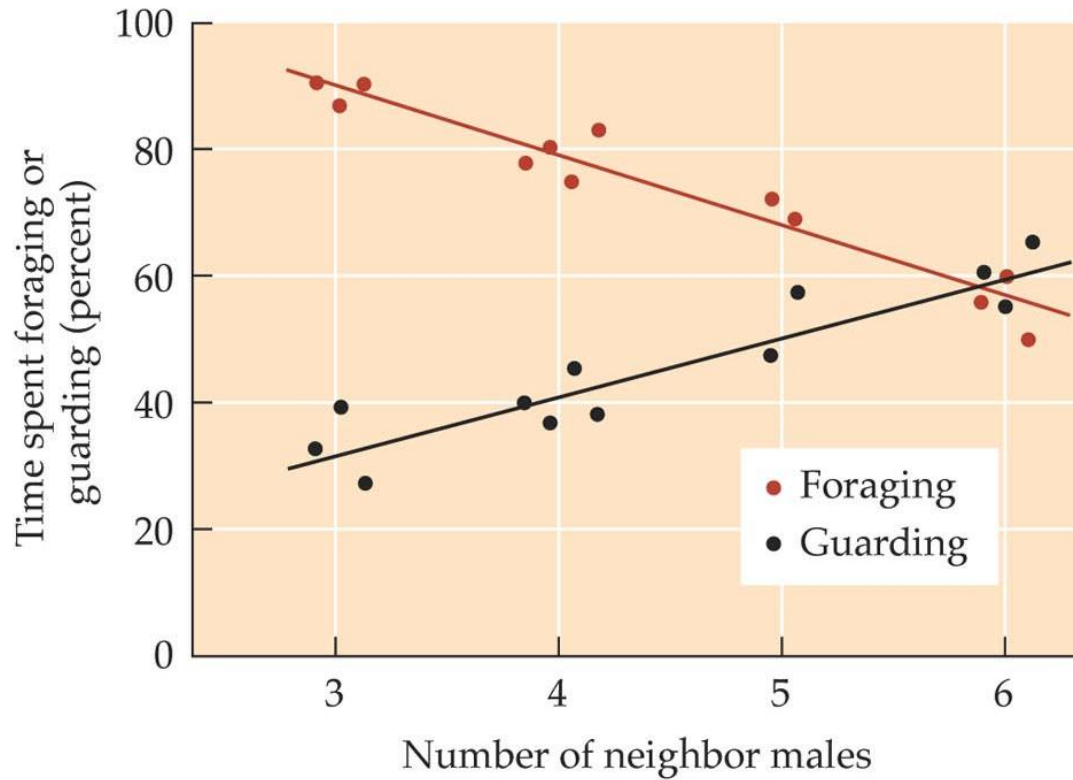
Intrasexual selection: precopulatory

Males guard females when most receptive



Seychelles warbler

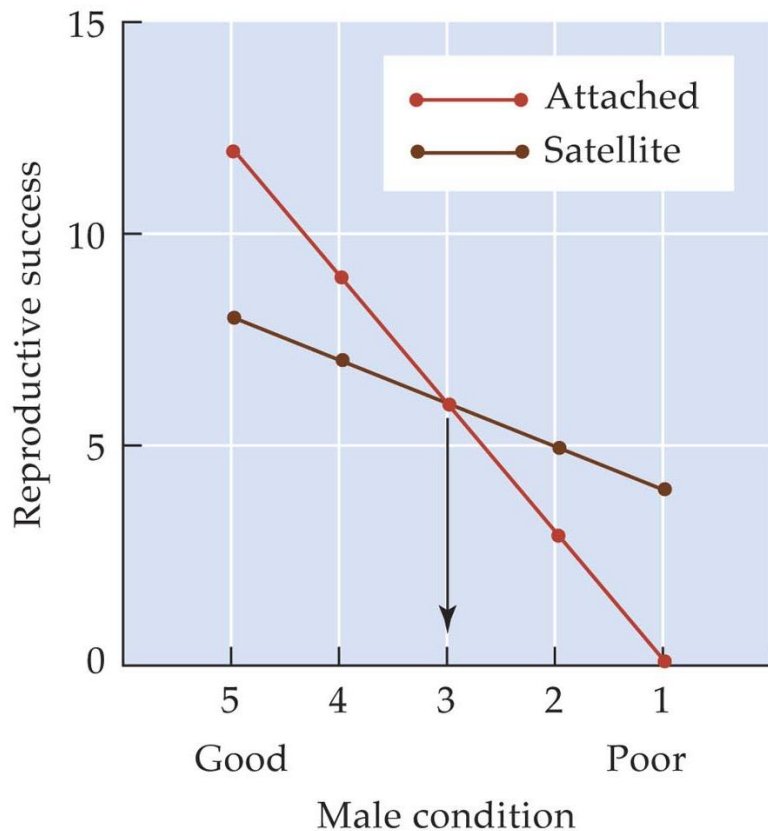
Intrasexual selection: precopulatory



