



About the Creeper Gene

Story, photos & diagrams by: Greg Davies (AU)

Japanese bantams (and some other breeds) carry a lethal allele related to short leg length. This article explains the basic genetics of this condition.

There are a number of lethal genes in poultry, however in Japanese bantams, the Creeper (**Cp**) allele is the offender. This is a skeletal shortening mutation which is also found in other short-legged breeds such as Scots Dumpies.

Before we can understand how the Creeper allele works, we have to have a basic understanding of some genetic terms. The seven we need to know are:

- genotype
- phenotype
- diploid cells
- chromosome
- alleles
- homozygous, and
- heterozygous.

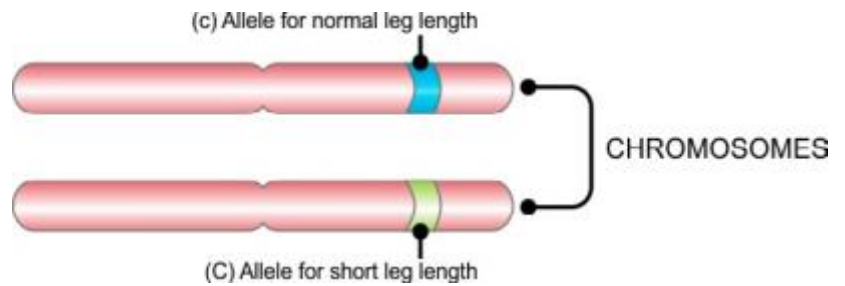
So let's look at each of these (without going into too much scientific detail):

Genotype: The Genotype is the genetic composition of an organism for a particular trait and is inherited from parents through sexual reproduction.

Phenotype: Phenotype refers to the expressed physical characteristics defined by the genotype. (Note: there are other influences that may influence the phenotype such as random genetic variations and environmental factors but for our purposes, we will ignore these.)

Diploid cells: A diploid cell is one that carries two sets of chromosomes. Apart from gametes (sperm and ova cells which are haploid cells), all cells of chickens (and us) are diploid.

Chromosome: A chromosome is a group of genes that carries heredity information. Chromosomes are paired together, with one received from the mother and the other from the father.



Above: How alleles are positioned on a pair of chromosomes to express leg length.

Alleles: Alleles are a type of gene located at a specific spot on a particular chromosome. Diploid organisms usually have two alleles for a particular trait.

Homozygous: Homozygous refers to identical alleles for a single trait.

Heterozygous: Heterozygous refers to where an organism carries two different alleles for a single trait.

Now that we have gotten the technical definitions out of the way, let's look quickly at lethal alleles and how they affect an organism.



Above: This Japanese bantam cockerel is homozygous for normal leg length.

Lethal alleles

Lethal alleles (sometimes called lethal genes or simply, lethals) are alleles that are fatal to an organism that carries them.

A dominant lethal only needs one allele to be present to be fatal.

A recessive lethal needs both the alleles to be present to be fatal.

A conditional lethal requires an outside influence, such as exposure to a particular chemical or other environmental trigger.

The Creeper allele is a recessive lethal as two alleles are required to express the lethal trait.

The Creeper lethal

All Japanese bantams with proper short leg length have a heterozygous phenotype.

However, depending on the phenotypes of the parents, the embryos can have one of three possible genetic combinations for leg length; two being homozygous and one heterozygous.

Of these three possibilities, only two can survive to hatching.

To illustrate the combinations, I shall (unscientifically) label the two alleles as thus:

- normal leg length (**c**) and
- short leg length (**C**).

