The Uncertainty Principle of Pigeon Breeding

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In physics there is a key concept known as the “Heisenberg Uncertainty Principle”. In somewhat loose terms it means that it is impossible to determine the exact position of an electron (or many other subatomic particles) at any particular point in time. In layman's terms we might express the principle this way – by the time one determines where an electron is, it isn't there anymore.

There is a similar principle at work in the breeding of racing pigeons. By the time we figure out who the key breeders are, they are often gone and we have missed (or not fully utilized) the opportunity we briefly had to take advantage of their unique genes.

The “Heisenberg Uncertainty Principle” was first put forth in 1927 by the German physicist Werner Heisenberg (fans of the TV series “Breaking Bad” will recognize the name “Heisenberg” as the moniker of the drug dealer Walter White – a subtle inference that by the time the authorities find him he won't be there anymore). 1927 was a long time ago and the field of particle physics has accomplished an amazing body of work in those eighty six years. And yet today the principle still applies. That is pretty incredible - we can't ever know exactly where an individual electron is, but we can both harness its power and achieve a level of understanding that is truly mind boggling. We need to do the same in the breeding of our pigeons.

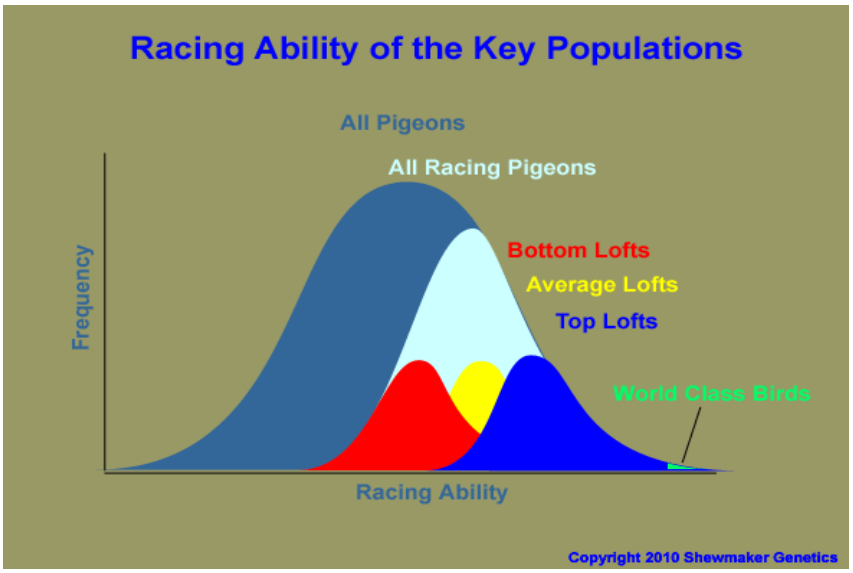
There are many reasons why we fail to see our key breeders during the time they are still in our lofts and in their prime. The most significant of these is simply the time it takes to identify them. The only meaningful way to measure the value of a breeder is through the breeding and flying accomplishments of their descendants and that, at a minimum, takes several years. Often by the time we identify them they have been sold, lost, died, culled or become sterile. Even if we understand this conundrum, most of us are still limited in available loft space, making it hard if not impossible to stock pile potential breeders while the evaluation process unfolds.

One last reference to electrons. Physicists were able to over come their inability to exactly locate an electron by employing a couple of novel approaches. For example, one of these was to look at spatial representations of all the possible locations of a particular electron. In other words, they didn't worry about where it was at any one point in time, but instead where it was over a period of time. With this simple approach, many of the concepts of modern chemistry followed.

The point of this article is to outline some approaches that we can take to overcome the limitations of the “Uncertainty Principle of Pigeon Breeding”. It is great if you should be fortunate enough to discover a great breeder early on, but these ideas will hopefully help you to excel in breeding great pigeons even when the key breeders have not yet been identified or when they are identified but no longer available.

Think in terms of the population

Consider the following graphic. It is a visual representation of the racing abilities of all pigeons in the world.



There are a number of important points to recognize in this diagram.