Seychelles warbler

Alternative mating strategies

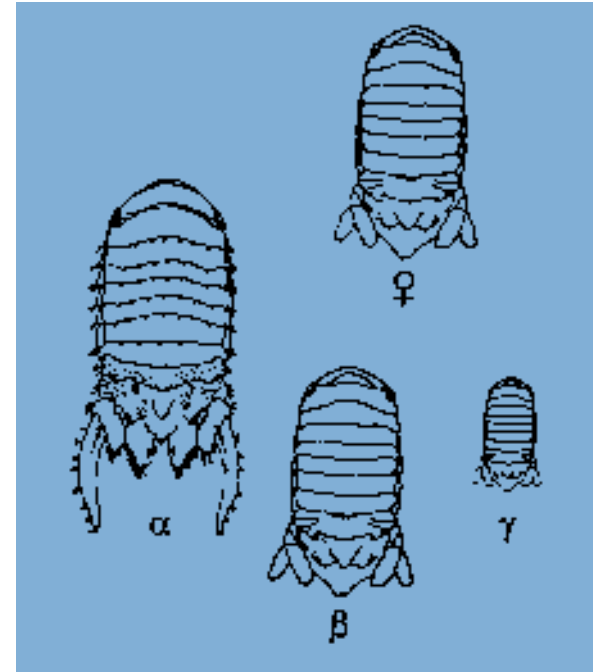
- Males may adopt alternative strategies
 - Satellite or sneaker behavior
 - Female mimicry
- Strategies usually conditional, occasionally genetic