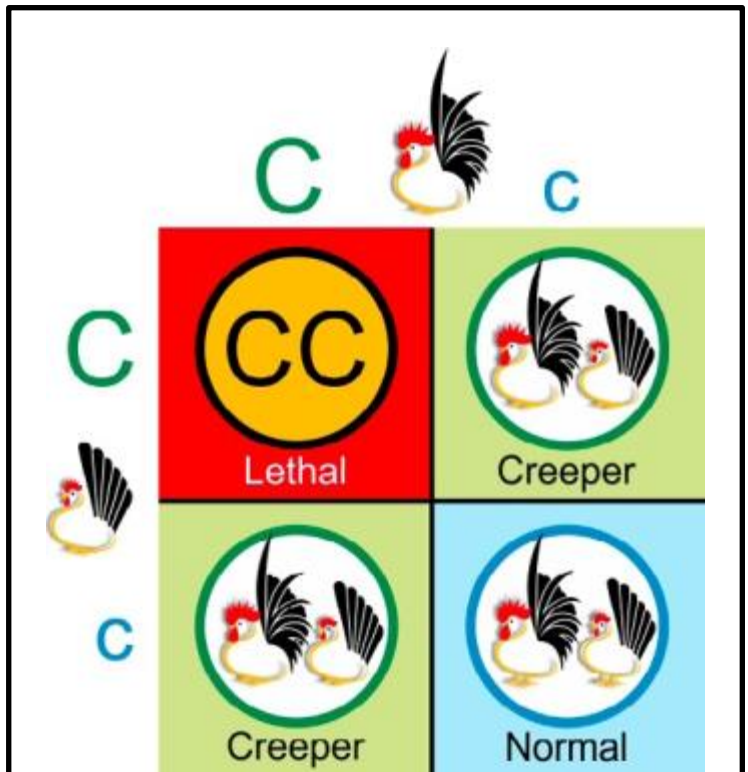
So the possible combinations can be shown as follows:

- (**cc**)= These do not have the creeper gene. They will all have normal legs and when mated together cannot breed short-legged chicks.
- (**Cc**)= Exhibition Japanese bantams. Chicks with this combination will have short legs as demanded by the standard. When mated together, they will (theoretically) produce 50 per cent short-legged chicks (**Cc**), 25 per cent normal-legged chicks (**cc**) and 25 per cent lethal (**CC**).
- (**CC**)= The lethal combination. Embryos with this combination are homozygous and will always die before they can hatch.