1. The truly great racing pigeons are few and far between. To put it another way, even if you have one of the top lofts in the world, most of your pigeons are not likely “World Class”.
2. While world class pigeons can theoretically exist in any of the four populations shown, they occur in a significantly higher frequency in the “Top Lofts”. If we think of the four populations of racing pigeons as representing four different gene pools, the “Top Lofts” population has a higher concentration of those genes which make for good racing performance.
3. Speaking practically, the “Bottom Lofts” and most of the “Average Lofts” may not even have the necessary genes in their pool to breed world class birds.
4. But also notice that even the “Top Lofts” population has birds on a par with those of the “Bottom” and “Average” populations.
5. So, the goal of our breeding program needs to be to identify the best we have and only breed from these, constantly striving to move the bell curve of our own loft as far to the right as we can.
6. The gene pool of any population favors a state of equilibrium. What this means is that if the bell curve of a population shifts to the right or to the left (through some from of selection), it will try to regress to the mid point of the original bell curve if that selective pressure is not maintained. In other words, a “Top Loft” can regress to an “Average Loft” (or even all the way back to “All Pigeons”) if the selective pressure for “World Class Birds” is removed. While it would take quite awhile for a “Top Loft” to regress all the way back to “All Pigeons”, the regression from “Top Loft” to “Average Loft” (or even to “Bottom Loft”) can occur rather quickly if selective pressure is not maintained.

The point here is that we should be interested in achieving a loft with a gene pool bell curve that is far to the right of the gene pool of “All Racing Pigeons”. That approach is actually far more productive in achieving a sustainable level of racing performance than just breeding lots of birds (from all over the curve) constantly looking for that one “World Class” bird.

So how do we do this? The key is to understanding the three factors which determine both the ability to make genetic progress and the speed at which this progress is made:

1. The **accuracy** of your selection
2. The **intensity** of your selection
3. The **time** interval over which you do the selection

The accuracy of your selection

This is more important than you might think. Make sure you are using a meaningful basis for selection. The concept of “regression” mentioned above is very real. Fail to maintain positive selective pressure and the gene pool of your loft **will** shift to the left (toward mediocre and away from “World Class”).

The most reliable measure of **racing ability** is **race results to a single loft**. Use something meaningless (with respect to racing ability) like large toe diameter and you will get larger toes, but the bell curve for Racing Ability will regress rather quickly to the left. I don't know any pigeon breeder who would actually use toe diameter, but most of us have things we look for in a pigeon. Some of these make more sense than others. None of these though are as reliable as race results to a single loft and they should be used with caution. If they aren't strongly correlated to racing ability and they are used more than actual race results, the loft's gene pool for racing ability could quickly regress backwards toward mediocrity.

Be careful about drawing any conclusions from a single race result. As the old saying goes, “a broken clock is right twice a day”. We are looking for birds with a genetic superiority for racing, not for birds which had luck on their side on one fortunate day. The more data you have, the more accurate you can be in your assessments. I generally like to have **at least three notable race performances** before I consider a bird as a good racer. As we will discuss below, “good” is a relative term and we will have to take into consideration which birds are “good” and which are the “best” .

Also when you identify a good racer, the likelihood of that bird having a genetic basis for its good results increases with every relative that you find that also had good race results. When you get a bird with three or more notable race results **and two or more close relatives (parents, direct off spring, siblings, aunts, uncles) also with three or more notable results**, you know you have something special.

The most reliable measure of **breeding ability** is race results to a single loft of **descendants**. As was the case above, multiple notable results from multiple descendants increases the confidence you can have in your assessments.

