A Genetic Program for Breeding Racing Pigeons

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Overview

- My biases
- Urban Legends vs the Scientific Method
- Key Genetic Principles
- Key Strategies
- Key Techniques
- A Case Study
- The Biggest Lessons I've Learned

My Biases

- 11 species, 43 years
  - viruses, bacteria, flies, mice, rabbits, sheep, hogs, cattle, dogs, horses, pigeons
- I strongly believe that the principles of genetics are essentially the same for all of these species.
- I am a practitioner and proponent of inbreeding.
- This seminar is FYI. I am hear only to share what I am doing, not to say this is the only way.

My Biases

- In pigeon racing I believe there are seven factors that determine your success. One is beyond your control (luck - as in not hitting the wire or particular wind conditions on race day), five are pass/fail (fuel, fitness, training, motivation, health) and one represents unlimited and largely untapped potential (genetics).

My Biases

- In years past many of these pass/fail factors were not widely perfected within the sport and so when someone advanced our understanding or came up with an improved technique, the early adopters had a huge competitive advantage. Two examples of this are widowhood and the darkening system.
- I am of the opinion that we are just about as far along as we can get with respect to the pass/fail five. The only frontier left for carving out a significant competitive advantage is genetics.

Urban Legends vs the Scientific Method

- “Urban Legends” probably originate with something close to the truth, but quickly grow to fictional status as the stories are passed from person to person. The apparent validity of the legend rests almost exclusively in the credibility of the story teller (“I had a friend who . . . “).

Urban Legends vs the Scientific Method

- The life of the legend can be thought of as a very linear process by which it keeps getting further and further from the truth the more often the story is told and the longer this has gone on without the story's credibility being checked.
- Some of our thoughts and concepts on the racing and breeding of pigeons may have origins very similar to these "Urban Legends".

Urban Legends vs the Scientific Method

- The “Scientific Method” is something you probably learned in school, but may not have had the occasion to use on a regular basis.
- It is a circular process which (when properly executed) takes the investigator closer and closer to the truth with each cycle:

Urban Legends vs the Scientific Method

- This is the “Scientific Method”:
  - Observations are made.
  - A hypothesis is put forth that attempts to explain the observations.
  - An experiment is designed whose outcome is predicted by the hypothesis.
  - The results of the experiment are analyzed to see if they are consistent with the hypothesis. These results are in fact new observations and the process is repeated over and over until a clear understanding is achieved.
  - Most importantly - Even then, the process is not really over. Any future observations which are not 100% consistent with the hypothesis will trigger a new round of experimentation.

Urban Legends vs the Scientific Method

- My point is that we need to constantly evaluate what we think is true about racing and breeding pigeons.
- When someone tells us a “Pigeon Legend” we need to then test it against what we actually observe and whenever possible control the circumstances under which we make those observations.

Urban Legends vs the Scientific Method

- Even more importantly, when we stock a bird, it needs to be because the scientific evidence indicates it is a solid breeder candidate and not because it is just the beneficiary of unsubstantiated beliefs.

Key Genetic Principles

- Expression = Genetics + Environment
- Progress = Selection Intensity X Number of Generations
- Phenotype vs Genotype
- Not all traits are visible
- It's a numbers game -
  - The Bell Curve
  - Gene scrambling
- Heterosis
- The reality of maternal Influence
- The myth of paternal influence

