

Preface

I think guppy genetics has an unjust reputation for being difficult. It has a special language and for novices it's difficult to follow the exchanges between people who speak it.

In fact I think it can be learned by anybody with the patience and desire to learn. The analogy is to the game of chess that initially appears to be amazingly complex to those who do not play it. But the movement of individual pieces and basic game play are rather simple. A rook can move horizontally or vertically in as many spaces as you want. It cannot move diagonally. The bishop can move diagonally in as many spaces as you want but cannot move horizontally or vertically. A pawn can move one space at a time in any direction...and so on. The basics of game play and strategy can be learned after only a few sittings.

It is when you set all the pieces into play that complexity arises. Chess players need to consider the whole picture and work out in their heads the implication of their, or their opponent's, next move. Chess game play can take a long time to assimilate.

The problem is that you initially forget the legal moves for individual pieces. It is a memory issue. In genetics you have such terms as "autosomal" and "heterozygous." Although the concepts these words represent are fairly simple to understand, remembering the actual words acts as an initial barrier to comprehending discussions about genetics.

The basic Mendelian laws are easy enough to memorize. The number of color cells are few (four basic types) and you can easily understand how they develop and the factors affecting their expression. How genes come to be expressed as color cells and how they affect body patterns is easy enough to learn. It just takes time and a certain degree of effort to assimilate the concepts and form a mental picture of the entire field.

Grand masters of chess are said to see the game as a pattern rather than seeing the potential moves of individual pieces. This ability to see the game rather than individual pieces comes with time and practice.

You get better at chess by playing. Same with genetics. In genetics the game is played in your fish room. A couple of blond colored guppies appear in a drop from those grey guppies you recently acquired. Where did they come from? For somebody who has a basic grasp of genetics the answer is easy. The blond trait is *autosomal recessive*.



See-thru female guppy. I created this guppy by combining three recessive genes. I gave it away and the person I gave it to put it up for sale for \$365 a trio on Aquabid.

By the end of this book you will understand what it means to call a trait “autosomal recessive.” I will be repeating basic concepts again and again until they become effortless to recall. I am going to take a great deal of time and use many illustrations to help you get over the initial hump of guppy genetics, including memorizing the basic terms commonly used in guppy genetics discussions.

However, ultimately a full understanding of guppy genetics will come when you actually try to apply what you will learn in this book. You have to take what you read into the fish room with you. How do you create a truebreeding strain of blond guppies? By only using blond guppies as the parents of the next generation. That is implied by the concept of an autosomal recessive trait. The moment you figure this out you have assimilated a basic concept and you have made it part of what you see in your fish room.

I am always disappointed when I hear people say that guppy genetics is esoteric, too difficult or irrelevant to guppy breeding. Perhaps they have just given up the effort it takes to memorize and apply genetics theory.

In fact genetics theory makes comprehensible many puzzling results from crosses. Some people say they can figure it out for themselves. But they are limiting themselves. Why would you deny the help of literally thousands of scientists studying genetics?

And the beauty of genetics theory is that it gives us a common language for discussing the inheritance and expression of color and pattern in the guppy. So many guppy discussions on forums go off the rails and end in bitterness or bewilderment because the participants are not speaking a common language.

I do think that the study of genetics has immense benefits. It ultimately takes you back into your fish room staring intently into a tank of guppies and seeing something new in them. But I do understand many people are unwilling to go through the mental effort to master it. That's a shame because they miss the core pleasure of guppy breeding. That is the ability to *deliberately* design a new color variety of guppies. Is that not what attracts many people to the hobby of guppy breeding in the first place?

I am not talking about the accidental art of guppy breeding where strains are put together in the hope of producing something new. I mean the ability to develop new strains by premeditated design.

It is no accident that the most famous designers of guppies are also people who were knowledgeable about guppy genetics, like Yoshiaki Tsutsui in Japan or the scientists who discovered and isolated the blond or Half-Black genes. Knowledge of guppy genetics theory makes you a keen observer of guppy genetic anomalies and it gives you the tools to reach your breeding goals quicker and more efficiently.

This book is intended to act as a quick introduction to the hobby of guppy genetics for people with no formal education in biology. It will equip you with the intellectual tools you will need for your own exploration of the guppy's remarkable color repertoire. And it will help you understand the exchanges you'll hear between guppy genetics hobbyists.

How does this book help you join the conversation?

- ◆ I have added many pictures and illustrations to help you retain ideas in your visual memory and to help you visualize concepts.
- ◆ I have added many practical applications of theories to help you see how the concepts play out in your guppies and to ground theory in actual observations.
- ◆ I have added a dictionary at the back of the book with the most common terms you will encounter in guppy discussions.

The field of guppy genetics is wide open and largely unexplored. There is much to be uncovered and there is beauty ahead. Come join us.

Acknowledgements

I could not have arrived at my present level of understanding of the ge-

netics of guppies without the help of others. I would like to thank those hobbyists who have generously shared their knowledge and experiences on Internet forums and through telephone conversations and email. I wish to single out Dr. Richard Squire as a mentor and teacher. He has proven to be a very patient and generous teacher indeed.