horseshoe crabs

Alternative mating strategies

Three tactics in marine isopods

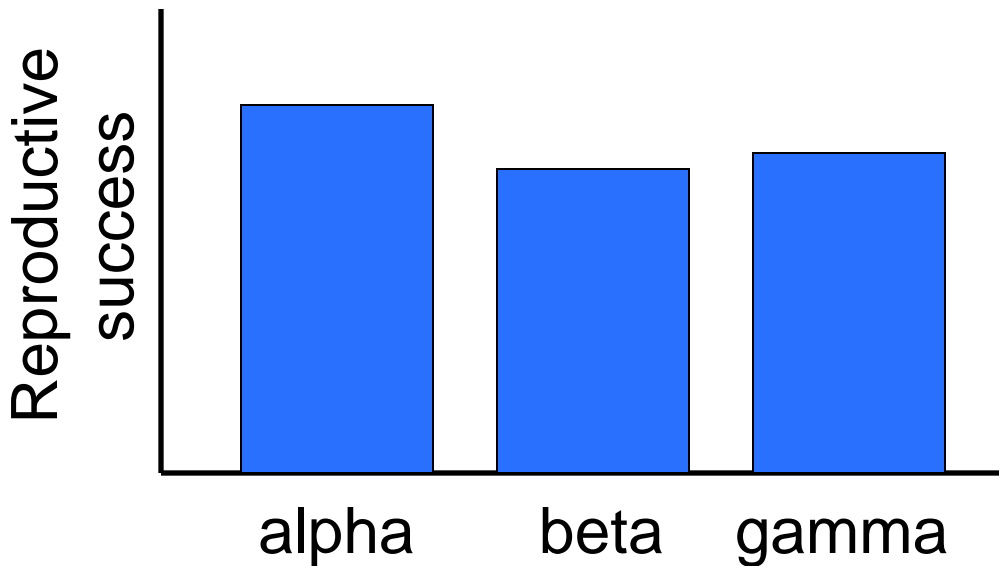


One locus, three alleles

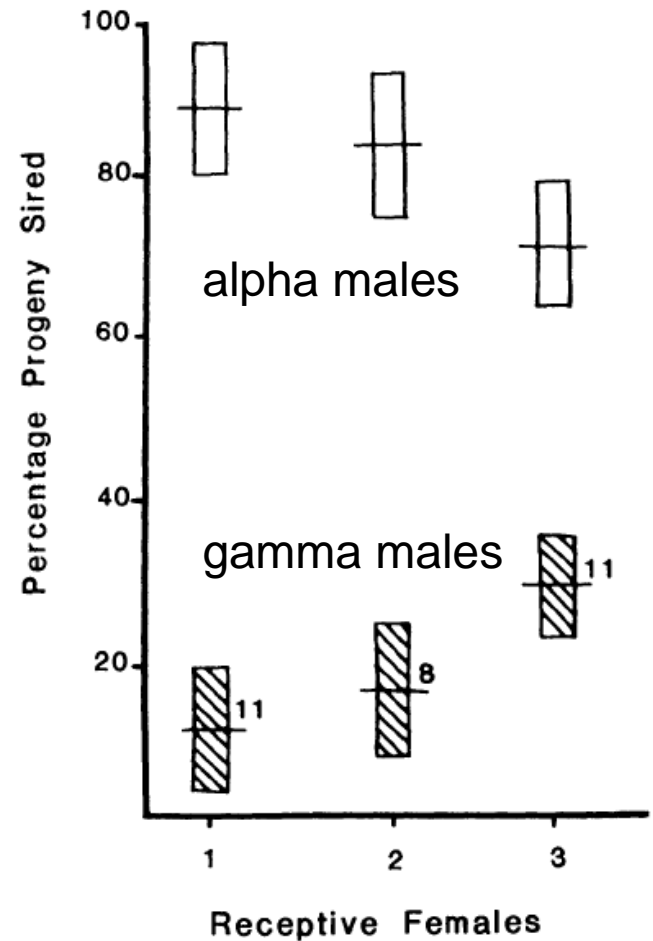
Cross-class	No. of families	No. of progeny	Weighted survivorship	Progeny phenotypes					Expected male frequency		
				α	β	γ	F	N	α	β	γ
$Ams^{\alpha}Ams^{\alpha} \times Ams^{\alpha}Ams^{\alpha}$	8	247	0.43	53	0	0	55	108	1.0:0.00:0.00		
$Ams^{\beta}Ams^{\alpha} \times Ams^{\alpha}Ams^{\alpha}$	12	1,308	0.49	59	267	0	317	643	0.50:0.50:0.00		
$Ams^{\beta}Ams^{\alpha} \times Ams^{\beta}Ams^{\alpha}$	1	107	0.39	0	28	0	14	42	0.25:0.75:0.00		
$Ams^{\gamma}Ams^{\alpha} \times Ams^{\alpha}Ams^{\alpha}$	10	921	0.38	75	0	105	167	347	0.50:0.00:0.50		
	$\overline{31}$	$\overline{2,583}$	$\overline{0.44}$	$\overline{187}$	$\overline{295}$	$\overline{105}$	$\overline{553}$	$\overline{1,140}$			

Alternative mating strategies

If genetically controlled, what would we predict about the fitness of each genotype?