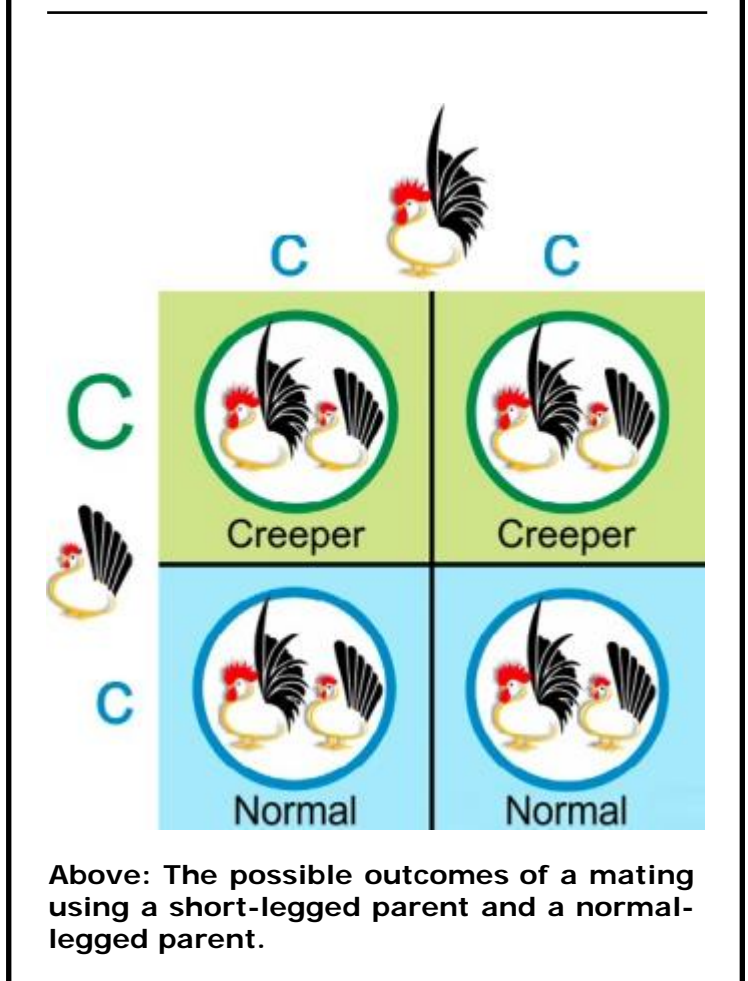
Breeding strategies

Breeders of Japanese bantams all strive to breed birds with the short legs required, however they may use different strategies to get them. Some will mate short-legged birds with long-legged birds. This removes the chance of any embryos having the lethal (**CC**) combination and all fertile eggs will hatch. The main drawback of this strategy is that it increases the number of long-legged chicks to 50 per cent. Therefore, the incidence of "wasters" is greatly increased.

Most serious breeders however, will mate two short-legged birds together. The advantages of this strategy are: the number of correct short-legged birds is maintained at 50 per cent, and the eggs containing chicks with the lethal (**CC**) combination do not hatch anyway. The percentage of "wasters" is therefore reduced naturally.



Above: The possible outcomes of a mating using two short-legged parents.



Above: The possible outcomes of a mating using a short-legged parent and a normal-legged parent.

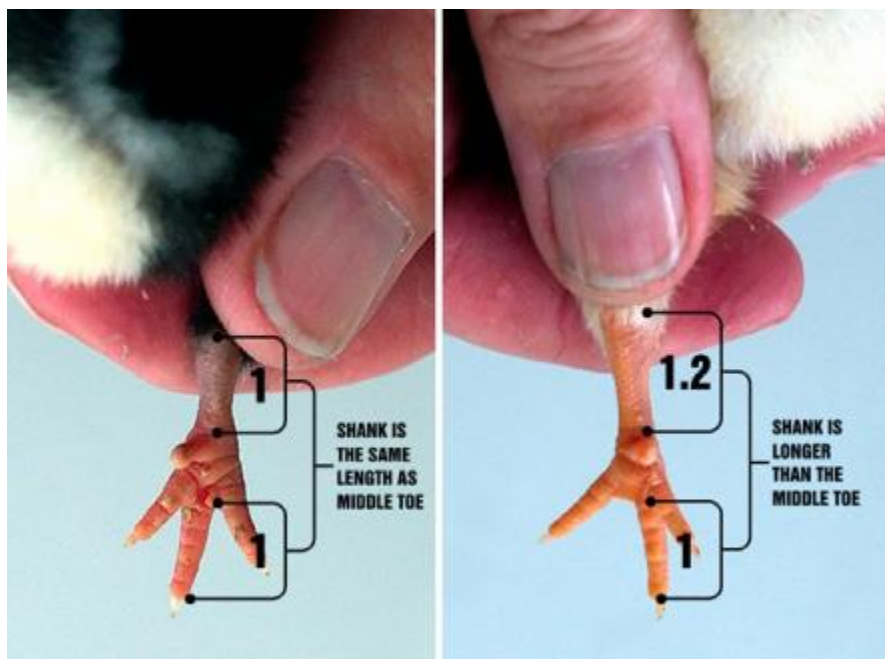
A common fear among people is, that breeding with two short-legged birds will give them chicks with terrible deformities or chicks that will die during rearing. Neither of these things happens.

In my experience, not a single homozygous **Cp** chick ever hatches. Most of them die within the first day or two of incubation and generally appear as either infertile eggs or as early dead-in-shells. The rest die well before hatching time.

Mixing up genes

Looking at some strains of Japanese bantams in Australia, it is obvious to me that they are carrying Indian Game blood from previous crosses—presumably done to improve bone size and constitution—by their body shape, short, narrow feathering, skull shape, and legs that seem to be of intermediate length, neither long nor short.

Indian Games have a different (semi-lethal) short-leg gene known as **Cl** and it would appear that these strains of Japanese bantams may well be carrying this gene, and not be the proper **Cp** gene. An example of injudicious breeding potentially wrecking a famous breed, for dubious short-term gain.



Above: A simple way to determine the leg length of chicks is to compare the shank with the length of the middle toe.



Above: A Japanese bantam with lovely, short leg length.



Above: A Japanese bantam with intermediate leg length.

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