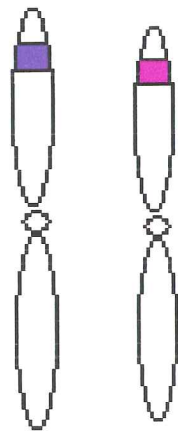


Genes, Chromosomes, Alleles, Oh My!

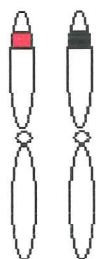
These are two copies of the same Chromosome:
One inherited from the mother, the other from the father.

Genes are located on the Chromosomes.

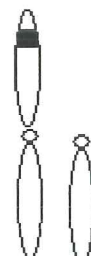
A single gene can have more than one variety, “allele,” that when present, can cause a change in the physical appearance of the animal.



Genes are “Sex-Linked” when they exist on the “Sex Chromosomes” – for Birds, the sex chromosomes are labeled “Z” and “W” where males are “ZZ” and females are “ZW”
In Gouldians, the Sex-Linked Genes are located on the Z chromosome(s). This is why males can be SF or DF, which females can only ever be SF for these genes.



Z Z
Male



Z W
Female

Head Color

- Red [R]
 - Black [r]
 - Orange [o]
- Pattern of Inheritance
 Sex-Linked Dominant
 Sex-Linked Recessive
 Autosomal Recessive

Key Points:

Females inherit sex-linked head colors from their *father*.
 Females can not be "split" for any of the sex linked colors.
 Males and females can both be split for OH.
 OH requires at least 1 red allele present to be visually expressed.
 BH birds with OH genes appear visually BH with an orange tipped beak.

Genetic Head Color Possibilities

	Visually Red	Visually Black	Visually Orange
Male	RR RR o Rr Rr o	rr rr o rr oo (BH OTB)	RR oo Rr oo
Female	R R o	r r o r oo (BH OTB)	r oo

Breast Color

- Purple [P]
 - Lilac [L]
 - White [w]
- Pattern of Inheritance
 Dominant
 Dominant to White, Recessive to Purple
 Recessive

Key Points:

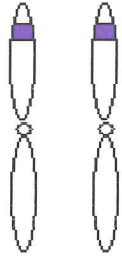
The three breast colors are regulated by the same **gene** and are just different varieties (**alleles**) of that gene.
 No bird (male or female) can ever be visually purple breast and split for **both** lilac and white.
 The breast colors are not located on the sex genes, so females and males can both be split for any recessives

Genetic Breast Color Possibilities Same for males & females

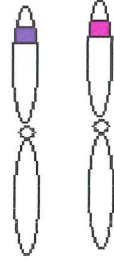
Visually Purple	Visually Lilac	Visually White
PP	LL	ww
PL	Lw	
Pw		

