

Selecting Your Best Turkeys for Breeding

Chapter 4 – Preparing for Your First Year of Breeding

The decisions made every fall regarding which birds to sell and which to keep will have great



Master breeder Frank Reese (left) instructing new turkey owner, Craig Rogers, about selection of breeding stock.

implications for many years to come. Choose breeding stock thoughtfully and wisely. Learn from those with knowledge and experience. Get the American Poultry Association *Standard of Perfection* and learn what your breed should look like. For instance, know the Narragansett and Bronze feather pattern before you go to look at the flock. Even white turkeys have a particular shape, eye color, and leg color, so know these specifics. White Holland's have brown eyes.

If working with Slate turkeys, know that you are working with recessive color genes and what that means to maintaining the proper slate color in the flock will be challenging. Other challenges are in knowing how to

maintain the dark red color in Bourbon Reds so they do not turn orange and knowing the difference between Jersey Buffs and Buff turkeys.

Use well-matured young hens and toms each season and keep breeding stock from year to year. Always select large hens to maintain good body size within the flock. As larger hens are selected for the breeding flock the toms will become larger, too.

Do not dispose of all breeders as soon as the demand for hatching eggs subsides. While this was once the practice, it is no longer advisable. There are so few good standard turkeys left that it is necessary to hold breeding flocks over for many seasons.

Introduce new blood only when necessary to effect desired improvement. If you begin your breeding flock from genetically diverse stock, it is possible to not need "new blood" for several years or more depending on the breeding plan and diversity within your founder animals. It is best to set up a self-perpetuating breeding plan if breeding stock is producing satisfactory results and the flock is free of disease. This strategy will help you avoid the expense and dangers connected with frequent introductions of "new blood". A single large mating of 200 or more hens is self-perpetuating for many generations if a new group of young breeders is selected at random each season and mated as a single large group. The danger of inbreeding with such a plan is less than the danger connected with frequent introductions of new animals.

Favorable results from crossbreeding will show up chiefly in the first generation. Master Breeder Frank Reese does not advise crossbreeding unless the breeder has years of experience and knows what to expect. Whatever the crossbreeding might gain in the short term will eventually be lost if the breeder does not know exactly what to expect or does not understand the strategies for assuring long-term success. Potential problems can occur, such as the color pattern in the birds becoming compromised. It can take years, and in some instances may be impossible, to correct. Reese advises that you visit the breeder you are buying from and learn from them. Buy turkeys only from breeders who breed turkeys to the standards and you will have the best turkeys you can get. Remember that you must know the APA breed standards yourself before you go to the breeder.

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Ask the breeder about the turkeys' production potential, rate of growth, feed conversion, egg production, fertility rate, and most of all buy turkeys that have National Poultry Improvement Program (NPIP) certification and come from *Mycoplasma gallisepticum* (Mg), *Mycoplasma synoviae* (Ms), *Mycoplasma meleagridis* (Mm), *Avian Influenza* (AI) and *Pullorum/Typhoid* free flocks. When visiting the breeder look at the health of the birds and ask what the farmer's health program is for their turkeys. Also ask what biosecurity measures are in place on their farm. In most states, NPIP certification does not assure testing for Mg, Ms, Mm, and AI. Ask before purchasing. Obtain proper health papers if you are going to travel across state lines.

If you buy hatching eggs, heat treat (see page 25 for this procedure) the eggs before setting them. Never buy turkeys at a farmers market or flea market since they may carry disease, thereby being a huge biosecurity risk. If you do choose to buy birds in those venues, have them blood tested immediately and isolate them far from the birds on your farm for a minimum of 30 days.

Preparing for Your First Breeding Season

After making your breeder selections in the fall, the sexually mature birds need time to settle in to the areas in which they will breed. The breeding barns and nest boxes should be ready and in place by November. By December, the birds should be disturbed as little as possible. Caretakers can take a hands-off husbandry approach beginning that month. Depending on the breed, the latitude, and the weather, some breeds will begin to lay as early as January or as late as April. (See page 17 for more details on reproductive seasonality.)

Quality feed and proper nutrition is crucial to the fertility and hatchability of the eggs. Breeding birds must be on a breeder diet in order to assure that they are receiving the appropriate levels of vitamins and minerals. Regular feed will not contain the increased levels of these items needed by the birds during the breeding season. Breeders need to be started on a breeding ration a month prior to the start of the breeding season.

