

# A Comparison and Evaluation of Heritage Breed Broiler Chickens on Pasture

## Final Report for FNC12-866

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Region: North Central

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Project Coordinator:

[Wesley Hunter](#)

Providence Farm

## Project Information

### Summary:

The benefits of pastured poultry from a sustainable agriculture perspective are well documented, and there are many excellent resources available to assist and guide the aspiring pastured broiler chicken producer including Joel Salatin's book *Pastured Poultry Profits*; the American Pastured Poultry Producers Association (APPPA); publications by ATTRA, SARE, and research done by SARE grant recipients. However, nearly all of these materials are concerned with the use of the Cornish-Rock Cross (or CRX) breed, a hybrid bird introduced in the mid-20th century, or in a few cases with a modern hybrid (such as the Freedom Ranger) with similar production qualities. These birds are chosen due to their obvious upsides: low feed conversion rate, quick rate of growth, the broad breast and high ratio of white meat to dark meat that suits current American preferences, and availability of CRX chicks from nearly any hatchery in the United States. The problem is that the CRX and similar modern hybrids have their downsides for the small-scale producer. First, the birds have a high mortality rate due to having been bred for such rapid growth and exaggerated features. Second, the CRX (but not the modern hybrids) was bred primarily for confinement operations, and simply does not thrive in pasture-based systems. Third, they are less voracious foragers as a result of being less mobile due to their size and growth patterns. Fourth, since these birds are hybrids they do not breed true-to-type, so a farmer must purchase new stock for each batch and thus cannot improve the genetics on his or her farm through selective breeding. Fifth, the farmer can never be certain of the quality of chicks from any particular batch he or she orders. Each of these problems can be overcome by raising heritage breed chickens, but these birds have been ignored by the meat industry for the last 50 to 60 years and there is very little information on them readily available for producers to consider when planning a pastured poultry enterprise. We propose to address this problem by raising and comparing a variety of heritage breed chickens, as these breeds overcome the shortfalls of the CRX and similar hybrids. Common knowledge dictates, and a small handful of studies confirm, that generally they do not approach the rapid growth rate, low feed conversion rates, and potential profitability of the

CRX and modern hybrids, but there is a lack of information as to which heritage breed(s) specifically may be a potential alternative. Thus, we seek to raise, in a pastured setting, 30 each of eight different heritage breed chickens, purchased from a local hatchery. We intend to purchase the following mostly common barnyard breeds, subject to availability at the time: Barred Plymouth Rock, New Hampshire Red, Naked Neck, Delaware, Silver-Laced Wyandotte, Speckled Sussex, Buff Orpington, and Dark Cornish. They will be raised separately from each other, each breed in its own shelter, to ensure accurate data collection. All chicks will be purchased at the same time (mid spring) so that weather patterns affect all breeds equally. By keeping detailed records of each breed, including total feed consumption, periodic weight checks, carcass weights, mortality rate, and input costs per pound of meat yield, we will, at the end of the project, be able to determine how these breeds compare to each other, and which breed(s) shows potential as a possible alternative to the CRX and modern hybrids. This will give other farmers considering heritage breeds a starting point for their own flocks, providing them with concrete information on just how well each breed can be expected to perform, and allowing each farmer to tailor his or her breeding flock to meet certain desired criteria, such as cold tolerance in the northern states or drought tolerance in the Southwest, rate of growth, feed conversion rates, general hardiness, carcass qualities, and even customer taste preferences. We will keep detailed records of each of the eight breeds of heritage chickens we raise, tracking information in a field notebook daily which will be added to an Excel spreadsheet at weekly intervals. Data recorded daily will include pounds of feed given per breed, mortalities, apparent cause of mortalities (if reasonably ascertained), and general observations of development and behavior. Weekly we will weigh a random selection of birds from each breed using a produce scale. At processing time the breeds will be kept separate, and for each breed we will record total final live weight prior to slaughter, dressed carcass weight range, average carcass weight, and carcass weight percentage of live weight. By analyzing feed usage, feed conversion rates, mortality rates, and average carcass weight per breed, we will be able to determine the total input costs per pound of carcass weight, and thus potential profitability of each breed. Other farmers will then be able to access our data and input their own costs and selling price to determine potential profitability for each heritage breed in their own markets. At the very least, those farmers interested in raising heritage chickens for the table will have concrete data as to the performance of each of these eight breeds, and as such will have a solid starting point from which to develop their own heritage chicken program.

