

Perfecting the Day-Range Pastured Poultry System

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Introduction

Raising poultry on pasture instead of in a barn or other permanent structure is an increasingly popular enterprise for hobby and small farmers across the country. There are two general systems used by producers. The Salatin system consists of an open-floor enclosed pen or other structure that is moved once or twice a day around the pasture. The birds are kept in the pen 24 hours a day but are provided with fresh pasture by moving the pen. The Day-Range system consists of a mobile pen that is kept inside a fenced area. The birds are free to roam within the fenced-area during the day and are put in the mobile pen at night if predators are a problem. The mobile pen is moved daily to prevent accumulation of manure and the fence is moved as necessary to provide access to fresh pasture.

One of the many benefits of both systems is that the birds are eating plants, bugs, and anything else they can forage in the pasture. Although studies indicate the forage doesn't contribute much to the protein or carbohydrate needs of the birds, the foraging does improve some characteristics of the meat and is appealing to customers that feel such foraging is a more humane way to raise poultry compared to conventional confinement operations. As such, consumers are willing to pay more for the poultry.

Despite the many benefits of pasturing poultry, the profitability of the pasturing-system is still largely determined by the feed conversion efficiency and the labor requirements, not unlike conventional systems. The challenge, then, for pasture poultry producers is to maintain the benefits of pasturing while maximizing feed conversion efficiency and minimizing labor requirements. Furthermore, it is important that producers themselves be given the tools to develop and evaluate these strategies and refine their systems.

In cooperation with three poultry producers in Ashland and Bayfield County a low-cost, but statistically valid system for testing feeding strategies was developed for the Day-Range pastured poultry system. The system was tested by evaluating the effect of number of feedings/day on weight gain.

The Day-Range System

Production

The Day-Range system used by the cooperating poultry producers starts with the brooder. The chicks arrive by mail and are placed in a draft-free brooder equipped with heat lamps. Beginning at one week, the chicks have access to pasture through a door in the brooder. The chicks are kept in the brooder for 3-4 weeks, depending upon the weather and are fed a 19% protein broiler ration *ad libitum*.

At 3-4 weeks the, birds are moved outside to pasture (Photo 1). A single, 4' high by 164' long electrified poultry-net fence is used to enclose the pasture area. The fence keeps the birds inside and predators outside.



▲ **Photo 1.** In the Day-Range system, the birds are free to forage within a fenced area during the day, like these chickens about to devour the tasty dandelion leaves.

| Week | lbs/bird/day |
|----------------------|--------------------|
| 1 | free choice |
| 2 | free choice |
| 3 | free choice |
| 4 | 0.25 |
| 5 | 0.3 |
| 6 | 0.45 |
| 7 | 0.45 |
| 8 | 0.55 |
| Approx Total: | 16 lbs/bird |

▲ **Table 1:** Amount of 19% protein broiler ration fed per bird per day for the 8 week grow-out period.



▲ **Photo 2.** The Day Range hoopie is an easy to build and sturdy structure that can be moved by one person and will last for many years. It will comfortably hold up to 150, 8-week chickens overnight.

Inside the fenced area is a “hoopie” (Photo 2) built of cattle panels as described below. At night, if necessary, the birds are herded into the hoopie and the doors are closed to provide protection from mammalian and avian predators.

The broiler ration is fed in gutters mounted on pieces of 2x4 and the birds are watered with 7-gallon gravity flow waterers. Each bird receives approximately 16lbs of 19% broiler ration during the 8 week grow-out period as shown in Table 1. The feed is provided twice each day, half in the morning and half in the evening. The birds are processed at 8 weeks with an average carcass weight (including neck, heart, and liver) of 5.5 lbs.

“Hoopie” Construction and Materials

The Day-Range hoopie is built with 5, 52”x16’ cattle panels (Figure 1-A-C), 55’ of 1” chicken wire, some galvanized wire, and a 12’x14’ tarp. Three of the panels are arranged side-by-side as shown in Figure 2 and tied together at the overlap with galvanized wire. The other two panels are cut to the dimensions shown in Figure 1. The ends of the two panels are used as doors (C.) to cover the openings cut into the B panels. The three-panel structure is bent by pulling the short sides toward each other to create a quonset-type arch and fastened on each side to the B panels as shown in Figure 3 with the galvanized wire. This step takes at least two people. Chicken wire is attached to the bottom 3-4 feet of the structure on all four sides using galvanized wire or hog rings. A hog ring pliers makes this job go faster (Photo 3). The last step is to attach the tarp to the outside of the structure and attach the doors (Photo 2).