Probiotics and vitamin supplements are often added to drinking water or feed. Probiotics are beneficial bacteria that live in the gastrointestinal tract. They aid in digestion and ensure the gut is populated with healthy flora. Probiotics are particularly useful in cases where birds are stressed, such as during breeding season. Vitamins also support bird health. Vitamin C and Vitamin E are especially needed over and above normal requirements during times of stress. Vitamin E is a fat-soluble vitamin and Vitamin C is a water-soluble vitamin.



A flock of Midget White Turkeys.

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Below are a couple of examples of diets formulated to accommodate breeding birds:

Townline Farm Poultry Reserve Formula- 1020 Turkey Breeder

Ingredient Name	As Fed Amount	Scale (lbs.)	
Corn- ground	1137.00	1137	
SBM 48%	581.00	1718	
Lime 38%	127.00	1845	
Distillers	50.00	1895	
Ratite Premix	50.00	1945	
BIOPHOS	29.00	1974	
Fat (Animal)	20.00	1994	
Salt	6.0	2000	
	2000.00 total	2000 total	
Nutrient	Unit	As Fed	Dry Matter
Dry Matter	% of Wt.	89.50	89.50
CP	%	20.40	22.80
Sol. CP	% of CP	16.42	16.42
Undeg. Protein	% of CP	36.82	36.82
NEL	Mcal/lb	0.75	0.84
Fat	%	3.68	4.12
ADF	%	3.77	4.21
NDF	%	8.20	9.16
Effect NDF	%	0.26	0.30
NFC	%	46.86	52.36
NFC (CALC)	%	48.23	53.89
Sugar	%	5.33	5.95
Starch	%	34.00	37.99
Sol. Fiber	%	7.40	8.27
Ca	%	2.80	3.13
Absorb Ca	%	0.67	0.75
P	%	0.67	0.75
Absorb P	%	0.47	0.53
Salt	%	0.30	0.33
Na	%	0.14	0.15
Cl	%	0.26	0.29
Mg	%	0.15	0.17
Potassium	%	0.76	0.85
S	%	0.20	0.22
Elect. Bal.	Meg/100g	5.6	6.3

Walters Poultry Breeder Feed 17% protein (For 2000 lb Batch)

Weight in pounds	Ingredient Name
1244.95	Ground corn
470.00	Soybean meal Hi-pro-B
108.00	Calcium Co3
80.00	Wheat Middling
1.00	Chorine Chloride 60%
0.70	Methionine DL-98%
0.30	Vitamin E 227.000
41.00	Dical Phos 21%
20.00	M&B Meal-Cert.
10.00	Fat. C.W.
10.00	Lignin, Dried 2X 50#
8.30	Salt Mixing #50
5.00	Poultry MFG V/TM Fort
This is optional but recommended	
0.75	Histostat 50% 50#

Water

Turkeys must have access to fresh, clean water at all times. Waterers need to be cleaned twice daily and thoroughly washed with disinfectant on a weekly basis. Apple cider vinegar is reported to reduce the incidence of coccidiosis and inhibit bacterial or algal growth in the water. Add 1-2 tablespoon(s) of apple cider vinegar per gallon of water 2-3 times per week. Adult birds can drink roughly 1 gallon of water per 5 birds per day. Water intake is highly dependant on environmental factors so provide more water than is necessary to assure the birds have an ample supply.

In order to provide enough space for multiple birds using the same feeder and waterer, a good rule of thumb is to have approximately 6 linear inches of access space per bird in each of the containers.

Breeding Ratio of Males to Females

Generally speaking, healthy sexually mature males should be able to service 14-20 females. Yearling or older males will service fewer averaging 8-14 only. To further break down the ratio the following is recommended for the different body types:

- Large type turkeys – 15 hens to 1 tom
- Standard-size turkeys – 18 hens to 1 tom
- Small type turkeys – 20 hens to 1 tom

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Caution must be taken in monitoring the physical condition of hens that are in small breeding groups of less than 10 to ensure that they are not injured from overzealous toms. It is recommended that in this case a “turkey saddle” is used to protect the hen’s back from injury. Turkey saddles are also recommended when using very large toms for breeding. The “arm holes” of the saddle slip over each wing to hold the device in place on the back during the mating season.