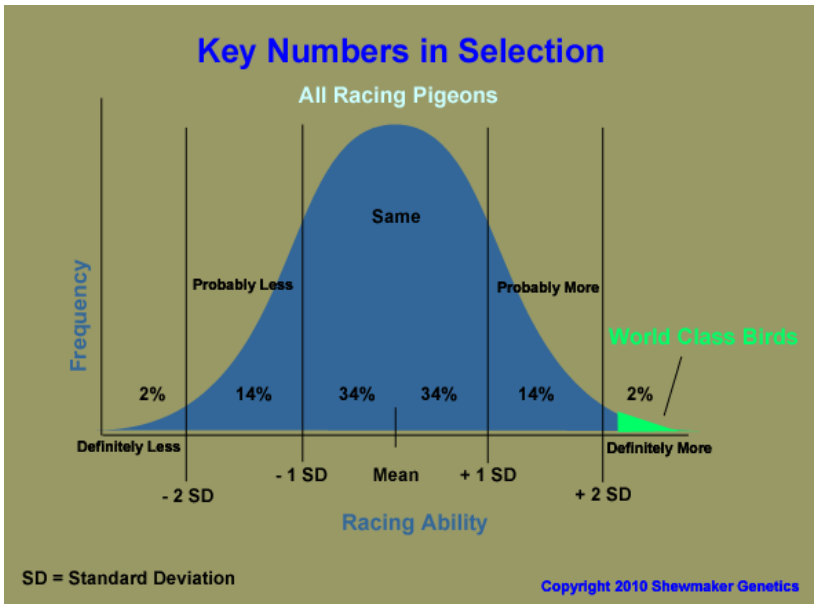
The intensity of your selection

Be extremely selective! Most of us are far too lenient and it actually hinders our ability to genetically improve.

If you select your breeders from the middle of the bell curve, you are not going to make much progress. This seems obvious enough. The question though is how much better than average (to the right) must a breeder be to have a positive impact? There are no absolute answers to this question, but the field of statistics gives us some helpful guidelines. In general, if you are selecting from the top 16% of your racers, you are probably selecting breeders which are genetically better than the average for your loft. However if you confine your selection of breeders to the top 2% that probability increases dramatically.

To put it another way, confine your selections to the top 16% and you will make progress. Confine it to the top 2% and you are likely to make much greater progress, much faster. If you are fortunate enough to be able to limit your selections to the top 1% the results can be even more dramatic.

The graph below shows the statistical likelihood that a bird selected for breeding is genetically better (or worse) than the average of the population. If you aren't selecting in at least the top 16%, you probably aren't selecting at all.



The time interval over which you do the selection

The third factor in the formula for genetic progress is the duration of your selection efforts as well as the generation time (the rate at which you turn over the generations).

You have to be careful with this one, since it often takes several years to get enough data to know who the good breeders are . Turn over the generations before you accurately identify the good breeders and you can go backwards pretty rapidly. My recommendation would be to be a little conservative with this one. A great breeder is a bird who breeds birds who both race well and breed the next generation of breeders. It is pretty hard to evaluate birds that fit this description in less than four or five years.

A more important point to be made here is that it takes several generations to make significant genetic progress. So, it is important that you have a clear idea of what you are breeding for and stick with it. Turn to a new fad every few years and you are pretty well doomed. Stay focused on a single plan and you can make notable progress within just a few years.

Line breed when you find a good one

Line breeding is one of the greatest tools available to an animal breeder. When a great breeder does emerge, maximize its value through line breeding. Line breeding is a form of inbreeding and so it can reduce vitality (and race performance) if carried to an extreme. The level of line breeding practiced by most pigeon breeders though isn't enough to worry about. Should you take it to this extreme, it is easily handled by racing youngsters produced by crossing with another line.

The message here is not to make it seem impossible, but to emphasize that most of the pigeons we produce and keep are not suitable for moving the flock forward. So,

- test them hard and sort out the good ones. Be very selective.

- Don't get attached to the pretty ones or the expensive ones or even the ones with a single win. If the results aren't repeatable, they probably aren't statistically significant from a genetic perspective.
- Stay the course. Don't change directions without good cause and don't let up on the selection pressure.
- And this is really important – don't assume you have to go buy new birds. While we all probably need to cull out most of what we have, the American racing pigeon gene pool is very deep and until you conduct a fair test you really can't say you don't have the right genes.

Some of the ideas presented here are discussed in more detail and from various other perspectives on my web site at www.shewmaker.com under the tap “For the Sport”.