## Introduction:

Providence Farm is a fledgling 25-acre operation owned and operated by Wes and Ame Hunter. We are located in Webster County, Missouri, approximately 30 miles east of Springfield, which has a population over 400,000 in the metropolitan area. We have approximately 8 acres of woods, 14 acres pasture, 1 acre tillable/garden, 1 acre in beginning orchard, and 1 acre homestead (house, yard, and outbuildings). Our interests run largely toward historic agriculture, encompassing heritage breed livestock, heirloom fruits and vegetables, and historic practices. We currently run a small herd of dual-purpose Irish Dexter cattle, are raising Mulefoot hogs for pork and piglet production, and dual-purpose heritage chickens of assorted breeds for both eggs and meat. We have recently begun milking a couple of our Dexter cows for our own use, and in the summer of 2013 we processed two calves to be sold as pasture-raised veal. In 2012 we raised a small batch of Barred Plymouth Rock cockerels for meat, primarily for our own table, but with no comparative data we weren't sure how economical of a breed choice they were. We rotationally graze our pastures,

use the hogs to till the garden and clear brush from the woods, and largely let our chickens roam to clean up any spilled grain as well as consuming insects, seeds, and forage. As a small farm we believe it is necessary to target small markets, which has helped influence our choice of enterprises. For example, on our acreage any beef produced would be a drop in the bucket of local agriculture, even those direct-marketing their products, but by pursuing veal as an alternative we can set ourselves apart. Similarly, there are multiple farmers raising pastured poultry, using standard hybrid genetics, but we seek a different market with our heritage broilers. We are continually researching new enterprises, new markets, and new ways of doing what we're already doing.

### Project Objectives:

The benefits of pastured poultry from a sustainable agriculture perspective are well documented, and there are many excellent resources available to assist and guide the aspiring pastured broiler chicken producer including Joel Salatin's book *Pastured Poultry Profits*; the American Pastured Poultry Producers Association (APPPA); publications by ATTRA, SARE; and research done by SARE grant recipients. However, nearly all of these materials are concerned with the use of the Cornish-Rock Cross (or CRX) breed, a hybrid bird introduced in the mid-20th century, or in a few cases with a modern hybrid (such as the Freedom Ranger) with similar production qualities. These birds are chosen due to their obvious upsides: low feed conversion rate, quick rate of growth, the broad breast and high ratio of white meat to dark meat that purportedly suits current American preferences, and availability of CRX chicks from nearly any hatchery in the United States.

The problem is that the CRX and similar modern hybrids have their downsides for the small-scale producer. First, the birds often have a high mortality rate due to having been bred for such rapid growth and exaggerated features (disproportionate body type). Second, the CRX (but not the modern hybrids) was bred primarily for confinement operations, and does not really thrive in pasture-based systems. Third, they are less voracious foragers as a result of being less mobile due to their size and growth patterns. Fourth, since these birds are hybrids they do not breed true-to-type, so a farmer must purchase new stock for each batch and thus cannot improve the genetics on his or her farm through selective breeding. Fifth, anecdotal evidence suggests that the chicks received can vary considerably from batch to batch, so the farmer can never be certain of the quality of chicks from any particular batch he or she orders. Each of these problems can be overcome by raising heritage breed chickens, but these birds have not been actively selected for meat qualities for the last 50 to 60 years, and there is very little information on them readily available for producers to consider when planning a pastured poultry enterprise.

Our proposed solution was to raise and compare a variety of heritage breed chickens. While these breeds overcome the shortfalls of the CRX and similar hybrids, they come with their own drawbacks. Common knowledge dictates and a small handful of studies confirm that they do not approach the rapid growth rate, low feed conversion rates, and potential profitability of the CRX and modern hybrids, but there is a lack of information as to which heritage breed(s) specifically may be a potential alternative. Thus, we wanted to raise, in a pastured setting, 25 cockerels each of eight different heritage breed chickens. The criteria for breed selection included how common each breed was (with preference given to commonly raised "barnyard" chickens), size at maturity and rate of growth (for example, no Leghorns, which are a solely egg-type chicken, and no Jersey Giants, which grow large but do so slowly), and availability from our chosen hatchery. Thus we settled on the

following breeds: White Plymouth Rock, New Hampshire Red, Naked Neck, Delaware, Silver-Laced Wyandotte, Speckled Sussex, Buff Orpington, and Dominique. I had originally intended to include a standard Cornish but was informed that the hatchery would probably have a difficult time providing a full 25 cockerels from any one hatching.

I initially went into this project hoping to find the "best" heritage chicken candidate to be raised for meat, but in fairly short order realized the downfall of that particular attitude. The quest for the "best," after all, is what led us to the stranglehold the Cornish-Cross has on the chicken meat industry today. Rather, I realized the ultimate benefit would be in gaining a more complete picture of each breed—from cost of production to temperament to ease of processing—and the ultimate application of this research might be to equip farmers (including myself) with the information necessary to determine which breed or breeds best suit their own operations and markets.

My objectives with this project were, through detailed record keeping of feed consumption, weight gain, carcass weights, mortality rate, and input costs per pound of meat yield, to determine how these breeds compare to each other and which breeds shows potential as possible alternatives to the CRX and modern hybrids. I had—and still have—no illusions of a heritage breed replacing or even really competing with the CRX in terms of growth rate and production cost; rather, I recognize the raising of heritage breed chickens for meat as a decidedly niche market, though a growing one. My hope is that other farmers considering heritage breeds might be given a starting point for their own flocks, and that through a combination of my project results and relevant research of their own they could come up with the breed or breeds that best suit their own farm, methods, and markets.