Turkey saddle

Tracking the Breeding Birds

Toe Punch Guide
Hatch Year: _____

Punch		Mating		Punch

It is useful to have multiple line matings in your farm’s breeding to limit the need to add “new blood” to your flocks. Pen pedigreeing can help a producer avoid inbreeding for a longer period of time. With pedigreeing, the producer can easily track bloodlines and the traits passed on within those groups of birds. To the left is a sample of a simple toe punch tracking system that can be developed for poults from multiple matings on a farm. Begin by writing the breeding pen in which each bird is placed adjacent to its toe punch ID. This provides the pedigree of the eggs. Track the pedigrees by first marking eggs after they are collected. Incubate similar pedigree eggs as batches. Toe punch the poults as they hatch from those eggs, picking up with the next toe punch combination in the cycle. Maintain records of the toe punch guide to enable you to track family history. Visit the ALBC website’s Educational Resources page for a free full-sized printable version of the toe punch guide at:

www.albc-usa.org/documents/ToePunchChart.pdf.

When starting with adults, use wing or leg bands to track the individual birds.

Breeding Plans and Strategies

The goal of all breeding strategies is the maintenance of healthy and viable genetic resources. Many strategies can be employed to accomplish this. Below are two strategies that will enable breeders to keep their flocks closed for six or more years. They will also result in composites of the strains started with. For the health of the breed as a whole, some breeders need to maintain pure strains, which can be done using line breeding strategies. More information on that topic can be found in *Managing Breeds for a Secure Future* by Sponenberg & Bixby.

If two breeding pens are maintained, a producer can avoid having to bring in unrelated breeding stock, or “new blood” for three to six years. Each of the two breeding groups should contain toms that are comparatively unrelated to each other. The females of both groups may be of similar or different breeding amongst each other within their groups. The following text outlines a six year breeding plan based on starting with two breeding groups as described above:

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Example: Two Pen Breeding Plan

Year #1

Group 1: Tom A → A hens = AA toms & hens

Group 2: Tom B → B hens = BB toms & hens

Year #2

Repeat year #1 breeding

Year #3

AA tom → BB hens = C toms & hens

BB tom → AA hens = D toms & hens

Year #4

Repeat year #3

Year #5

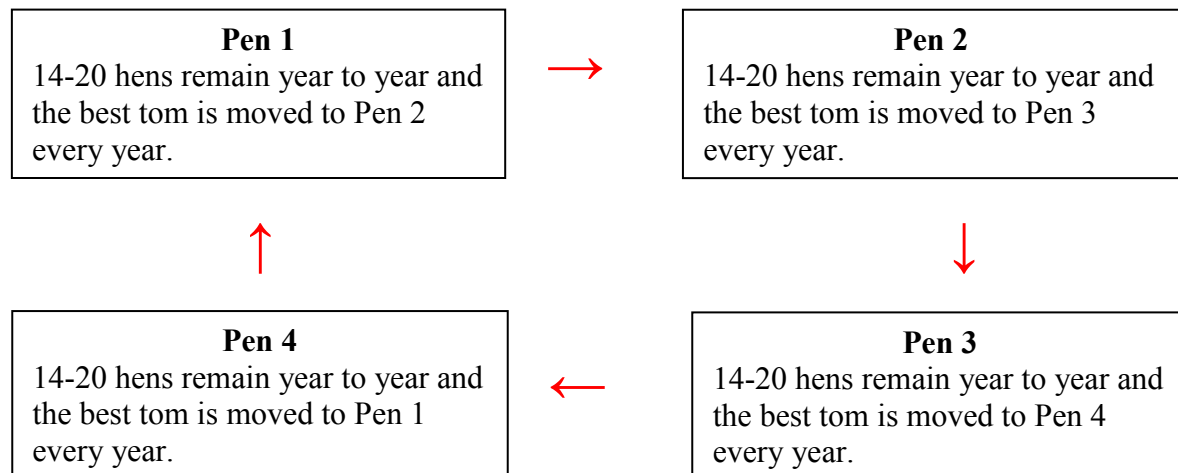
C tom → D hens = E toms & hens

D tom → C hens = F toms & hens

Year #6

When introducing new arrivals into the breeding plan, be sure the new animals are high quality stock.