Key Strategies

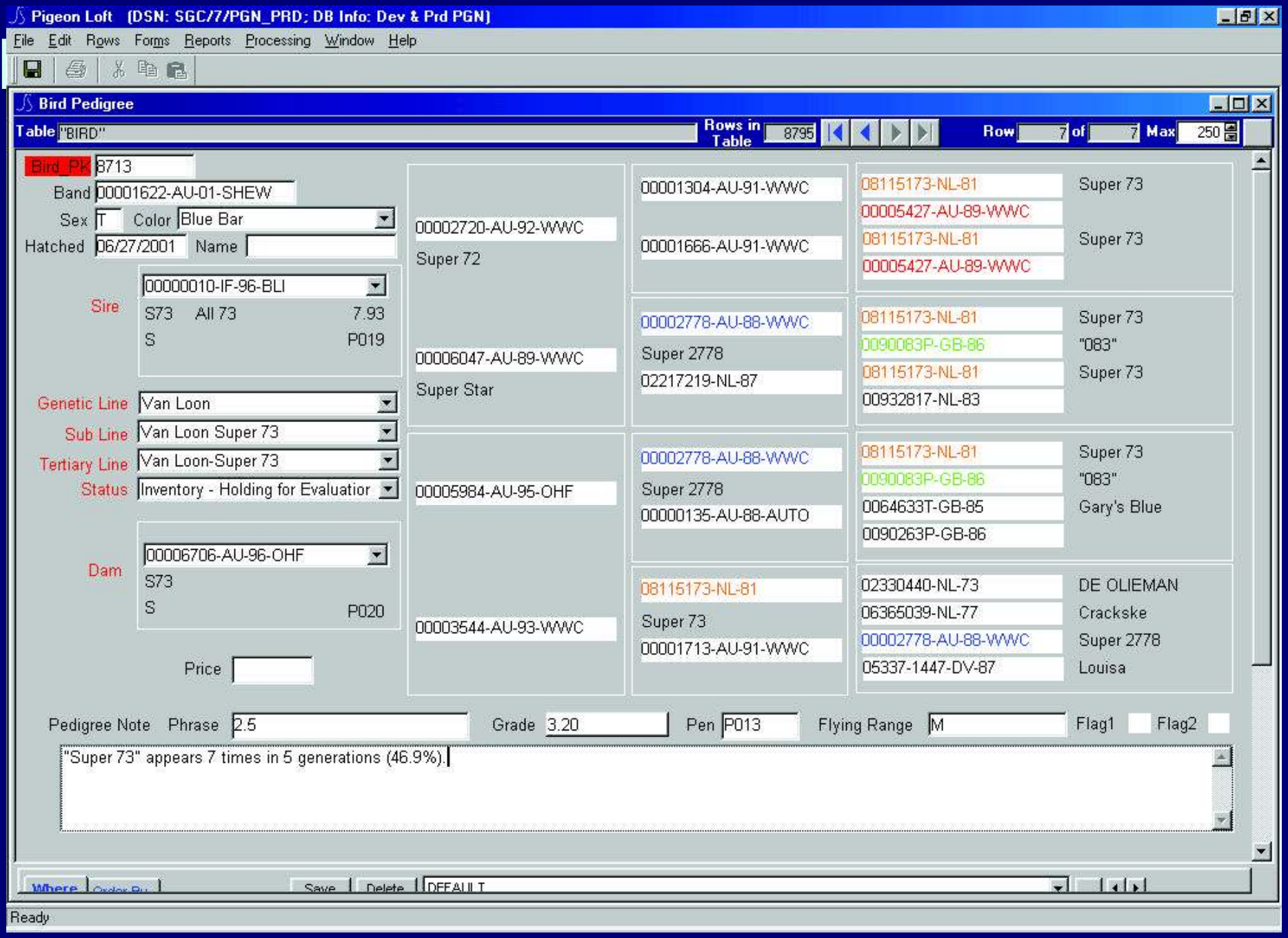
- Clearly identified objectives
- Meaningful selection criteria
- Accurate records
- Applied consistently over a prolonged period

Key Techniques

- Linebreeding to stack the deck
- Inbreeding to improve consistency
- Cross breeding to maximize performance
- Outcrossing to raise the bar
- Random matings to maintain the status quo
- Selection to shift the bell curve
- Testing to validate selection
- Contemporary group testing to minimize the environmental factors

Key Techniques

- Linebreeding to stack the deck
  - Useful when a key animal isn't available
    - died, gone sterile, lost or culled before its value was known, unaffordable
  - A technique for "cloning"
  - A technique for stopping the aging process
  - Example: I have found in my DeVriendt's that the more I put "Lodi" in the pedigree, the better they perform. The same has been true of "Super 73".
  - Consider this pedigree:
    - It points out the value of a pedigree, even beyond 2 or 3 generations!