As a side note, I should perhaps explicate my usage of the term "heritage breed." I do not hold fast to the definition of "heritage chicken" as provided by the Livestock Conservancy (formerly the American Livestock Breeds Conservancy), specifically the requirement that "heritage chickens" be used only with breeds recognized by the American Poultry Association (APA) prior to the mid-20th century. There are two reasons for this. First, there are chicken breeds—and feather patterns within a breed—that have been raised since before that time period that have not been recognized by the APA, namely some breeds recently imported from overseas. I don't feel that these breeds should be barred from being properly considered "heritage." Second, breed development is dynamic, not static, and the current definition disallows new breeds from being properly considered "heritage." The Plymouth Rock breed, for example, does not necessarily have any greater merit as a useful and important chicken than a newly developed (or yet-to-be developed) breed, yet the former is "heritage" while the latter is not. Really, this is just an accident of history that certain breeds were developed a certain number of years prior to our non-objective point in time. But that's more of a personal soapbox than something necessarily relevant to this grant project. Suffice it to say that, in my opinion, a breed's point-in-time of development should not necessarily be a (dis)qualifying factor from marketing said breed(s) as "heritage," especially as an alternative to modern hybrid chickens.

## Cooperators

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## Research

### Materials and methods:

For this project we ordered 25 cockerels of each of eight heritage breeds: White Plymouth Rock, New Hampshire Red, Naked Neck, Delaware, Silver-Laced Wyandotte, Speckled Sussex, Buff Orpington, and Dominique. The chicks were picked up from Cackle Hatchery in Lebanon, MO, on April 30, 2013. They were all brooded together in my homemade brooder, which is a crude wooden box approximately 6 feet wide, 8 feet long, and 2 1/2 feet high, bedded with straw, and heated by two hanging heat lamps with 250 watt bulbs. I would have liked to have been able to brood each breed separately for the sake of more accurate data collection, but I did not have the infrastructure to do so. Perhaps the associated costs could have been added to my proposed project budget (I came in \$1000 under the cap), but at the time I submitted my project proposal it didn't occur to me. Even so, I have my doubts that brooding the breeds separately would have drastically altered my findings, if it altered them at all, since they consume a relatively small amount of feed during those first few weeks, and in my opinion there probably wasn't enough consumption rate difference between breeds to have been meaningful in the long run.

On day 33 the chickens were moved to pasture, each breed into its own pasture pen. These pens are very loosely based on the Salatin-style chicken tractors, but with some significant changes. The frame is made of 2x3 lumber, 8 feet wide by 12 feet long, with the 8-foot pieces notched and resting on top of the 12-foot pieces so that the long sides act as skids during moving and the 8-foot cross pieces 'float' rather than drag. The rest of the structure is formed by bending three 16-foot welded-wire cattle panels and attaching them to the skids, making a hoop-type house. The ends were then roughly framed with 1x3 lumber and finished with 1" galvanized chicken wire. The cattle panels were covered with a large medium-duty tarp. There is nothing special about day 33 in terms of the timing of the move - in this case it was just the confluence of chicks feathering out, nice weather for the foreseeable future, and a full day ahead to see to any problems that might result from the move.

Each pasture pen was fitted with one 5 gallon vacuum waterer and one 36" galvanized feed trough. The chickens were fed a prepared chick grower ration from a local feed mill using non-GMO grains, based on a recipe formulation from Fertrell. Feed and water were refilled as needed, and pasture pens were moved as needed. Each of these, of course, occurred more and more frequently as the birds grew. Of necessity the chickens were confined to their pens, as I would have no way to accurately measure feed consumption by breed if the breeds were allowed to intermingle. I think that the heritage birds might profitably forage for a higher percentage of their feed if allowed to free range—that is, they would cost less to produce. Most producers will stock 75 to 100 birds per pasture pen, but my hope is that my lower stocking rate of 25 birds per pen more closely approximates a free range model, and is thus closer to the economics and feed consumption rates of the

same birds free ranging. Then again, if allowed to free range the birds might expend more energy and grow more slowly, offsetting the savings in feed. And predation becomes a considerably larger issue in a free range model; there were of course no aerial predators that swooped in and killed any of our birds inside the covered shelters, nor was there any chance for the chickens to wander off to the woods and roost in the trees.

On day 130 (18 weeks, 4 days) the birds were processed on farm.

For this grant project I collected numerical data in two categories: weight and feed consumption.

Collection of weight data was fairly simple. Upon receipt of the birds they were weighed by breed, and the total weight was divided by the number of birds to get the average. They were then weighed at weekly intervals, and the results recorded the same way. While the chickens were still in the brooder I climbed in and collected each bird of each breed into a box for weighing. After the chickens had been moved to pasture we waited until dusk when the chickens had begun to settle down for the night. This made collection much easier. Through week 8 the birds were collected into one box and weighed as a group. But at week 9 they were too large to all fit into one box, so the birds were collected into two boxes and the weights added together. We then skipped the week 10 weighing, as by that point the growth patterns had become pretty much set and we no longer felt a weekly weighing to be necessary. At week 11 we decided not to try to weigh each bird of each breed, but opted to gather 15 birds of each as a sampling. We then skipped weeks 12 and 13, weighed on week 14, skipped weeks 15 and 16, weighed on week 17, then skipped week 18 but weighed on the morning of processing day which was week 18 plus 4 days.