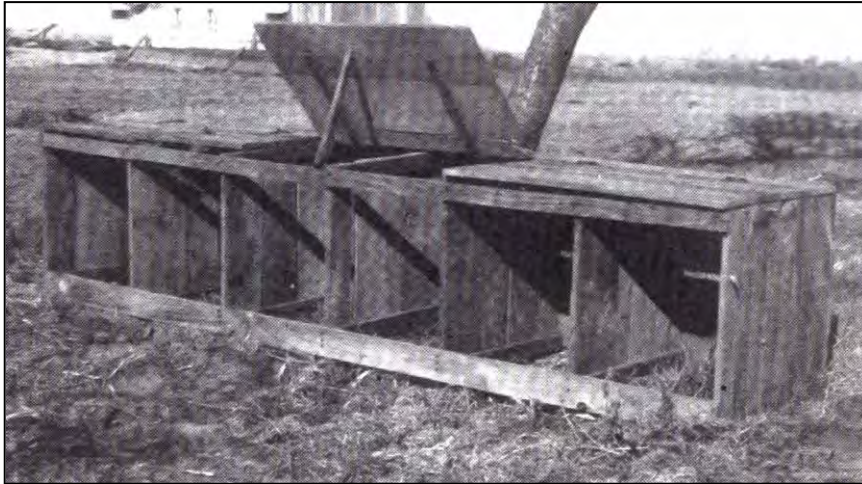
When considering maintaining more than two blood lines, a good breeding strategy is the systematic intercrossing plan as described with four breeding pens in the book *Turkey Management* by Stanley J. Marsden and J. Holmes Martin, Interstate Publishing (1939). According to the authors, when using this plan it is not necessary to introduce new blood. The producer can continue to breed from his own stock for many years without significant inbreeding.



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For more detailed information on the principles and practices of breeding turkeys (and everything else involved with turkey management), the Marsden and Martin book cited above is highly recommended reading. The book is out of print, but a used copy can be purchased through various online resources. The book can also be viewed in its entirety in electronic form through the Cornell University's Core Historical Literature of Agriculture digital collection at <http://chla.library.cornell.edu/c/chla/>. The book itself is over 700 pages long but it is a worthwhile read for turkey producers. It was written at a time when heritage turkeys were the mainstream for production and the principles are much the same now as they were then.

Nest Boxes



A row of nest boxes circa 1939

Turkey hens tend to want to nest in groups so there is an advantage to building nest boxes in close proximity to each other in a battery configuration as pictured here. The dimension of each box is approximately 24 inches wide, 24 inches deep, and 24 inches tall. There is a lip in front of the boxes that is 6-8 inches tall so that the bedding stays in place and eggs don't roll out of the

box. The boxes are kept at ground level and are lined with clean bedding that may consist of dry straw or pine shavings. There should be one nest box for every 4-5 hens.

Collecting Eggs

Eggs are collected at least twice a day with the smallest amount of disturbance to the hens as possible. The routine of collection should be consistent and follow a predictable pattern for the birds so they know what to expect from day to day.

There is much debate about cleaning hatching eggs. Some producers say they shouldn't be cleaned because it removes a protective coating that helps the egg combat harmful bacteria. Others are adamant about cleaning with at least warm, soapy water or an appropriate disinfectant such as Tectrol so that feces and other contaminants will be removed from the surface of the eggs. If the decision is made to clean the eggs, the water and disinfectant should be at least 20°F degrees warmer than the egg and is at least 90°F (preferably between 110-115°F). The disinfectant can be poured over the eggs or the eggs may be dipped in the disinfectant for up to thirty seconds. This action makes the egg contents swell and pushes dirt away from the pores of the egg. Washing in cooler water will force dirt into the pores of the eggs and trap contaminants as the contents contract.



A Narragansett hen in her nest box.

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Eggs can be stored for up to 10 days prior to incubation in an area (such as an egg cooler or closet) that is preferably between 50-60°F with a relative humidity of 70-75%. A regular family refrigerator is not recommended as the temperature within can fluctuate. Remember, cell division begins within the eggs at 72°F so higher temps are to be avoided when storing eggs.



Stored eggs propped up

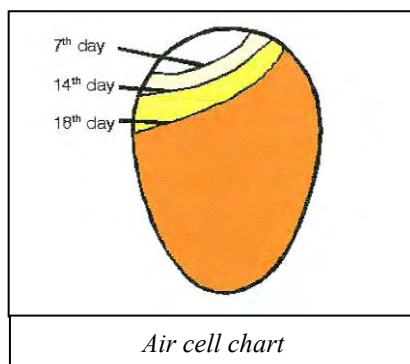
Stored eggs are placed in an egg tray with the large end of the egg up. Turned the eggs twice a day to keep the yolks from sticking to the inside of the shell. This can be accomplished by propping the tray on one side and alternating the tilt from side to side to effectively “turn” the eggs twice a day.

Incubation

Poults can be hatched naturally or artificially. Some producers will use broody hens to hatch eggs but this will limit the number of poults that can be hatched. A more efficient way to hatch large numbers of poults is to use an incubator. These machines come in many shapes and sizes.

Before setting eggs, regulate the incubator temperature and humidity and let it run for 2-3 days. After that, allow the eggs to reach room temperature before setting eggs in the incubator trays, again with the little end down, big end up. After eggs are set, the incubator temperature will drop but soon thereafter the incubator will return to the desired level.