To build a Research Hoopie, a cattle panel is cut to the dimensions shown in Figure 1-D. This is covered with chicken wire and attached inside the middle of the hoopie parallel with the B panels to make two equal spaces. The D panel divides the hoopie in half.

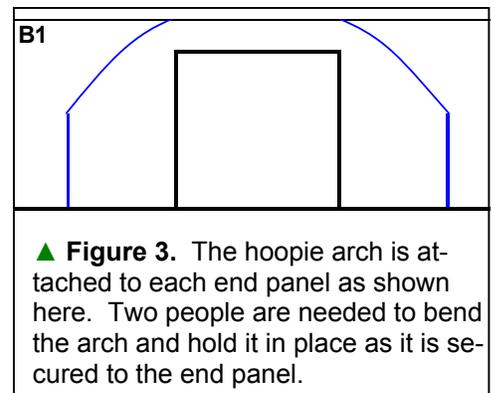
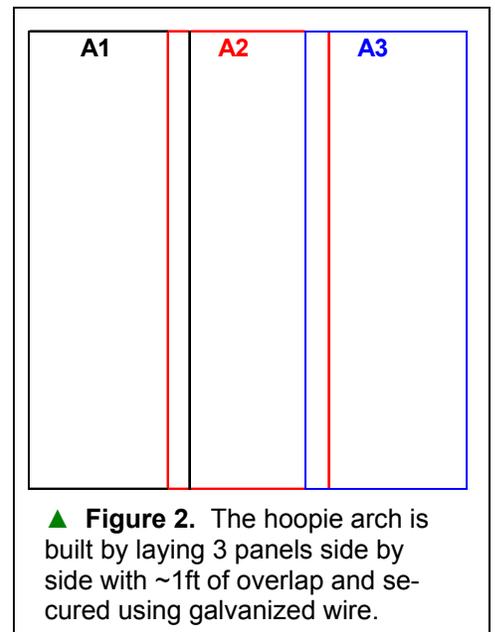
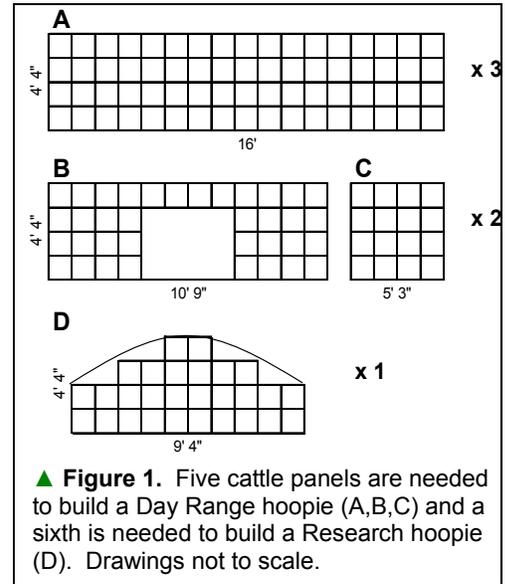
As constructed, the hoopie can house between 130-160 full-grown birds at night with room for 1-2 waterers.

The Day Range Research System

With support from the SARE Farm-Rancher Grant Program, a system for testing various feeding and management options was developed. The Day Range Research System is a statistically-valid method to compare two treatments, such as two different rations, or two different breeds, or as described later, two different feeding times. The System uses three replications to allow for statistical analysis and provide some certainty that the treatment effects are real and not due to random chance or some other confounding variable. Each replication uses one Research Hoopie, one 164’ length of electrified poultry netting, up to 160 birds, two feeders, and two waterers. For each replication, the group of birds is divided in half with each half raised in one side of the Hoopie with one half receiving Treatment A and the other half receiving Treatment B. It is crucial that the conditions within each replication be as similar as possible. For example, the pasture on one side of the Hoopie should always be the same as on the other side of the Hoopie. The basic Day Range Research System is described on page 3.