We processed each breed separately, finishing and bagging each breed before moving on to the next. When we had finished, we then weighed and labelled each bird of each breed to get the carcass weights.

Collection of feed data was a little more complicated. As mentioned previously we brooded all eight breeds together so determining feed consumption by breed during the brooder stage was not an option. Rather we kept records of total feed usage in the brooder, then divided that total by the total number of birds to determine, on average, how much feed each breed consumed. Again, as mentioned previously, this was a small enough amount of feed that I don't believe it seriously impacted my results.

Feeding and the collection of feed data when the chickens were in the pasture pens presented its own set of problems. I clearly needed to know how much feed in pounds each breed consumed during the grow-out period. Without this data, my findings would be useless. Weighing how much feed I put in each trough each day would have been a rather miserable and probably ultimately untenable option, so I decided my next-best course of action was to put one bag of feed in each pen and feed that pen's birds only from that bag. When the bag was emptied it was replaced with a new one, and a note was made of the day each bag was emptied. The problem this presented was that the feed mill uses standard brown paper feed bags, and on occasion the chickens from one pen would scratch and tear open their bag, spilling some feed. While they generally cleaned up what was spilled, the fact that the feed was milled quite fine meant that there would always be some feed that they couldn't reasonably clean up. This, too, could have been remedied by the inclusion of something in my grant proposal—such as some sort of lidded trash bin to hold the feed in each pen—but again I didn't think of that at the time. But there is

always going to be some feed wastage in any livestock operation, and I have no reason to believe that this particular feed wastage was ultimately impactful of my results, in large part because it happened to each breed at some point during the season, but it would be nice to have eliminated this slight uncertainty.

The other uncertainty I ran into while feeding the chickens on pasture is that during the times when one particular breed would scratch a hole in its feed bag they would go through that bag of feed more quickly than when they were only fed in their trough. It doesn't take much observation to notice that the chickens prefer to pick out the larger bits of grain first and leave the more finely milled bits, only eating the latter when that's all that is left. So my suspicion is that having the feed bag accessible enticed those chickens to go through and pick out the large grain bits in fairly short order, where they would have eaten the finely milled bits in the trough more slowly were that their only option. Presumably they may have gained weight more quickly if they had a constant supply of larger grain bits, but of course I don't know to what extent. At any rate it doesn't seem to have affected relative breed performance as this is, again, something that happened to each breed at least once during the grow-out period; I can only assume that it more or less balanced. I am, however, a bit suspicious concerning the Wyandottes, since their feed consumption per bird seems considerably higher than the others.

- [Dominique 5 weeks](#)
- [Naked Neck 5 weeks](#)
- [Wyandotte 5 weeks](#)
- [New Hampshire Red 5 weeks](#)
- [Back of the shelters](#)
- [Shelter fleet](#)
- [Delaware 5 weeks](#)
- [White Rock 5 weeks](#)
- [Sussex 5 weeks](#)

#### Research results and discussion:

I had originally intended to include mortality rate when considering the viability of any one breed as a marketable and profitable heritage broiler, but quickly realized that this was really going to be outside the scope of this grant project. This is because of the 26 Delaware chicks received, 9 died within the first 8 days. Clearly this was not the result of any brooder problem, as we had seven other breeds doing just fine. Nor do I think this was specifically a breed problem, as I have seen the same disproportionate death rate while working on another farm when we were brooding six different varieties of chicks—only that time it was Speckled Sussex and Silver-Laced Wyandottes dying more frequently while the Delawares did fine. Rather, I believe the problem either came from the hatchery directly (perhaps some difference in which incubator or hatcher this batch came from, or a difference in handling before pick-up), or from the farm that the parent stock came from (as the hatchery purchases hatching eggs from local farms). The other mortalities that occurred during this project were primarily the result of predation while the birds were on pasture; a few times it seemed that a small bird had stuck its head through the chicken wire at night, and twice there were larger birds killed in the corners where I believe a raccoon or opossum reached into the pen. There were one or two deaths during the 13 weeks on pasture that I couldn't conclusively ascribe to

predation. But the takeaway is that there was no clear difference between breeds in terms of mortality rate, as they were raised in this project. (Had the birds been allowed to range outdoors, however, there may very well have been a difference; I can only assume a white bird would fall prey to hawks and such more readily than a bird with colored or patterned feathers.) As such, my findings in terms of the cost of production do not reflect the cost of chicks lost before processing.