“Breast Color”
Genetic Possibilities

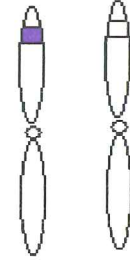
Purple Breast



DF Purple

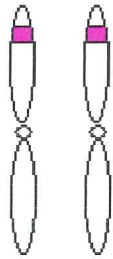


Purple/Lilac

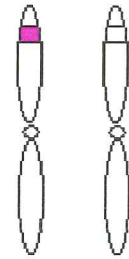


Purple/White

Lilac Breast

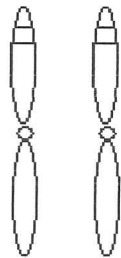


DF Lilac



Lilac/White

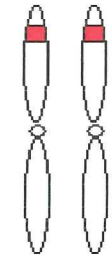
White Breast



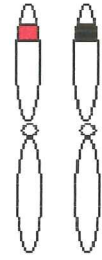
DF White

“Head Color”
Genetic Possibilities

Males



Z Z
DF Red

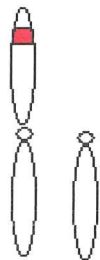


Z Z
Red/Black

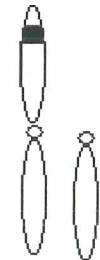


Z Z
Black Head

Females

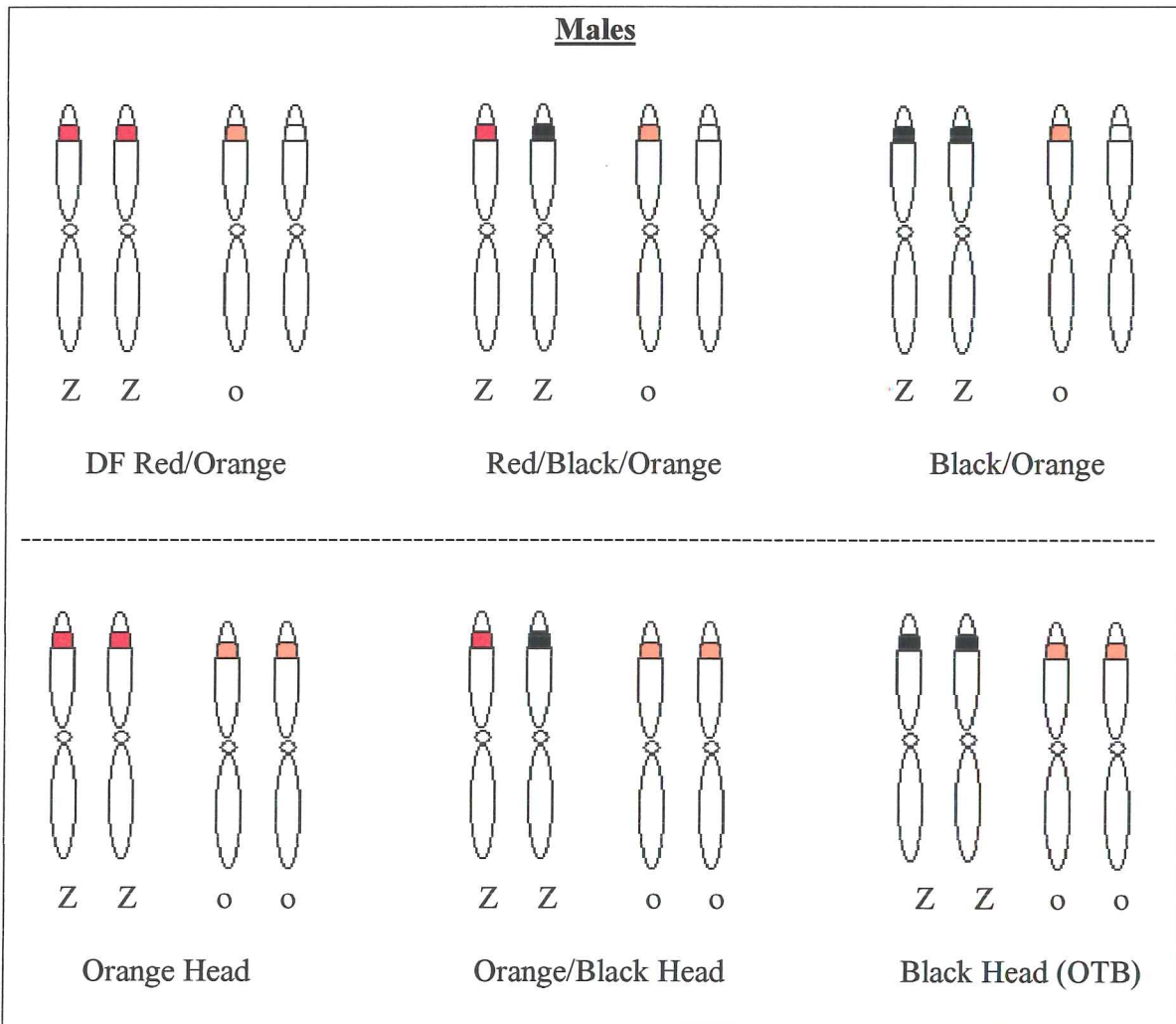


Z W
Red Head



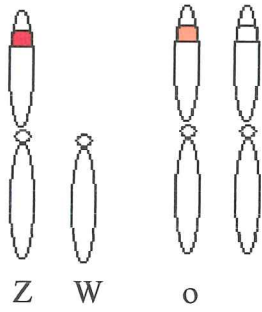
Z W
Black Head

“Head Color”
Genetic Possibilities

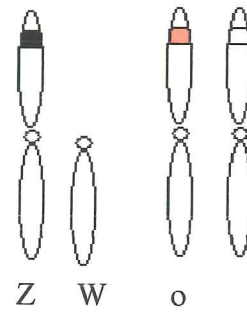


“Head Color”
Genetic Possibilities

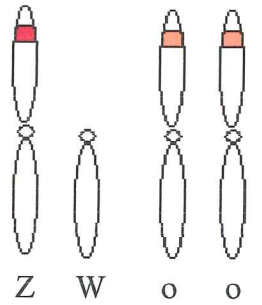
Females



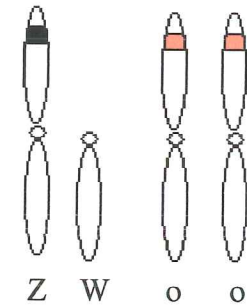
Red/Orange Head



Black/Orange Head



Orange Head



BH(OTB)

Body Color

Pattern of Inheritance

- Normal
- Dilute* (Incompletely Dominant to Yellow)
- Sex-Linked SF Yellow + Purple Breast
- Sex-Linked Incompletely Dominant to Normal
- Blue
- Autosomal Recessive
- Pastel* (Sex-Linked SF Yellow + Purple Breast + Autosomal Recessive Blue)
- Silver* (Sex-Linked Yellow + Autosomal Recessive Blue)

**Because the yellow gene is incompletely dominant, possessing only one copy in males results in partial expression, but full expression in females*

Key Points:

Females always inherit yellow genes from their *Father*

Any yellow female will always pass her yellow gene onto *every* son

Yellow females can only be "SF" and will always be visually yellow

Therefore Dilutes and Pastels can *never* be female

Males can be either SF or DF for yellow, and the way SF is expressed depends on breast color.

SF Yellow PB Males = Dilute; SF Yellow Lilac or WB Males = Visually Yellow

DF Yellow males are always visually yellow

Yellow inhibits (partially or fully) black pigment; inhibition is heightened if the bird is L or WB

Blue inhibits yellow, orange and red pigment; inhibition is heightened if the bird is L or WB

Genetic Body Color Possibilities

	Normal	Dilute*	Yellow	Blue	Pastel*	Silver
Male	GG	GY	GY LB or WB	GG BB	GY BB	GY LB or WB BB
	GG B	GY B	GY LB or WB B			YY BB
			YY			
						YY B

**Breast color can be Purple/Purple, Purple/White or Purple/Lilac only*

	Normal	Dilute*	Yellow	Blue	Pastel*	Silver
Female	G		Y	G BB		Y BB
	G B		Y B			