

Disclaimer

These genetics are 100% fantasy, for use in my Art Role-Playing Game (ARPG) known as Arkylia. There is some inspiration from real-world genetics here, but overall, this system is completely fictional and in no way represents any real-world animal's genetics. Thank you for understanding.

Body Conformation

S Locus - Size

Chrysocyons come in three distinct body types - Large, Medium, and Small. Large chryros are large enough to be ridden and used as work animals. They stand between seven and nine feet tall at the shoulder. Medium chryros stand at five to seven feet at the shoulder, and are only bulky enough to be ridden by children or otherwise lightweight individuals. Small chryros are best suited as friends and companions, standing at just three to five feet.

SS - Large

Ss - Medium

ss - Small

Size Chart

The chart below shows the three linearts we currently use to represent each size of chyro.

Large (SS)



Medium (Ss)



Small (ss)



Base Color

A chyros base color is determined by two loci: the E (extension) Locus, and the D (dilution) Locus.

E Locus - Extension

The E Locus controls which pigment a chyro will produce, with the code for orange pigment being dominant over the code for black.

EE, Ee - Red

ee - Dark

D Locus - Dilution

The D Locus holds an incomplete dominant gene on it which dilutes first red pigment, and then all pigment to lighter shades.

DD - Arctic

Dd - Red becomes Fennec, Dark is unaffected

dd - Non-Dilute

Base Color Chart

The Chart below details the four base colors chyros may present with.



Red

EE dd, Ee dd

The chyro's coat is a rust-orange.



Fennec

EE Dd, Ee Dd

The chyro's coat is a pale tan.



Dark

ee dd, ee Dd

The chyro's coat is a rich black.



Arctic

EE DD, Ee DD, ee DD

The chyro's coat is a bright white.

Modifiers

Color modifiers, known sometimes as just color mods, are genes that cause a chyro's pelt to show in unnatural colors. A single color modifier can affect the chyros base coat or one marking. When presenting on the base coat, any markings can also be affected (up to the artist).

When multiple color modifiers present on one chyro, the artist has a few options. They can either:

- Have one color mod affect the base coat, and the other(s) affect different marking(s),
- Have two or more color mods create a gradient on the base or any one marking,
- Have two or more color mods layer over each other on the base or any one marking, creating a middling hue between them,

Or...

- Have each color mod affect it's own marking, leaving the base coat alone.

Color modifiers affecting the base may have the base coat peek through on the joints (such as the elbows and knees) and/or on the very tips of the points (muzzle, ears, paws, tip of the tail). These "holes" in the modifier's range must be small, and completely soft-edged/blended.

There are seven known color modifying loci, all of which are recessive mutations.



Gray
grgr

The chyro's coat will be desaturated,
with very little color at all.



Crimson
crcr

The chyro's coat will display vibrant
scarlet hues.



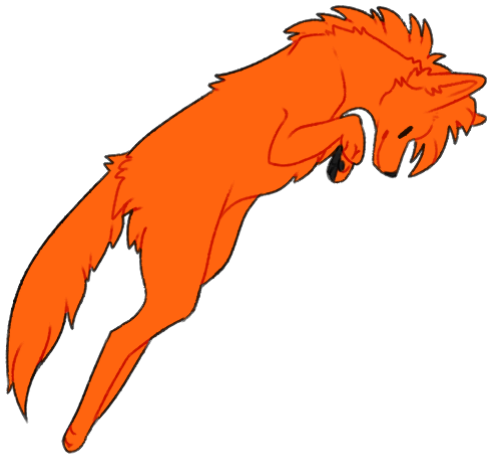
Dandelion
dldl

The chyro's coat will display bright
yellow colors.



Horizon
hzhz

The chyro's coat will display brilliant
blue hues.



Sunset

susu

The chyro's coat will display vibrant orange colors.



Verdant

vdvd

The chyro's coat will show in deep green hues.



Violet

v/vl

The chyro's coat will show in bright purple hues.

Markings

Markings must always mix well with the base and the other markings. Unless the chyro has a color modifier, they should be naturally colored, and never become too saturated.

A marking that is specified to be lighter or darker is a base-dependent marking, and must match the base in hue. This means that if the base is affected by a color modifier, any base-dependent markings will be the same modified hue as the base, unless they are affected by another color modifier.