Around Week 12 I began to notice that the Buff Orpingtons were lagging considerably in terms of growth rates, and that their secondary sexual characteristics were slow coming as well. When I started paying closer attention, I realized that we had a pen full of Buff Orpington pullets instead of the cockerels we had ordered. We stopped including the Buffs in our live weighings after Week 12, both because we would not be processing them and because it wasn't a fair comparison to the cockerels of the other breeds.

In terms of relative production cost the results were about as expected. The White Plymouth Rock, which is used in the development of the Cornish-Rock Cross due to its meaty characteristics and clean dressing qualities, was the cheapest to produce. I expected the Naked Neck to do well, as I assumed its general lack of feathers would mean more efficient use of feed; they came in second. Third place was the New Hampshire Red, a breed selected out of Rhode Island Red stock based on the criteria of fast growth and quick feathering, one I also expected to do well. The Silver-Laced Wyandotte unexpectedly came in last, though I do wonder if this isn't just the result of the feed issue mentioned previously. The other three ended up with very similar numbers.

#### DATA

I have included multiple charts with the following data, but here it is in a simple text format. I have ordered data within the following sections based simply on the order of the shelters on pasture, not from highest-to-lowest or lowest-to-highest. This is for ease of comparison.

Total feed consumption per bird, by breed:

- Dominique - 22.808 lb.
- White Plymouth Rock - 24.385 lb.
- Naked Neck - 24.137 lb.
- Silver-Laced Wyandotte - 26.487 lb.
- Speckled Sussex - 20.821 lb.
- New Hampshire Red - 24.302 lb.
- Delaware - 23.110 lb.
- AVERAGE - 23.721 lb.

Average live weight per bird at processing (18 weeks 4 days), by breed:

- Dominique - 4.388 lb.
- White Plymouth Rock - 5.010 lb.
- Naked Neck - 4.815 lb.
- Silver-Laced Wyandotte - 4.686 lb.
- Speckled Sussex - 4.103 lb.
- New Hampshire Red - 5.238 lb.
- Delaware - 4.801 lb.
- AVERAGE - 4.720 lb.

Average dressed weight per bird, by breed:

- Dominique - 2.98 lb.
- White Plymouth Rock - 3.40 lb.
- Naked Neck - 3.38 lb.
- Silver-Laced Wyandotte - 3.17 lb.
- Speckled Sussex - 2.85 lb.

- New Hampshire Red - 3.29 lb.
- Delaware - 3.03 lb.
- AVERAGE - 3.16 lb.

Dressing percentage rate, by breed:

- Dominique - 67.86%
- White Plymouth Rock - 67.84%
- Naked Neck - 70.27%
- Silver-Laced Wyandotte - 67.74%
- Speckled Sussex - 69.52%
- New Hampshire Red - 62.87%
- Delaware - 63.02%
- AVERAGE - 67.02%

Feed efficiency rates based on live weight (lb. feed per lb. gain), by breed:

- Dominique - 5.20
- White Plymouth Rock - 4.87
- Naked Neck - 5.01
- Silver-Laced Wyandotte - 5.64
- Speckled Sussex - 5.08
- New Hampshire Red - 4.64
- Delaware - 4.81
- AVERAGE - 5.02

Feed efficiency rates based on dressed weight (lb. feed per lb. carcass), by breed:

- Dominique - 7.66
- White Plymouth Rock - 7.17
- Naked Neck - 7.13
- Silver-Laced Wyandotte - 8.34
- Speckled Sussex - 7.30
- New Hampshire Red - 7.38
- Delaware - 7.64
- AVERAGE - 7.49

Cost of production per lb. dressed weight, by breed\*:

- Dominique - \$4.08
- White Plymouth Rock - \$3.71
- Naked Neck - \$3.73
- Silver-Laced Wyandotte - \$4.21
- Speckled Sussex - \$4.01
- New Hampshire Red - \$3.82
- Delaware - \$4.05
- AVERAGE - \$3.90

\* These cost figures are to be used for reference only, and are not intended to be authoritative or even typical. Clearly one's own enterprise costs will vary largely depending on a number of factors. Farmers should input their own relevant costs, using the breed-specific data above, to best determine their own potential outcomes. My own production costs are based on the following:

- cost per chick of between \$1.34 and \$1.45 (depending on breed);
- feed cost to butcher date at \$0.365/lb. for bagged non-GMO feed;
- processing equipment rental cost of \$75.00 for one day;
- bags, clips, and labels at \$0.371 per bird;
- mileage to pick up chicks from the hatchery, pick up feed, and pick up and return processing equipment;
- and approximate shelter depreciation cost of \$1.00 per bird.