Depends on density of females

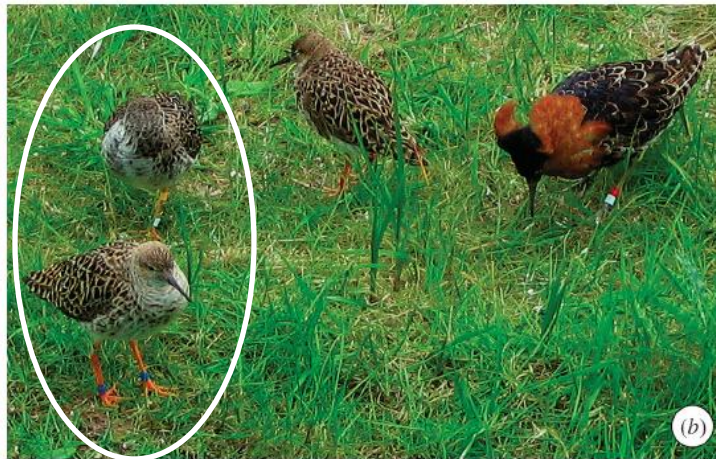


Alternative mating strategies

“Resident” (85%) and “satellite” (15%) morphs in ruffs



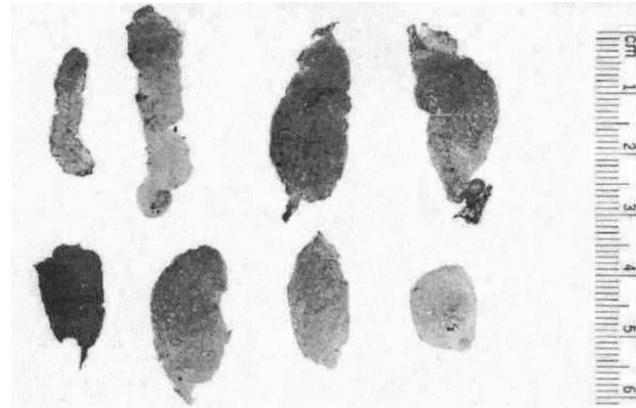
Pedigree analysis suggests one gene, two alleles



Recently discovered “faeder” morph has enlarged testes

Intrasexual competition: postcopulatory

Copulatory plugs: (i) sperm storage, (ii) chastity enforcement or (iii) prevention of sperm loss?



no sperm in plugs



Females often mated
2x per night,
2nd male dislodged
plug left by first



Suggests sperm
loss function

Intrasexual competition: postcopulatory

Male garter snakes avoid mating with females for 48 h – based on plug odor?



Observed Mating Status and Courting Activities of Female Garter Snake

	Number Courted	Number Not Courted
<i>T. sirtalis</i> without plug	21	6
<i>T. sirtalis</i> with plug	0	19

