

The Matrix

by

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Every year around this time, I get about ten emails that read, "Book, why don't you write an article about how to pair pigeons for the upcoming breeding season?" I really don't know who is the most remiss, them for asking this question so close to the breeding season, or me for not discussing this subject last summer, when that type of planning should have been initiated. Since my inbreeding program is laid out a little differently than most, I have the ability to plan things out several years in advance, and because of this I tend to forget that not everyone can operate in this manner.

Pairing pigeons is a complicated subject simply because there are so many possible matings. For instance, let's say that we have 12 cocks and 12 hens and we want to make 12 pairs of pigeons by mating them together. Most fanciers would say that there are 144 possibilities, but this is not the case. There are 144 combinations that can be made with 12 pairs of pigeons, but there are far more possibilities. In fact, to determine the number of possibilities requires the use of something called a factorial which is denoted by an exclamation mark, or in this instance "12!". When expanded, 12! equates to $12 \times 11 \times 10 \times 9 \times 8 \times 7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1$ or 479,001,600 possibilities.

How do I know this? Well, there was a time when I did a great deal of computer programming. Thinking like most people that there were only 144 combinations, I thought I would just write a program that produced 12 sheets of paper with one set of mating combinations on each sheet. With this, I could just go through the sheets until I found the sheet that made the most sense, and I would be done. It sounded so simple. Maybe I should have paid more attention in my finite math class in college. As I remember it, even getting the programming worked out was not as easy as it should have been, but when I was finished, I could see right away that not every mating possibility was identified.

Obviously, 479,001,600 possibilities would be impossible to solve in the manner previously mentioned, so I gave up on that idea. However, later I devised several methodologies to simplify these possibilities, and today, after discussing some related topics, I will share one of the basic tools I developed.

My family of pigeons has a high level of genetic commonality, so I can predict more easily than most and with a higher level of confidence, what a pair is going to produce. Therefore, I plan around eventual pairings instead of eventual individual pigeons. I am pretty confident that if I breed six pigeons from a pair each year, I will produce at least one pigeon that meets my level of expectation. Part of that expectation is that the youngster will meet both my genotype and phenotype requirements. In reality, genotype is something that you can strive for, but phenotype is something that you can see, so while my inbreeding program should be locking in the traits, I still want to be able to see those traits. However, in the end, I expect to produce at least one excellent pigeon in every six youngsters, and if a pigeon can't manage that, then it either doesn't have it or I don't know how to use the pigeon correctly. Either way, I don't need to hang on to a pigeon that isn't working out for me.

Taking this a step farther, I would say that the vast majority of my pairings are put together looking for a youngster of a specific sex. For instance, when the foundation cock is mated to his daughter, I already know that I am looking for sons. If that pair happens to breed a great hen, I will be happy to use her, but I am more interested in the cocks from that particular pairing. When the Super Pair is mated together, I am primarily looking for hens because that is what they produce best. This is not to say that the cocks from the pair are bad; instead, there simply are not enough of them to select from, and this is the reason that I recently removed the Super Pair from foundation status.

When the sons of the new foundation cock are mated to hens from the Super Pair, I am looking for hens that I can backcross to these sons. In my case, the only real suspense is whether I can produce the right sexes for what I am trying to accomplish. Many times, I have a pretty good idea beforehand if a pair is going to be a better producer of cocks or hens. Getting the right sex of a pigeon out of a pair is a key point because I rarely mate a pair together two years in a row, so it is pretty important to be successful the first time around.

So far we have talked a little about predicting future matings, and we have also talked a little about the importance of knowing what we need to accomplish from those matings. To make these predictions, I am constantly monitoring the internal and external evolution of my breeding program.

In my last article, in referencing the word "compatibility," I mentioned that in terms of breeding, this word has many implications. For example, two common categories of compatibility are internal and external compatibility. Internal compatibility is essentially the relationship between pigeons within a given family, i.e., line breeding or inbreeding. External compatibility is the relationship between the fancier's family and pigeons external to that family, i.e., out-crossing. The tool that I am going to describe now is a very simple matrix that has many applications beyond what I am going to discuss here, but today we will use it to examine the internal compatibility of our family.

I came up with the matrix idea while working on a concept involving standard deviations. Going clear back to college statistics when we were learning about T-scores and Z-

scores, I became fascinated with the concept overlaying bell curves that were based on different, but somehow related, characteristics. As an example, let's consider determining the performance relationship between feather color patterns and eye color patterns where each color and performance pattern had its own bell curve and where those curves might intersect when overlaid.

Although it is not exactly the same use of this concept, it was this line of thinking that allowed me to develop the internal and external compatibility concept. I wondered what the results might show if I could overlay a bell curve, of sorts, for my population of cocks onto a bell curve of my population of hens. Without having a real method of doing this, I could still identify a number of benefits, so it seemed to me that it was worth the effort. After working on it for a number of months, all I developed a rather simplistic matrix. However, sometimes a concept doesn't need to be complicated to be valuable. My problem was not in the complexity of the tool, it was in understanding what the tool was telling me.