TASTING

We had originally planned on hosting a blind side-by-side tasting event at a local restaurant at the culmination of this project, which would have included one each of our heritage breeds plus a pasture-raised Cornish-Rock Cross for comparison. We printed and distributed posters, sent e-mail notifications, and made announcements at a couple of local farm events, but nobody purchased a ticket to the event, which I think underscores the first hurdle of raising heritage breed chickens, namely that I suspect there aren't a lot of consumers who know anything about them. By contrast, many consumers across the spectrum have at least a vague notion of different breeds of beef cattle, in part due to the nationwide marketing success of the Angus association, as well as the fact that even a short drive through a rural area will make evident the many colors and patterns of cattle in roadside pastures. Further, in this area at least, there are multiple breeds of cattle being raised and sold for beef at farmers markets, often with accompanying identifying photographs. When it comes to chicken, however, farmers raise "pastured poultry" without any indication of breed, since with very few exceptions they all raise the same thing and so the only differentiation to be made is management style (pastured versus confinement). Restaurants might tout their new "Angus burger," but I've yet to see one advertising their "Fried Barred Rock Chicken special."

So without a public tasting event, we instead opted to invite a number of friends over to our house one Sunday afternoon for a more informal blind side-by-side tasting. I explained to them our reasons for raising these breeds, the significance of heritage breeds compared to modern hybrids, and the overall results of my grant project. The birds had been roasted with a little butter, salt, and pepper to allow the flavors of each breed to shine through (rather than being masked by, say, a bold sauce or spice rub), then the meat was cut into bite-size pieces. The meat from each breed was put on its own plate, and the plates were identified as "A" through "H." Each participant was given a scorecard with the breeds listed "A" through "H" and columns for scoring the flavor and texture of each on a 6-point scale (the 6-point scale disallowed a "neutral" middle vote, and was intended to be less demanding of nuance than a 10-point scale). They were encouraged to try their choice of meat (white or dark or both) from each breed, rate it, and record any comments.

In explaining this project to our guests, I mentioned that we had raised eight different breeds, and noted that there were eight different breeds available to taste, but I did not mention that one of the breeds raised (the Buff Orpingtons, which turned out to be all pullets) had been replaced by a pasture-raised Cornish-Rock Cross from a local producer. That is, though I explained my reasons for not raising CRX chickens, the tasters had no indication that one of the breeds tasted was a CRX and as such had no expectation of finding a "lesser" chicken. Therefore none of our guests would have reasonably thought, "That one must be the CRX, so I'm going to rate it lower because I know it's not as good." So it was doubly gratifying when, after all the scores had been tallied, the CRX came out last.

The Speckled Sussex was the consensus favorite, with the Dominique and New Hampshire Red tied for second place. The Wyandotte, Delaware, Naked Neck, and White Rock were all close behind, but the CRX lagged considerably. But to me the real takeaway is that they all taste different, and while one person might prefer one breed someone else preferred another. The most common comment regarding the CRX was not that it tasted bad, but that it was "bland," that there was simply little flavor, particularly in contrast to the heritage breeds. This is due, I believe, in large part to the age at which the respective breeds are processed. As a result of its incredibly fast growth the CRX must be processed young (usually 6-8 weeks or so), while the heritage breeds grow more slowly and aren't at a respectable butcher weight until at least 16 weeks. An apt comparison might be veal and beef: veal, processed young, is more tender and mild, while beef, processed older, is perhaps

firmer (and tougher in some muscles) but more flavorful.

In terms of texture, I was curious going into the tasting how the others would respond. The meat of the heritage breeds, as a result of both age and physical activity level, is denser than that of the CRX, and I wondered if this would be interpreted by the tasters as being "tough" or "chewy" or "stringy" or something similar, but there were no comments, and no ratings, to that effect. To me this was quite important, as perceived texture is one of the most repeated criticisms of heritage breed poultry; perhaps the criticisms stem from a failure to distinguish between, say, an 18-week-old cockerel and a 3-year-old mature rooster? The former can be roasted quite successfully, while the latter should only be braised or stewed. Indeed, it seems that the CRX, though younger than the heritage breeds, is not necessarily more tender—breast meat tends to be dry, and leg/thigh meat was more often described as "soft" and "mushy" than "tender," though this is probably due more to their relatively sedentary lifestyle than to age.

- [FNC12-866 Charts](#)

## Impact of Results/Outcomes

This grant has given me a more solid starting point for future batches of heritage breed broilers. In coming years, starting in spring 2014, I intend to begin selectively breeding a few of these chickens to increase their quality as meat birds with the hope of making them more economical. Though consumer interest is low, most likely due to a necessarily higher price per pound than farmers who raise the CRX, there is enough interest in alternative breeds to make it worth continuing to seek out this market. I have also had a couple of chefs express interest in these heritage breeds. My hope is that with time our farm can both be known in the area as one that is willing to provide those "unprofitable" products that other farmers won't touch, as well as being a positive example for other farmers interested in similar enterprises.

Marketability seems to be the single most important factor when considering a heritage poultry enterprise, particularly heritage chickens. (Heritage breed turkeys are an increasingly popular option, as more consumers seem willing to pay extra for a celebrated product [just check the food magazines around November] for a special holiday celebration, whereas chicken is still seen as a common, everyday sort of food and as such heritage chickens cannot as easily command a higher price than their industrial counterparts.) I think it can be quite easily demonstrated that, to the palates of most consumers, a heritage bird is a better, more flavorful product, so the marketability issue comes down to price and how much consumers are willing to pay. As expected, the heritage breeds cost a considerable amount more per pound to produce than modern hybrids. While I don't believe the extra cost alone is a valid reason to dismiss their potential as marketable meat birds, production cost is certainly a concern in any enterprise. Provided a farmer can develop a market for heritage birds, that farmer's ability to lower production costs should translate into more profit, either through more sales (as a result of a more consumer-acceptable price) or a higher net profit per bird (as a result of a greater difference between sales price and production cost).