Pigeon Loft (DSN: SGC/7/PGN_PRD; DB Info: Dev & Prd PGN)
File Edit Rows Forms Reports Processing Window Help
Bird Pedigree
Table "BIRD"
Rows in Table 8795
Row 7 of 7 Max 250
Bird_PK 8713
Band 00001622-AU-01-SHEW
Sex T Color Blue Bar
Hatched 06/27/2001 Name
Sire
00000010-IF-96-BLI
S73 All 73 7.93
S P019
Genetic Line Van Loon
Sub Line Van Loon Super 73
Tertiary Line Van Loon-Super 73
Status Inventory - Holding for Evaluatior
Dam
00006706-AU-96-OHF
S73
S P020
Price
00002720-AU-92-WWC
Super 72
00006047-AU-89-WWC
Super Star
00005984-AU-95-OHF
00003544-AU-93-WWC
00001304-AU-91-WWC
00001666-AU-91-WWC
00002778-AU-88-WWC
Super 2778
02217219-NL-87
00002778-AU-88-WWC
Super 2778
00000135-AU-88-AUTO
08115173-NL-81
Super 73
00001713-AU-91-WWC
08115173-NL-81
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08115173-NL-81
Super 73
0090083P-GB-86
"083"
08115173-NL-81
Super 73
00932817-NL-83
08115173-NL-81
Super 73
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"083"
0064633T-GB-85
Gary's Blue
0090263P-GB-86
02330440-NL-73
DE OLIEMAN
06365039-NL-77
Crackske
00002778-AU-88-WWC
Super 2778
05337-1447-DV-87
Louisa
Pedigree Note Phrase 2.5
Grade 3.20
Pen P013
Flying Range M
Flag1 Flag2
"Super 73" appears 7 times in 5 generations (46.9%).
Where
Save
Delete
DEFAULT
Ready

Key Techniques

- Inbreeding to improve consistency
  - By breeding related animals there is less genetic diversity in the resulting offspring.
  - If the inbreeding is accompanied by selective pressure, the gene pool will narrow. This means certain genes will fall out of the pool and those that remain will be more concentrated.
  - Since the next generation has a narrower gene pool from which to draw, the resulting offspring tend to exhibit less variability (or in other words more consistency).

Key Techniques

- Inbreeding to improve consistency
  - This resulting consistency is good if the right genes have been concentrated and not good if they have been excluded.
  - Sometimes "bad" genes can be concentrated (e.g. undesirable recessive traits such as web feet). However, with additional selection, they can be removed from the gene pool in subsequent generations.
  - Remember vigor is directly related to genetic diversity and so we will have to deal with the loss of vigor when using inbreeding to produce racing pigeons.

Key Techniques

- Cross breeding to maximize performance
  - Cross breeding is simply the breeding of unrelated animals. Since all animals of a given species are related to some degree, cross breeding is a somewhat relative term. I generally consider two racing pigeon lines to be unrelated if there are no common ancestors in ten generations.
  - The HUGE benefit of cross breeding is that it negates the decrease in vigor that can be produced by inbreeding.
  - Example: Most field corn is produced from a cross of two barely viable inbreed lines which are themselves are almost completely unrelated.

Key Techniques

- Outcrossing to raise the bar
  - Lets review where we are:
    - Linebreed coupled with keen selection to develop an exceptional line
    - Refine this line with inbreeding to make it consistently reproducible
    - Cross this exceptional consistent inbred line with another exceptional consistent inbred but unrelated line to produce a uniform crop that exhibits 100% heterosis.
    - Unfortunately we now have a problem . . .

Key Techniques

- Outcrossing to raise the bar
  - If we have been perfectly successful we now have two lines which cross to produce birds which out perform everything else that our competitors are flying.
  - The problem is we can no longer improve. We have reached a plateau. In the theoretical extreme, every bird will be exactly the same with no variability. Even if they are all good, no one will be better or worse than another. It will be impossible to move forward.
  - This is where we use outcrossing.