Sperm competition

Modified penis can remove
>90% of previous males' sperm

black damselfly



dunnock



Birds lack morphological
sophistication of insects

Sex role reversals



Fertility window results in sex role reversal in topi

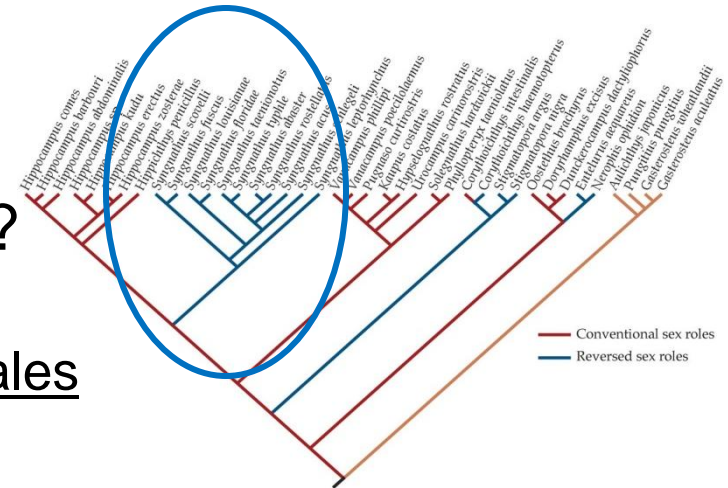
Sex-role reversals in birds



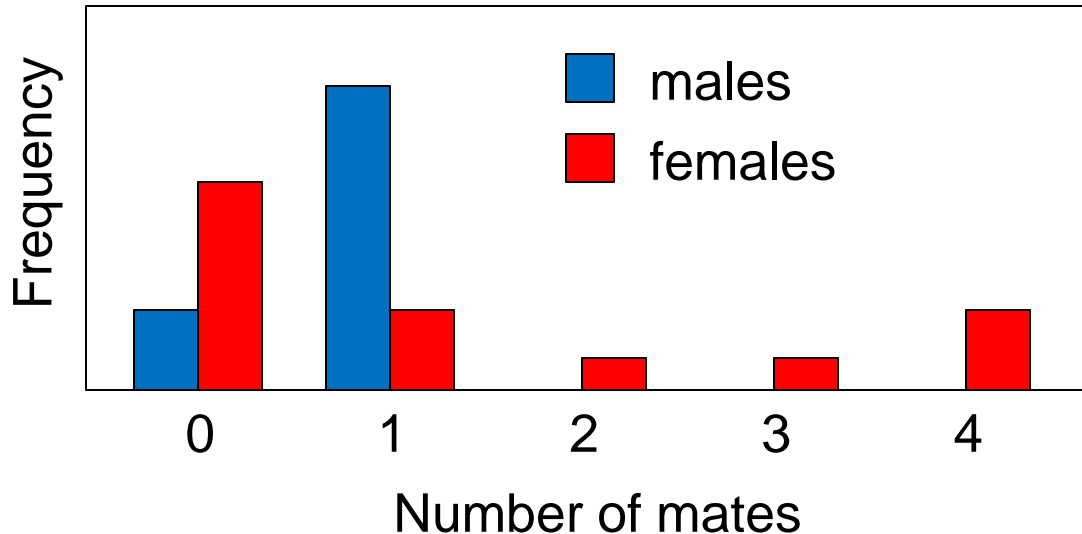
- Males rarely sing
- Males provide all care for young
- Females larger

Sex-role reversals and sexual selection

Even in clade with apparently reversed sex roles, does sexual selection act more strongly on females?



Parameter	Mated females	Unmated females
Length	38.10 mm	33.80 mm
Mass	0.4 g	0.29 g
Color index	5	3.3

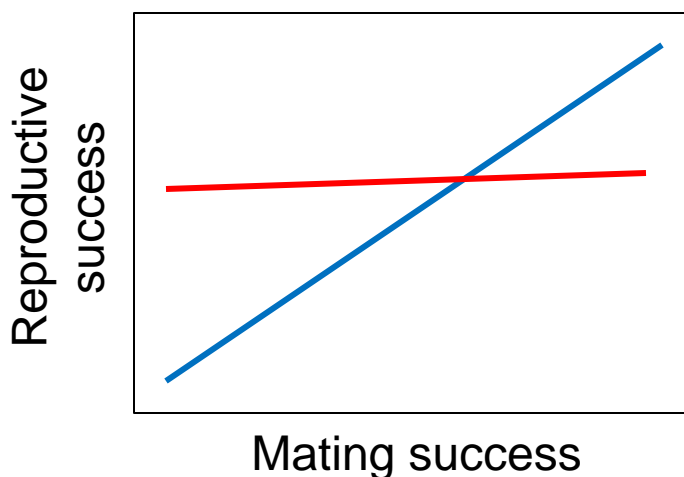


Intensity of sexual selection

Mating success = number of matings

Reproductive success = number of offspring

What did Bateman predict about the relationship between mating success and reproductive success for males and females?



Sexual selection
or "Bateman's"
gradient

Intensity of sexual selection