I believe that this grant project accomplished what it set out to do, which was to gain some sort of baseline information on heritage breeds relative to each other and relative to their modern hybrid counterparts. There were, however, limits to the scope of what could be ascertained, due to certain limiting factors. In my mind the largest limiting factor was breed stock, as the only really feasible option I had was to

purchase day-old chicks from one hatchery. (Had I been reasonably able to source chicks from breeders dedicated to selecting for meaty characteristics, my results may have been quite different.) As these are breeds which have not actively been selected for their meat characteristics in quite a long time, the ultimate accuracy of my outcomes was therefore limited. I believe that within a few generations of active breeding for meat qualities of these respective breeds (and, indeed, others not included in my project) this same project could be repeated with considerably different end results. Certainly each breed would become more feed efficient and probably faster growing and therefore cheaper to produce, but the extent to which each breed would improve over my current findings would likely be variable; that is, the Dominique, for example, might become a lot more feed efficient, while the White Plymouth Rock might become only marginally so.

Another limiting factor was the simple fact that this project was conducted start-to-finish in a little over 18 weeks, and in one particular geographic location in one particular year. To get a more complete picture of exactly how these breeds relate to each other and to the modern hybrids, the same project would need to be repeated by multiple farmers in multiple locations over multiple seasons and years. For example, it is quite feasible that the Naked Neck breed, which has up to 60% fewer feathers than most other chickens, would perform considerably better in a hotter environment than some of the others, and might be the clear best choice for farmers in those environments. (Our summer was a relatively mild one; if it had been hotter—or colder, for that matter—my results might have been significantly different.) And even shifting the growing season forward or backward by a month or so could have significant implications.

I was a little surprised at how impactful the differences in production cost were. The spread of production cost per pound dressed weight was \$3.71 (White Plymouth Rock) to \$4.08 (Dominique). (I am excluding the Silver-Laced Wyandotte for a moment, for the uncertainties mentioned previously; they had a production cost of \$4.21 per pound.) That's a difference of \$0.37 per pound dressed weight, which perhaps doesn't seem like too great a difference. But when I apply the average production cost per pound to average weight by breed, and then assume a sales price of \$5.50 per pound (what I charged for these birds), that's a difference in net profit of \$1.86 per bird. In other words, if I raised and sold 200 White Plymouth Rocks I would net \$1218.00, while if I raised and sold 200 Dominiques I would net only \$846.00, or 30% less (unless, of course, relative demand allowed me to charge a different rate for each breed).

There are a few things specific to heritage breed chickens that one must keep in mind when considering a broiler enterprise.

First is the fact that heritage breeds take approximately twice as long to produce as the Cornish-Rock Cross. This has multiple implications. A farmer runs approximately double the risk of losing birds to predators with heritage breeds, since they're out on pasture longer. There is a lost "opportunity cost" in raising heritage breeds, since for any given shelter and time parameters a farmer could raise two batches of CRX for every one batch of a heritage breed. And there is the matter of recouping one's investment--a farmer will have more money invested per bird for the heritage breeds, and it will take at least twice as long to get that investment back. I would advocate heavily for the use of heritage breeds over modern hybrids, but the economic implications need to be given full consideration.

Second, the heritage breeds will begin displaying secondary sexual characteristics prior to butcher age. A pen full of cockerels will begin fighting, to a limited extent, before the age at which they are processed. I don't know—and this project was not designed to study—the effect that this fighting has on physical growth and

development, but it stands to reason that a model that does not keep the birds confined to a pasture pen, and thus gives them more space, will reduce the stresses involved and may result in better weight gains and final butcher weights, but they will still develop and enforce their pecking order to a greater extent than birds butchered earlier will.

Third, in a day-range type system where the chickens are allowed to range on pasture during the day and return to the shelter at night, the heavy-bodied CRX and other hybrids will 'roost' on the ground inside the shelter. Heritage breeds, on the other hand, have the ability to roost off the ground, and may choose to roost in a spot that presents them as easy prey for aerial predators (namely owls). Depending on one's own housing choice, it would be wise to supply the heritage birds with a proper roost under a covered shelter to reduce predator losses.

Fourth, as a result of a greater maturity level the birds become more difficult to process due to the more developed hackle feathers. A sharp knife is essential in any chicken processing, but especially so when dealing with these more mature birds. The Naked Neck breed, on the other hand, was very simple to process due to the absence of neck feathers. Further, some of birds had tougher skin than others; the White Plymouth Rocks, for example, were more difficult to eviscerate than the other breeds. I don't recall having seen this with the CRX in the past.