▲ Photo 3. The bottom 3-4 feet of the entire hoopie is covered with 1” chicken wire and fastened to the panels using wire or hog rings.

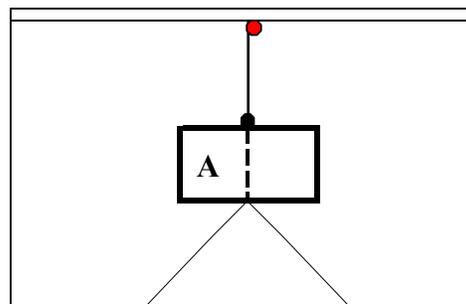


Day Range Research Protocol With Three Replications

1. Raise all the birds (all cockerels or pullets) in the brooder until ready to go outside. The birds should have full and equal access to water and feed.
2. Set-up the three Research Hoopies in the pasture. For the 4-5 weeks on pasture, each replication will need an area roughly 50' x 200'.
3. Using the poultry netting, create an equal-sized pasture for each side of each Research hoopies. Figure 4 shows one possible arrangement using a single 164' poultry net fence. Photo 5 shows the Research hoopie and a paddock for each side of the hoopie.
4. When ready to go to pasture, randomly divide the birds into 6 groups with each group going into one side of each of the three Research hoopies. The groups should have the same number of birds but no more than 40 per group.
5. Mark the birds using leg bands or spray-paint on the primary feathers in case the birds cross sides. Mark each bird in each group the same way. (Photo 4)
6. With the birds in place, the treatments can be applied. For each Research Hoopie, one side will receive Treatment A and the other side will receive Treatment B. In essence, you are repeating an experiment to compare the two Treatments three times.
7. As necessary to spread the manure and provide fresh pasture, move the Research hoopie and poultry netting.
8. This system allows comparison of two treatments, one for each side of the Research hoopie.
9. The material cost for implementing this protocol with 3 replications is shown in Table 2. For this protocol, no more than 80 birds should be raised in one Research hoopie (40 per side). Except for the tarps, the materials should last at least 7 years and a single hoopie can be used to produce roughly 150 birds per 4 week period in a normal non-research production situation. Assuming each hoopie is used to produce a batch of 150 birds every 4 weeks, June through September, for seven years, the per bird cost of the materials is roughly \$0.11.



▲ **Photo 4.** All the chickens in each group are marked with spray paint on their primary wing feathers. This allows separation in the event they cross a fence and get mixed-up. The photo shows two groups, one in each half of the hoopie.



▲ **Figure 4.** Use the Research hoopie (A) as the center point and create two equal-sized paddocks using a 164' poultry net fence. The fence should start next to the hoopie (black dot) and be set-up counter-clockwise around the hoopie as shown, reconnecting to the fence at the red dot. Both the hoopie and fence are moved, as necessary.

Putting the Day Range Research System to Work: Evaluating the Effect of Feedings Per Day on Broiler Weight Gain

Feeding behavior studies have found that broiler chickens raised with the Day Range system tend to do their most active foraging during the early-morning and evening hours. This is exactly the same time when most users of the Day Range system feed the grain ration to the chickens—in the morning when they let the chickens out of the hoopie and in the evening when they put them back in. Such a feeding schedule may actually dis-

Day Range Trial System Material Expenses (3 replications)

| Item | Number | Cost |
|---------------------------------------|--------|--------------------|
| 7 gallon waterer (\$42.99ea) | 6 | 257.94 |
| Gutter feeders (\$4ea) | 6 | 24 |
| Cattle panels (\$23ea) | 18 | 414 |
| 12' x 14' tarp (\$12ea) | 3 | 36 |
| 1" chicken wire (\$34.79/50ft) | 150ft | 104.37 |
| galvanized wire (\$23) | 1 | 23 |
| 164' of 48" poultry netting (\$165ea) | 3 | 495 |
| Materials Total | | \$ 1,354.31 |

▲ **Table 2.** The material costs for implementing the Day Range Trial System with 3 replications.