Key Techniques

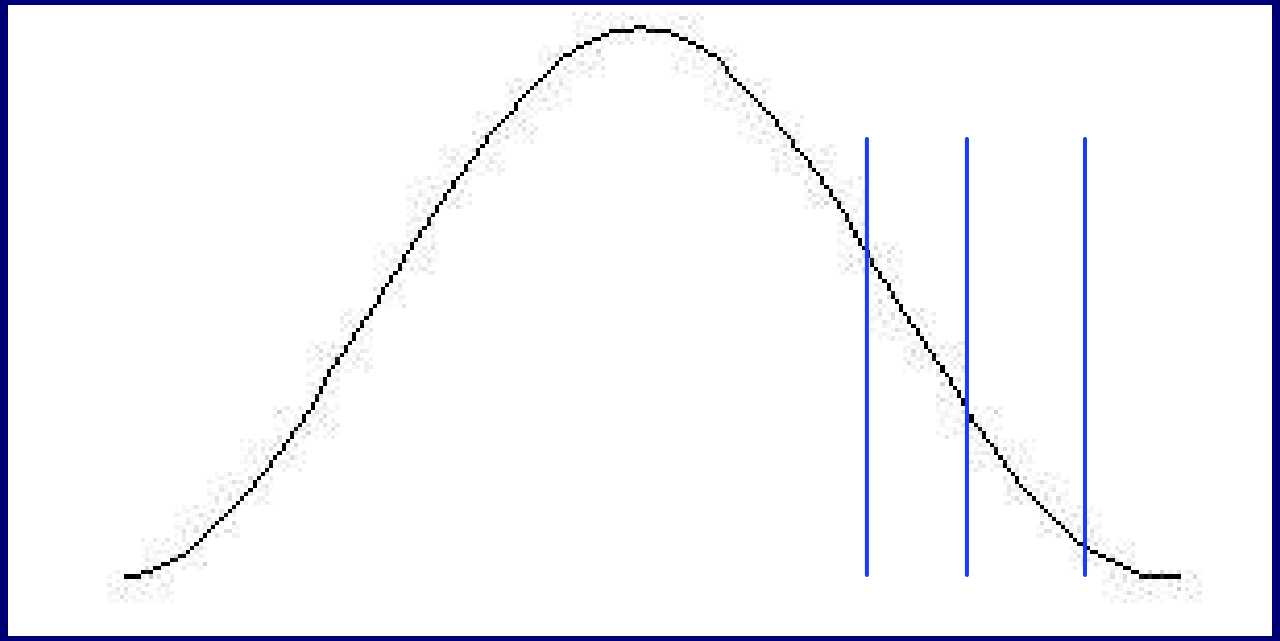
- Outcrossing to raise the bar
  - Outcrossing is the introduction into the breeding loft of a bird that is generally unrelated to the other birds.
  - The advantage is that the new bird brings diversity to the gene pool. This will result in variability. We now have to re-establish a new narrow gene pool which is incrementally "better" than the former one.
  - It is a kind of 1 step back, 2 steps forward approach. We lose some of our consistency, but we can now improve by careful selection of the resulting birds.

Key Techniques

- Random matings to maintain the status quo
  - Be aware that in a population where matings are completely random and where there are no selective pressures, the population will remain in an equilibrium (meaning the population neither improves or degrades)
  - So if your flock is not improving, it might be because your matings are not properly correlated to what you are trying to intensify. Remember the Scientific Method here. Test the validity of your matings by the performance of their offspring.

Key Techniques

- Selection to shift the bell curve



Key Techniques

- Testing to validate selection
  - Eye Sign?
  - Throat?
  - Handling?
  - Basket?
  - Pedigree?
  - Purchase Price?
  - Race Results?
  - Demand?

Key Techniques

- Testing to validate selection
  - I can't tell you how to test.
  - Just make sure that you are in fact measuring your progress and weighing that measured progress against the goal of your breeding program.

Key Techniques

- Testing to validate selection
  - This is what I do:
    - Test fly 90% of what I raise.
    - Test in contemporary groups (e.g. equal opportunities).
    - Subject the test group to sufficiently severe selective pressures such that the results are a normal bell curve (e.g. I don't want groups on the drop).
    - Look for patterns (e.g. multiple wins from multiple mates).
    - Keep excellent detailed accurate and unbiased records.
    - Retain the top 1% for test breeding.
    - Retain for stock the top 10% of the test breeders who demonstrate an ability to "breed on".

Key Techniques

- Contemporary group testing to minimize the environmental factors
  - The goal is to evaluate performance in a test environment where everything is equal among the competing birds except genetics.
    - Similar hatch dates
    - Same feed, medications, training methods
    - Same disease exposures and opportunities for natural immunity
    - Inbreds are compared to other inbreds
    - Devriendts are compared to Devriendts; Van Loons to Van Loons and so on.

Key Techniques

- Contemporary group testing to minimize the environmental factors
  - Results can only be evaluated with respect to the test group.
  - For example, speeds can not be compared between groups.
  - I'll brag as much as anyone about a combine win. However, I only use loft results for evaluating performance. If I race one nest mate and my neighbor races the other, we can NOT compare them!