Then there is the simple fact that the heritage breeds cost a considerable amount more to raise to butcher age. There are multiple ways to cut costs in any sort of enterprise, and while the following methods would also apply to a typical pastured poultry model using modern hybrid breeds I think their implementation would have more a more striking effect on a pastured heritage breed enterprise.

First would be to breed and hatch one's own chicks. This would allow the farmer to develop genetics better suited to his or her own farm and locale, presumably resulting in a more feed-efficient bird. And while options abound when it comes to hatching chicks, it could probably be safely assumed that depending on how it was carried out there is certainly a possibility of saving money on a per-chick basis versus purchasing from a hatchery. Further, a farmer breeding and hatching his or her own chicks could then experiment with various crosses better suited to broiler production, and over time could even develop and stabilize a new breed best suited to his or her own farm.

Second would be utilizing alternative feeds. This would include things such as home-grown crops (grains, roots, legume pastures) as well as cultivated insects and bugs (such as black soldier fly larvae, worms, and others). Also, one could allow the chickens to glean behind hogs and cattle—perhaps in the loafing shed of a dairy?—to utilize what is dropped or passed by those other species. There are many options here.

Third would be to consider shelter options. There are multiple methods of housing chickens and other poultry (portable pasture pens, free-ranging, day-ranging, etc.) and multiple designs within each of those methods. Shelter cost and depreciation is not a small one, and depending on what was chosen could significantly impact one's bottom line.

Fourth would be in processing. For my particular project the processing equipment could have been more efficiently used. Since I was paying a flat by-the-day rental fee, the more chickens processed the lower my processing cost per bird. Of course this might mean that labor needs increase, adding a cost there, but options for barter or trading labor abound. Alternatively, one could build his or her own equipment, lower the per-use cost, or even purchase and rent out equipment to offset one's own use cost. And of course, the most economical choice might be to

have the birds processed at a local processor rather than on-farm.

Were I to repeat this project, the only major change I would make would be to process the chickens at 16 weeks rather than 18 weeks. There was a negligible weight gain during those two weeks, but feed consumption per bird was as high as it would be during the grow-out period, so I assume that those last two weeks increased total production costs. I think I could have realized significant savings by processing two weeks earlier.

Otherwise there's little I would change. I think the chickens might have gained better on a feed that was less finely milled, since they preferred to pick out the larger grain pieces. Going forward I will see if I can have the feed custom milled for this purpose. I would also be interested to see how different management systems affect the outcomes of this type of project (e.g. free range, day range, pastured pens, etc.).

## **Participation Summary**

### Educational & Outreach Activities

#### **PARTICIPATION SUMMARY:**

Education/outreach description:

Toward the end of the project I sought to host a field day for a local farm apprenticeship program, but by that time in the growing season most of the involved apprentices had already moved on, and so we were unable to schedule the event. There seems to be little interest coming from other poultry producers in the area; many of them have already written heritage breeds off as unprofitable, and decided that they will not be raising them.

As mentioned previously I had intended to host a blind side-by-side tasting event at a local restaurant, where I would discuss the importance of keeping and raising heritage breeds for meat, but that event fell through and was replaced by an informal gathering of friends in our home. I have, however, included a copy of the event flyer that my wife made, for reference.

I have had a handful of individuals e-mail me during the course of this project seeking more information about my results, and to date I have given them what I have had available with the promise to let them know when my project was completed and they could view the entire report online. These e-mails have been from individuals who are currently raising a breed or two of heritage chickens, or who are seriously considering a heritage broiler enterprise.

While there have been no publications to date, I am in the process of writing an article to be submitted to multiple farming magazines, including Small Farm Today, Small Farmers Journal, Acres USA, The Stockman Grass Farmer, Farming Magazine, and possibly others. Time will tell how many of them choose to print the article, and when. I also intend to present my results at the Farmers Forum during the Small Farm Today Conference & Trade Show, or other similar events intended for dissemination of SARE Grant Projects.

- [A Heritage Chicken Tasting Flyer](#)

# Project Outcomes

Recommendations:

## Potential Contributions

An increase in heritage breed chicken production could have fairly significant impacts within a community, most notably that control of genetics would be wrested away from large multinational corporations and given instead to individual farmers and small-scale local hatcheries. And as more farmers rely on these old fashioned breeds for meat production, fewer surplus males (the "byproduct" of laying hen production) will be destroyed. As there is necessarily a cost associated with production of those "surplus" males, a higher sales figure should clearly improve a hatchery's profitability.

An increase in the genetic pool of a given area has its own benefits. It is not outside the realm of possibility than an epidemic poultry disease could wipe out a large percentage of a given breed. At current levels, a disease that decimated CRX flocks nationwide would be devastating, but with increased genetic diversity would come increased food security as far as broiler chickens are concerned. One need only refer to the Irish Potato Famine to underscore the importance of genetic diversity, I think. (Though there were many factors involved, lack of diversity of Ireland's potato crop was a big one.)

Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture or SARE.



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