▲ **Photo 5.** The Research hoopie is in place with a paddock set-up for each side of the hoopie using poultry net fencing. The picture shows one replication. A total of three Research hoopies and three fences are necessary to replicate the feeding trial three times.

courage foraging and decrease the benefits of the pasture.

It was hypothesized that feeding the chickens their entire daily ration at one time between 11AM and 2PM would allow the chickens to exhibit their natural foraging behavior and, therefore, potentially increase their weight gain and feed utilization efficiency. Furthermore, even if there was no difference between once-a-day and twice-a-day feedings, the once-a-day feeding system could potentially reduce labor costs by requiring only one visit of the chickens each day.

To test the hypothesis, the Day Range Research System was used with three replications. The trial was conducted two times at each of two different farms. For each replication, one half of the birds received their total daily ration in one feeding between 11AM and 2PM and the other half received half their total daily ration between 7AM and 8AM and the other half between 7PM and 8PM. Thus, during the summer, the experiment was repeated 12 times (two farms x 2 batches per farm x 3 replications per batch).

All of the birds for each batch were raised together in a brooder for 22 days with water and 19% protein broiler ration *ad libitum*. At 23 days, the chicks were randomly divided into 6 equal groups with each group randomly assigned to one of the six hoopie halves. One half of each hoopie received the 1x feeding treatment and the other half received the 2x feeding treatment until the day of processing. On processing day, each bird was weighed live (Photo 6) and processed. For each of the six groups of birds, the average live weight was determined.

The effect of the number of feedings per day on live weight was variable. Averaged across all four batches there was no significant difference in live weight between the 1x and 2x feeding treatment (Table 3). However, the 1x feeding treatment resulted in larger birds at Great Oak Farm and for one of the batches at Wild Hollow Farm, smaller birds. (Table 4).

The average live weight varied from 6.96 lbs to 5.75lbs with an average live weight of 6.17 lbs. This translates into an average carcass weight of less than 5 lbs, which is considerably smaller than expected for a 56 day grow-out for the Ross strain of Cornish x Rock broiler chickens. The average carcass weight for birds in 2008 using the 2 feeding/day Day Range system was considerably higher at 5.5 lbs/bird. Analyses of the feed ration used for these batches indicates a slight deficiency in both lysine and methionine, likely causing the slower growth rates.

Conclusion

Based on the results of this Day Range Research Trial, it appears that feeding the total daily ration between 11AM and 2PM is a viable option and may even result in better feed utilization and higher finish weights. If producers can effectively manage predators so the birds don't have to be put in at night, this research supports visiting the birds only once per day, reducing labor costs. Additional research is needed to determine whether there is increased forage utilization due to the single feeding strategy and whether there is any consequent difference in meat quality.

This study also demonstrates the feasibility of on-farm pasture poultry research using the Day Range Research Hoopies and Research System.

Thanks to the cooperators Chris Duke of Great Oak Farm, Jay Cablk and Carrie Linder of Vranes Farm, and Melissa Fischbach of Wild Hollow Farm. This project was supported in part by funding from the Sustainable Agriculture Research and Education (SARE) Farmer-Rancher Grant Program.

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▲ **Photo 6.** On processing day, the birds are weighed live and then processed. Some chickens stand calmly in the bucket and others don't!

| | Live Weight |
|----------------|-------------|
| 1 feeding/day | 6.22 |
| 2 feedings/day | 6.12 |
| LSD(.05) | 0.25 |

▲ **Table 3:** The live weights averaged across all four batches for the two feeding treatments. There was no significant difference between feedings/day.

| | Wild Hollow | | Great Oak | |
|----------------|-------------|--------|-----------|--------|
| | 12-Jul | 13-Sep | 20-Sep | 25-Oct |
| 1 feeding/day | 6.23 | 5.58 | 6.96 | 6.10 |
| 2 feedings/day | 6.61 | 5.65 | 6.47 | 5.75 |
| P(T<t) | 0.07 | 0.32 | 0.10 | 0.07 |

▲ **Table 4:** The average live weights for each batch of birds in the trial. Each batch consisted of 120-150 chickens divided into three replications of each feeding treatment. Dates shown are the processing dates. P-values less than 0.10 indicate the means are statistically different.