The breakthrough came from another one of my programming failures. Years back, I thought that it might be possible to assign specific ratings to every trait that I look for in a pigeon, and then through a computer program, I would be able to match the right pigeons together. After months of programming, the computer results told me that I should mate my best to my best because that would produce the best, and my best to the worst because the best could potentially offset all of the problems the worst had. Well no kidding! I didn't need a computer to tell me the first part, and I wasn't going to waste the best trying to accomplish the second part. However, the process heightened my view of the value of the best.

One day while staring at the matrix, this programming experience came to mind, and I got to thinking about what made a pigeon "the best". Certainly its physical traits and maybe its performance were two factors, but then I had seen many excellent pigeons in both of these categories that hadn't been successful breeders. I had also seen many successful breeders that were only successful in a specific mating or for a single generation (the genetics didn't pass down).

After several days of thinking, I came to realize that it wasn't the genetic traits of a single pigeon, it was its genetic compatibility between it and its mate. Again, this is obvious, but while we can consolidate a genotype through inbreeding, this doesn't mean that we really know where the inbreeding is actually going. Therefore, we must still rely on phenotype and possibly performance to generally tell us where genotype is going. I say, "...and possibly performance," because if the genotype has become too consolidated through inbreeding, we can probably exclude performance because very few inbred pigeons actually perform very well.

Think of it in terms of a business. You could have some really talented people but unless they are compatible with each other, the business isn't likely to be successful, and as a result, compatibility is certainly a major key to success. Therefore, it seemed to me that if compatibility was at least as important as genotype (which is difficult to determine),

phenotype (which is based on our preferences), and performance (which is often based on circumstances), then how could I best determine compatibility? That is when it came to me that it was sitting right in front of me in my simplistic matrix.

Have you ever had someone come up to you with a piece of paper with a hole in it and ask you to look through the hole, and when you did, they proclaim that the eye you used was your strong eye? In fact, you subconsciously always knew which eye was your strong eye, but until that test, you might not have known that. It is my view that the majority of us have a pretty good idea which pigeons are our best; it is just that some people won't admit this to themselves because in so doing, they might be forced to wonder why they were keeping the rest. Like the eye test, I also think that subconsciously most fanciers know the interrelationships between the pigeons that make up their family, but unless they have some way of bringing these thoughts to the surface, they will remain hidden somewhere in the fancier's mind.

The compatibility matrix is developed in this manner. First, make a list of all of the cocks in a single column. The eventual goal to what I am about to describe is to create a depth chart, but that depth chart needs to be developed in the following manner. Place one of the cocks in a second column. Then take a second cock and ask yourself, "If I could only keep one of these two, which one would it be?" If it is the one that is already written down in the second column, then write that cocks' number below the cock already written in the second column. If you like the second cock better, write it in above the first cock. Starting at the bottom of the list that is forming in the second column, compare each additional pigeon to the pigeons already on the list.

Next, place these cocks in the order that you derived in the above across the top of the matrix starting with the best one first (see example below). To keep the example simple, I used six cocks and six hens. However, you could use far more hens than cocks if you are looking for the best possible matings for the cocks.

		Cocks			
99 H 1234	00 H 231	05 H 432	05 H 321	06 H 734	04 H 643
99 H 1207	00 H 247	99 H 1207	05 H 399	01 H 899	00 H 247
02 H 223	00 H 285	01 H 899	99 H 1207	05 H 399	00 H 285
	01 H 899		01 H 899		01 H 899
	05 H 399				99 H 1207
					02 H 223
		Hens			
00 H 247	00 H 285	01 H 899	99 H 1207	02 H 223	05 H 399
99 H 1234	05 H 321	06 H 734	99 H 1234	04 H 643	06 H 734
00 H 231	06 H 734	04 H 643	00 H 231	99 H 1234	
05 H 432	04 H 643	99 H 1234			
	99 H 1234	00 H 231			
	00 H 231				
	05 H 432				

Once the cocks are in place, then you simply compare each hen with each cock one column at a time, and if you feel that they would make a good mating, write the hen's number under that particular cock. Eventually, when all of the hens have been compared to the cocks, you can do the same things with the hens at the top of the matrix and the cocks listed under them.

Now, even though the above is just an example, you can see that the 643 and 231 have the most potential mates, and therefore, they are the most compatible of the cocks. In the hens' case, 285 and 899 have the most cocks listed under them, so they are the most compatible hens. I didn't try to make it work out this way, but you will see that 285 and 899 are listed under both cocks and 643 and 231 are listed under both hens. In practice, repetition like this is very likely to occur.

Next, I would recommend that you look at the hens listed under the first cock, and ask the same question that you asked when ranking the cocks, "If I could only keep one of these two, which one would it be?" Compare each hen with every other hen in the column in terms of how they would relate to that particular cock. Then do the same procedure with the cocks for that particular hen.

Finally, if you haven't already guessed this, once everyone is in order, you pretty much have the next several years of potential matings listed out!

Until next time!

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