A marking that is not specified as light or dark is an independent marking. These markings may be any natural color, and will not be affected when a color modifier changes the base.

Sabino: Any geno may have a small amount of white on it, regardless of it's genetics, similar to white marks on horses or mice. You may use Sabino to color a small part of the chyro white- such as one paw, a small chest locket, or its tail tip. You may only use one of these spots listed, or a similarly small spot. Sabino is always white or near-white, and layers atop every other marking.

[This is a link to the image guides for marking ranges.](#) if a marking isn't present here, it covers any/all parts of a chyro. Use this guide along with the marking examples to better understand what a marking is supposed to look like!



Aardwolf

Aa, AA

A marking that causes a few short stripes to appear over the backside.



Agouti

Aiai, AiAi

A dark marking that causes the chyro to have stripes similar to domestic tabby cats (can be any tabby).



Appaloosa

Apap, ApAp

A marking that causes the back end of a chyro to be covered in a white, holed marking.



Badger

Bbbd, BdBd

A marking that causes stripes which start at the eyes and move horizontally down the chyro's body, next to the spine..



Banded

Baba, BaBa

A dark marking that causes vertical stripes along the chyro's body.



Brindle

Bibl, BIBI

A marking that makes the base color mottled or brindled with a second color.



Bubble

Bubu, BuBu

A gene that causes ringlike markings. They may not span over more than 25% of the chyro.



Cheetah

Chch, ChCh

A marking that causes small, circular spots to appear on the chyro's coat.



Chest

Ctct, CtCt

A light marking that causes a splash of color on the chest.



Crescent

Cscs, CsCs

A marking that causes small crescents to fade out over the chyro's back..



Dapple

Dada, DaDa

A light marking resembling horse dappling that sits over all others at a low opacity.



Daubs

Dbdb, DbDb

A marking that causes large, dark patches with an optional light outline.



Dunstripe

Dndn, DnDn

A dark stripe that runs down the spine of the chyro.



Fox

Fxfx, FxFx

A dark gene that causes small, fox-like markings on the face and toes.



Freckles

Frfr, FrFr

A marking that causes tiny speckles to appear on the coat.



Half

Hfhf, HfHf

A gradient marking that can cover up to half the chyro. It can be lighter or darker in color than the base and markings it layers on top of.



Hood

Hdhd, HdHd

A marking that covers the neck and head of the chyro.



Marbled

Mbmb, MbMb

A marking that causes a second natural color to be blended in with the base, giving it a soft, painted texture..



Ocelot

Ococ, OcOc

A dark marking that causes horizontal stripes to appear on the chyro's flanks, which break into rosettes at the ends.



Paches

Papa, PaPa

A dark marking that causes large splotches to appear along the chyro's back and sides.



Piebald

Pipi, PiPi

A white marking that covers up all others, with patches and small holes showing the design underneath.



Points

Pp, PP

A marking that can lighten or darken the tail, limbs, face and ears of a chyro.



Ring

Rrg, RgRg

A marking that can cause up to three thick stripes winding around the chyro's limbs, neck or torso.



Roan

Rnrn, RnRn

A gene that causes the main body of the chyro to be lightened, while the points remain their original color, similar to roaning in horses. May have "roanspots" where the roan dilution is erased..



Rosettes

Roro, RoRo

A dark marking akin to a leopard's spots.



Sable

Sasa, SaSa

A dark marking over the back, can be blurred or hard-edged.



Shatter

Shsh, ShSh

A gene that causes a dark, web-like marking to spread over the coat, shaped similarly to cracked glass or water shadows.



Socks

SkSk, SkSk

Blended or hard-edged leg markings.



Streaks

Stst, StSt

A gene that causes long, horizontal stripes along the flanks of the chyro.



Underbelly

Uu, UU

A marking that turns the underside, paws, and end of the tail a lighter color than the base.

Mutations

These are rare, recessive genes that affect an individual's whole coat, not entirely dissimilar to modifiers. Mutations, however, can randomly occur when breeding, and are as a whole, more uncommon to see than the modifier genes.



Melanism
mlml

A genetic mutation that causes the chyro to over-produce melanin, resulting in a pure black individual.



Albinism
abab

A genetic mutation which prevents the chyro from producing any pigment at all, resulting in a white individual with light blue or pink eyes.