Recommended hatching temperatures within incubators vary depending on the type of machine being used. For the more commonly used forced-air incubators, the recommended temperature is 99°-100°F for the first 22-24 days of incubation. For the last 4-6 days, the temperature is reduced to 97°-98°F. The recommended humidity is 60% for the first 24 days of incubation and then 70% for the last four days.



Air cell chart

To check on the progress of the embryo, candle the eggs after 7-10 days in the incubator to check for clear eggs or blood rings, both of which indicate dead embryos. A high number of clear, undeveloped eggs could mean infertile toms. High numbers of blood rings could mean unhealthy or old breeding stock. Remove the bad eggs to prevent them from exploding from bacterial growth and contaminating the other eggs in the incubator. Candling is also a good way to check progress in

the eggs as they further develop. With appropriate temperature and humidity levels, the air cell within the eggs should become larger over time as described in this image.

Three days before eggs are scheduled to hatch, they must be placed on their side in the hatching tray. At this time, lower the temperature and raise the humidity to the recommended levels to facilitate hatching. After poults hatch, leave them in hatching tray for 24 hours to dry off before moving them to the brooder.

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Troubleshooting chart from Marsden and Martin's publication "Turkey Management."

Table 15. Incubation Trouble-Shooting Chart*

<i>Symptoms of Trouble</i>	<i>Probable Causes</i>	<i>Suggestions</i>
Many clear eggs—no blood (See Chap. 6)	(1) Holding too long or at the wrong temperature (2) Too few or too many toms (3) Toms too large (4) Toms inactive (5) Lice or mites	(1) Do not hold beyond 14 days: Hold between 45 and 60 degrees F.—Never ship eggs that are over 1 week old (2) Have 1 young tom to 15-20 hens: fewer for old toms (3) Toms should not be more than twice as heavy as hens
Apparently clear eggs—show blood on breaking (See Chap. 6)	(1) Chilled before setting (2) Irregular heat	(1) Warn shipping agencies to guard against chilling (2) Avoid high or low temperatures. Current interruptions are often a factor
Many dead germs (See Chap. 6)	(1) Eggs held too long or at extreme temperature (2) Bottom of eggs too cold (gravity incubator) (3) Insufficient oxygen in incubator room (4) Close inbreeding (5) Incomplete ration for breeding stock	(1) See above (2) Warm the incubator room; check for sagging trays (3) Increase ventilation in room where incubator is kept, avoiding drafts (4) Mate closely related birds only when pedigrees are kept so that families showing low hatchability may be discarded (5) Check vitamin content of breeders ration. Feed balanced ration to breeders
Pipped eggs not hatching—too many helpouts	(1) Insufficient moisture (2) Hatching temperature too high	(1) Increase moisture pan space; avoid too dry incubator room (2) Lower the temperature the last 4 days (particularly in separate hatchers)
Hatching too early	Excessive heat throughout incubation	Use correct incubation temperature
Slow hatching	(1) Insufficient heat (2) Bottom of eggs too cold	(1) Use correct temperature (2) Warm incubator room or lessen ventilation of incubator first 3 weeks
Dead in Shell (A) Much unabsorbed yolk (B) Yolk absorbed, embryo has "dried out" appearances	Too much heat 4th week Insufficient moisture or excessive ventilation	Use correct temperature—check thermometer (1) Add moisture (2) Decrease amount of ventilator opening
"Sticky" poults	Sometimes poor holding conditions (little yet known about this condition)	Avoid holding eggs during prolonged cold spells
Cripples and spraddles (legs bow out)	(1) Temperature too low throughout inc. period (2) Cloth or paper on nursery tray is too slick causing poults to slip and injure themselves	(1) Use correct temperature (check thermometer) (2) Use muslin or netting type cloth on bottom of nursery trays

*Prepared by the junior author for the Jan., 1938 Turkey World.

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Methods for brooding and growing out the young birds can be found in the ALBC publication *How to Raise Heritage Turkeys on Pasture* which is free for download on the ALBC website at <http://albc-usa.org/EducationalResources/turkeys.html> . Hard copies may be purchased through the website or by calling or emailing the ALBC office at 919-542-5704 or albc@albc-usa.org.

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Marsden & Martin's *Turkey Management* – p.27 *troubleshooting chart*

Turkey World Magazine – p. 6 *George Hackett*, p.7 *Stanley Marsden, Mrs. Ole Carson, & Sadie Caldwell*, p.8 *Mrs. W.T. Hall & Henry Domes*, p.25 *nest boxes*