Are Splits "the Pits"?

(Plus Some Notations on Cross-Mutations)

by Nancy A. Reed

(While this article is written specifically in terms of Cockatiels, it applies as well to the breeding of most species of birds that involve mutations.)

First let me define the term "splits". It is a bird that usually appears to be one coloration (a Normal or a mutation), but because of it's heredity, carries a hidden gene for another type. He or she is literally "split" genetically. The bird is one half what he or she looks like, and one half an entirely different color (mutation). This masked half is hidden in Normal splits (example: a Normal colored bird split to Pearl) because Normal is dominant over the recessive mutant gene (in this case: Pearl). This is written: X X^P. On mutant splits (for instance: a Pearl split to Lutino), it is not a matter of Pearl being dominant over Lutino; but because *both* color genes carry Pearl, and only *one* carries Lutino — written: X^P X^{PL}. In other words, a split is a bird that carries a mutant factor only on *one* of the two genes. Again, we are talking Cocktiels, where to my knowledge, we do not yet have any mutation that is dominant over another. In some species of birds, there is this added complexity.

By now, half the readers have quickly skipped on to the next article. Genetics turn many people off. It all sounds too complex, and to throw in a few charts with X's, Y's, P's, & Q's, is enough like hieroglyphics to discourage all but King Tut. But genetics is like math. Yes, it can get complex; but 90% of us get through the grocery store, the monthly bills, and *barely* through income tax forms, without any knowledge of calculus. So too can the average breeder function responsibly without a college degree in Biology — just an understanding of the simple *basics* of genetics (addition, subtraction, multiplication and division). Like math, genetics are fixed and able to be calculated.

And now I will promptly drop down to 5% of this publication's readers, because my purpose of this article is not to further explain or exemplify genetics. George Smith's book, ENCYCLOPEDIA OF COCKATIELS, has an excellent chapter on the subject. Tony Barrett, from southern California, has a flair for making the complex seem simple (and humorous) in two articles: The American Federation of Aviculture's "Watchbird" magazine (vol. V, no. 5, Oct/Nov. 1978); and "Bird World" magazine, June/July, 1978. In my forthcoming book, Rainer Erhart's chapter, which includes extensive charted calculations of all possible crosses, will hopefully prompt everyone to buy a copy for every bathroom in the house.

But why do people seemingly avoid using split birds?! I can only think of two possible reasons. First, as discussed above — fear of genetics. Secondly — greed: wanting to produce 100% nests of mutations.

I am not a believer in the old wives' tale that it is *bad* to cross Lutino × Lutino, Pied × Pied, Pearl × Pearl, or Cinnamon × Cinnamon. These mutations have been around long enough that they have had years of outbreeding involved. Try it! If the young do not equal and hopefully surpass the quality of the parent birds, then change the pairings. I have had young from mutant × mutant matings that are better than chicks produced from Normal pairs or splits, and visa versa. I see no set rule indicated here, other than to test for potential and parental performance, judge the results.

The main beauty of splits is that they are a way of including new blood without canceling out production of some mutant young in the first generation. They are also the less expensive route to go in breeding for a particular mutation. Also splits offer variety in the clutches so that a breeder will have a more versatile list to serve the buyer's needs. In the case of "double splits" (i.e., birds split to *two* different mutations), they may be bred to a variety of mates and still produce *both* mutations plus split birds.

Using splits is also a way of combining certain features from one "line" with ideal aspects from another. For instance: perhaps your Lutinos have good size but lack the full crests of your Pearls. Wouldn't it be nice to end up with *both* your Lutinos and Pearls being large and full crested — and then as a bonus, produce an occasional combination Lutino-Pearl, all on one bird?

This brings us to the subject of cross-mutations, which are becoming quite popular in the U.S. A cross-mutation is a single bird that physically shows and genetically carries a combination of two (or more) mutations — a Pied-Pearl, Cinn.-Pearl, Lutino-Pearl, etc. Each is *not* a new mutation: only a combination of existing mutations. These birds can be quite striking!

It takes a minimum of two years to produce from scratch a cross-mutation, *and it can only be accomplished through the use of the "lowly" split.* The novice will think that he can take a Cinn. to Pearl mating, and Bingo! Cinn.-Pearl young! Not that easy. The key is in the *males* from such a cross which will appear to be Normals, but will in fact be split to *both* Cinn. *and* Pearl ($X^C X^P$). The following year this Normal/ Cinn. & Pearl is mated to either a Cinn. or Pearl hen. And even then there are eight possibilities of type young produced. Only one of these eight will be the cross-mutation: Cinn-Pearl (in sex-linked mutations it will be a hen: (X^{CP} Y).

At this point let me explain what "cross-over" is. Above we mention the Normal split to Cinn. & Pearl, written: $X^C X^P$. This means that usually one gene (X^C) carries the Cinn. factor, and the second gene (X^P) holds the Pearl factor. Without going into the whys and hows, know that occasionally the Cinn. factor and Pearl factor combine on the *same* gene (X^{CP}) leaving the second gene as Normal (X): written X^{CP} X. When this single X^{CP} combines with the female Y gene, the result is always a Cinn.-Pearl hen.

Remember we are also using the Cinn-Pearl as an example. Lutino, Pied, and Fallow would also be interchangeable on the male genes. However, on the Pied and Fallow mutations, being straight recessive, *hens* can also be split. (There is no such critter as a Normal hen being split to a sex-linked mutation.)

There has been some discussion of the frequency of "cross-over", which is necessary to produce a cross-mutation from this double split Normal male (N/C&P). A year or so ago I read that one out of thirty young could be a cross-mutation. While work on this double mutation bit is still in it's infancy, I think the odds are *far* better than supposed. There have been *too* many instances where one or two cross-mutations have turned up regularly in even single clutches.

Aside from the aim of producing your first cross-mutation bird, a secondary bonus is realized in the split chick that shows the coloration of one mutation and is *split* to another. In the example we are using, (Cinn × Pearl parents) this might be a young Cinnamon split to Pearl male — $X^C X^{CP}$. Using this very valuable split bird means that we no longer have to rely on the whims of "cross-overs". We *always* have two mutant factors on one or the other X genes. If that "P" factor should jump from the X on the right to the X on the left, it doesn't matter ($X^{CP} X^C = X^C X^{CP}$). Using this C/P male mated to either a Cinnamon, Pearl or Normal hen, will predictably produce 25% C-P hens.

But of even greater importance is that this C/P male when mated to a Cinn.-Pearl hen (preferably not his sister), will finally produce on a 1:4 ratio, your first C-P *male*. (In sex-linked mutations, males are rarer, and prices often reflect this.)

Starting from scratch the first year with for instance a Cinn. male and Pearl hen (or visa versa) it will take a *minimum* of three years to produce a C-P *male*, and then *only* if suitable cross-overs have occurred in the second year. And note that we have only been able to achieve our final aim through the use of splits — *twice*.

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I apologize if I have left many of you cliff-hanging in some areas. I have purposely glossed over the detailed results of split crosses because I wanted to promote splits, not calculate crosses. To cover both adequately is beyond the scope of a magazine article, and most probably — me!

While I have dwelled more specifically on the necessity of splits in the cross-mutations, it *is* a new area and one which *needs* writing on. However, I hope even by reading the initial information in this article, that it will enlighten some breeders to the value and need for utilizing splits in their future pairing. Splits are *not* the "pits"! •