

# GENETICS OF THE CHICKEN EXTREMES

THE BASICS



SIGRID VAN DORT  
& FRIENDS



*White Plymouth Rocks, hen 1932, rooster 1938, photographed in Holland. Photos: Archive Avicultura, Holland.*

*White Plymouth Rock was one of the breeds used for today's broilers (meat chicken).*



For this book I used the papers, references and summaries of published research from ± 1900-1995. Most is listed in *Poultry Breeding and Genetics* from Crawford (1995) which was a good starting point. This is the period in which classical breeding experiments were done. Much similar to the way we breed our chickens. And totally different from molecular genetics as practiced today to collect information about the genetic actions which are responsible for phenotype. Also the book from Carefoot, *Creative poultry breeding* is interesting because it's especially written for fanciers. Both books are not up to date anymore but thanks to the internet knowledge and experiences spread very fast. You only need a loony who collects the stuff... I started this book July 2010. Don't want to count the hours... of fun, surprise and study. I know it's not complete, therefore I had to force myself to quit, a book is never ever complete...

Old stuff, which still holds true today is updated till the last publications in 2012, just before this book was printed. Note that not all 'scientific' is useful for us, but surprising things which will help understanding underlying mechanisms are mentioned nevertheless. Skip it if it's too much.

The traits studied by scientists, which are present in test lines of birds originating from well established flocks on universities, could be or not in our backyard birds. Some of these university lines go back over 53 generations of selective breeding. For instance White Plymouth Rocks on Virginia Tech (a work of prof. Paul Siegel) and the white Leghorn lines from Compton and East Lansing which started in the late 1980s. Industrial poultry is highly selected for specific traits, which differ from our backyard chook. Perhaps you won't expect it, but their genetic diversity is larger than it is of our birds...

The most freaky mutations are not mentioned here, only a few odd things which pop up now and then in our coops or which are funny.

We do inbreed, but not in the extent of laboratories. We don't breed for recessive mutations to see how long offspring is capable to survive or when embryos die in the egg. We want to get rid of such a destructive mutation unless we have to fix it when it comes with a trait we do appreciate.

Since genetics is also interesting for the fancier, most of us keep our eyes open and don't cull everything 'not wanted'. Therefore there are more new mutations in hobby poultry discovered lately. Thanks to breeders who have knowledge or want to gain it. We ask more 'why', than 'how', the past decade.

All information in this book could never be gathered and written down without the help of my FRIENDS, which helped me before with the *Chicken Colour Genetics* book. I want to thank my FRIENDS again for sharing their knowledge, experiences and unique photos. Their names are everywhere in the book. Next to them, a few universities from the United States and also one from Scotland which were willing to give their permission using their materials, you'll find it back as well, with the credits. There was even a swap of photographs since we document also interesting things for vets or scientists.

I hope you enjoy the book and that it can be of help in your breeding. For the ones which are not mentioned in the book, please send me an email, some I could not get contact with and you'll be mentioned in the next run of the book since it's printed digitally in a small amount of copies each time.

I'm Dutch so my English is far from perfect. If there is anything you don't understand, please send me an email so I have a second chance :-)

Sigrid van Dort, May 2012

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# Intro

Ever since domestication of chickens, some six or eight thousand years ago, man had the biggest influence on the phenotype and traits of those chickens. Next to this, local regional influences played a role and where the chickens were used for.

A long time chickens were just straying around on the property. It was in the 19th century chickens got 'value'. They got social cultural value. Not for producing meat and eggs, this was quite unimportant. It was keeping chickens for a hobby by royal highnesses, nobility, and the rich. Huge amounts of money were paid for special chickens, both local ones and more exotic birds. The first chicken exhibitions were organised in the 1850s and owning and breeding chickens became a way of self-expression. The same as today: I Am Special! It was from that time breeders started to focus on traits like: both meat and eggs, feather colour and extremes.

In the 20th century focus went more and more to production traits: meat and eggs. Mendel and his inheritance, the existing knowledge of selective breeding and the start of documenting individual birds, gave rise to select for as we now know in industrial poultry.

First it were the dual purpose breeds: breeds (also local ones) which laid eggs and were also a drumstick. Dual purpose breeds were continued to breed, till today, as there are Barnevelder, Wyandotte and Orpington.

It was in the years between 1930 and 1950 when hybrids arose, crosses between lines of which F1 were the production animals. F1 had extraordinary traits, whether meat or laying lots of eggs. Slowly the amount of breeds which were used became smaller and smaller and more specific then ever. Today the production of hybrids is in the hands of multinationals which control the chain, birds are boarded up with patents and can be found everywhere in the world, up to developing countries. Also genetics became an 'industry'.

Phenotype isn't rather important to industry in the way we value it in ornamental breeds. Phenotype is important to industry as long as it serves production. Chicken is a cheap source of proteins, the whole world benefits from genetic diversity in chickens therefore. Different traits means different genes and gene combinations (QTLs). But don't make it more than it is, actually the over 11 billions chickens share the same ancestors. Actually, there is more genetic diversity in industrial chickens than in pure bred ornamental chickens which are kept in small flocks because of their rarity. No surprise.

In order to prevent extinction of breeds because their gene pool becomes to small, an out cross can help to boost them. You should know which breed would be suitable, and most easy. Since ornamental poultry have 'ornaments', not every breed is suitable whether to boost a flock or to add something else to it like a new colour. Basic knowledge of the feather colours is available, but a chicken isn't only feather colour.

There is shape of the comb, leg colour, skin colour, feather quality, amount of toes, a bunch of feathers on the head or not, boots, long or short tails, you name it.

The extremes are just as important as the colour. And everything different from Red Jungle Fowl (RJF) is an extremity, technically spoken.

Genetics of the extremes is not much different from feather colour, and everything RJF is written with a + behind the short. The + means: normal, every gene without a + is not-RJF and therefore not normal. This book is about normal and not normal, about everything additional to pimp the chicken to more than a medium size standard model.

This book is about ornamental poultry, culture, beauty and joy.

So, take a look and use your imagination!





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