Erythrism
erer

A genetic mutation causing the chyro's coat to be saturated with red pigment, causing it's base and all of its markings to be shades of orange/brown.



Vitiligo
vivi

A genetic mutation which causes the chyro's coat to lose pigment over the course of its lifetime, starting in small dots and growing into large patches.

Chimerism

Chimerism is also a mutation, though a bit different; it occurs when two chyro pups merge together as embryos, becoming one chyro with two distinct coats. There is no "gene" for chimerism, but chimeric individuals will present with two different, distinct genotypes.

Using This Information

Chrysocyon genotypes are fundamentally the same as those of our other species, if a bit longer due to all of the loci. Follow these instructions in order to correctly craft the genotypes and phenotypes for them. Both phenotypes and genotypes are put together in a certain order, so pay close attention to the examples given to make sure you follow each guideline.

Genotypes

The genotype of a chyro is listed by loci grouping, in alphabetical order, with each locus separated from the next by a space. First come the base colors, then the modifier genes, then the marking genes, then the mutation genes, and finally the size (S Locus) at the end.

Each loci will have two alleles. The dominant allele is always listed first in the loci. This means that an individual with one B allele and one b allele will always have Bb in it's B locus, *never* bB.

Each modifier, marking and mutation locus which is not used will be removed.

The full genotype for a Large Red individual with no markings is as follows:

dd EE CrCr DIDI GrGr HzHz SuSu VdVd VIVI aa aiai apap baba bdbd blbl bubu chch cscs ctct dada dbdb dndn frfr fxfx hdhd hfhf mbmb ococ pp papa pipi rgrg rnrn roro sasa shsh sksk stst uu AbAb ErEr MIMI ViVi SS

In a real chyro genotype, however, all of the Modifier, Marking and Mutation loci would be removed, due to them having no effect on the chyro, so the actual genotype would just be:

dd EE SS

Phenotypes

The phenotype of a chyro is actually very very simple. There are five phenotype categories, which go as follows:

Base - The base color, as decided by the E and D loci.

Modifiers - The color modifiers. If a modifier is Heterozygous or Homozygous dominant, it will be blank.

Markings - The main markings. If a marking is Homozygous recessive, it will be blank.

Mutations - Any mutations in the chyro's genome. If a mutation is Heterozygous or Homozygous dominant, it will be blank.

Size - The chyro's size, as decided by the S Locus.

The Phenotype is ordered like so:

Size **Modifiers** **Base** with **Markings** and **Mutations**

When matching the genotype's loci to the marking categories they affect, the color code applies like this:

dd EE CrCr DIDI GrGr HzHz SuSu VdVd VIVI aa aiai apap baba bdbd blbl bubu chch cscs
ctct dada dbdb dndn frfr fxfx hdhd hfhf mbmb ococ pp papa pipi rgrg rnrn roro sasa shsh
sksk stst uu AbAb ErEr MIMI ViVi SS

This genotype is the same as the example in the “Genotypes” Section above, and in an actual chyro, would be simplified to:

dd EE SS

It translates to this phenotype:

Large Red

Translation Example

When trying to read genotypes, we break the whole process down into steps- one for each phenotype category. First we figure out the Size, then the Modifiers, the Base, and so on. All Arkylia characters should come with a pre-written phenotype, but it's always helpful when players can double-check their characters' phenotypes for possible errors.

As an example, let's break down a randomized genotype into its phenotype!

The genotype is:

Ee Dd CrCr Aiai Dbdb Uu ss

We'll break the genotype down in steps, like so:

Its **S locus** is **ss**, meaning it is a **Small** chyro.

Its **E locus** is **Ee** and its **D locus** is **Dd**, meaning its base color is **Fennec**.

It has the **Cr locus**, but it is **CrCr**, meaning it carries, but does not show, **Crimson**.

It has the **Ai**, **Db** and **U** loci, so its markings are **Agouti**, **Daubs**, and **Underbelly**.

It does not have any mutation loci, so it does not show any mutations.

This means the phenotype would read like this:

Small **Fennec** with **Agouti**, **Daubs**, and **Underbelly**

You can re-use this process for reading any genotype! Just match up the alleles to the charts found above and slot in the marking names in their correct places, and you'll be good to go.