A Case Study

- This is what I am doing - The Breeding Program:
  - Identify goals
  - Build the gene pool
  - Identify key lines
  - Intensify the genes of key individuals
  - Identify key crosses
  - Narrow the gene pool
  - Extend the lines

A Case Study

- This is what I am doing - The Breeding Program:
  - Hofkens - Hofkens, Traets
  - Grondelaers
  - Van Loon - Louis, Super 73, Zoontjens
  - Janssen - Brothers, Jemal, Van Moorsel, Van Herpen, Calia, Lumachi, Vernazza, Smeulders, De 46
  - Devriendt
  - Jan Aarden
  - Thone

A Case Study

- This is what I am doing - The Testing Program:
  - Two season breeding program, year round testing
  - Cage breeding with pellets and 17 hours light:
    - 15% Chicken Lay pellets (2 oz per bird per day) until hatching then
    - 28% Pigeon pellets (free choice)
  - Weaning at 30 days
    - Purge spray
    - Free choice 28% pellets and grain/grit
    - Water with large access openings
    - Vaccinate PMV and Pox

A Case Study

- This is what I am doing - The Testing Program:
  - Trap Training - 7 days
    - 3 days with water in loft and on landing board
    - 4 days with feed in loft and water on landing board
  - Landing Board Training - 2 days
    - Two consecutive afternoons the landing board screen is opened until dark
    - It is key that they leave on their own

A Case Study

- This is what I am doing - The Testing Program:
  - Loft Training - 14 days
    - Morning tosses prior to feeding
    - Once they enter the traps they can not return to sky

    - Day 1 Basket and release from 100 yards in view of loft
    - Day 2: Release from 1/2 mile
    - Days 3-6: Release from 2 miles in 4 separate directions
    - Days 7-10: Release from 5 miles in 4 separate directions
    - Days 11-14: Release from 10 miles in 4 separate directions (small group tossing whenever possible)
    - Day 14: Worm with Ivermectin in water

A Case Study

- This is what I am doing - The Testing Program:
  - Selection for orientation, intelligence - 1 week:
    - place electronic bands on birds remaining at this point
    - 5 daily tosses of 20-25 miles with all returns scored by the electronic trap
    - even large drops are worth scoring!
  - Selection for desire and race skills - 4 weeks:
    - daily tosses whenever possible with three each week being conditioning tosses of 40 miles.
    - A weekly "race" on Saturday with Sunday for rest:
      - Week 1: 75 miles Week 2: 100 miles
      - Week 3: 125 miles Week 4: 160 miles
    - Weekly baths

A Case Study

- This is what I am doing - The Testing Program:
  - Selection for the top 10%:
    - Continue the "weekly race" program extending the distance until it is clear which birds comprise the top 10% of the test group.
    - Remember my goal here is breeder selection and NOT race team training. I don't want large drops!
    - In evaluating the top 10% I look for consistency as well as multiple instances of top 5% placement.

A Case Study

- This is what I am doing - The Testing Program:
  - Selection for the top 10%:
    - From the graduates:
      - Exceptional cocks and hens are placed in the breeding program for testing as breeders
      - The top hens of those remaining join my Old Bird team
      - The top cocks of those remaining are offered for sale.
      - All others are culled.
    - The breeding pairs are evaluated on the basis of their offspring's performance in the testing program. I am looking for consistency and multiple top place finishes.
    - Interesting Note: There is a strong correlation between birds who do well in this 60 X 60 program and those who do well as old birds at the traditional race distances.

The Biggest Lessons I've Learned

- There is a HUGE genetic component behind the exceptional birds which win big or win often. This effect is much larger than I thought it would be. There are genetic components to virtually every aspect of racing, including speed of orientation and even the ability to be motivated.
- To move forward in a significant way we must be extremely selective. Breeding from the top 1% is not too extreme.

The Biggest Lessons I've Learned

- Virtually all pairs produce birds which need to be culled. Expect even the top pairs to produce at best 1 in 10 . Test, test, test!
- Conformation is important, but significantly less important than "brains and heart".
  - Remember "Rudy" and unfulfilled athletes
  - The D.J. Foster bird.
- Ventilation is critical for health. Health is of course critical for flying success, but it is also critical for maintaining inbred lines.