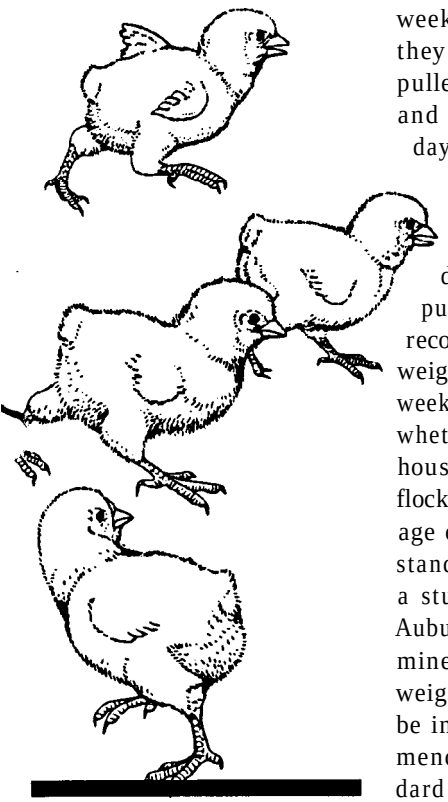
CURRENT CONCEPTS IN WINTER 1994

Broiler Production

Should Broiler Breeders Be Housed By Weight Or Age?



Primary breeders recommend that average weights of breeder pullets should be about 4.5 pounds at 20 weeks of age, at which time they should be moved from pullet to breeder houses and subjected to long daylengths. However, due to factors such as high temperatures, pullet growth may be depressed. Therefore, pullets may not attain recommended body weights for housing by 20 weeks. It is not clear whether it is better to house low-weight pullet flocks at the recommended age or when they reach standard weight. Therefore, a study was conducted at Auburn University to determine if the housing of low-weight pullet flocks should be initiated at the recommended age or when standard weight is attained.

Conduct of the Study

Arbor Acres pullets were selected in two weight groups from a commercial flock according to individual weights at 15.5 weeks. The standard weight group ranged from 3.0 to 3.3 pounds, and the low weight group ranged from 2.5 to 2.8 pounds. The two groups were placed in separate rooms and provided 8 hours of incandescent light per day until housing.

At 20 weeks, the standard weight group (S-20 flock) and half of the low weight group (L-20 flock) were housed in separate pens and provided 15 hours of incandescent light per day. Weights of S-20 and L-20 flocks averaged 4.5 and 4.0 pounds at 20 weeks. At 22 weeks, the other half of the low weight group (L-22 flock) reached an average weight of 4.6 pounds and was housed in pens in the same rooms that the S-20 and L-20 flocks were placed in 2 weeks earlier.

Discussion of Results

Body Weights. The average weight of the S-20 flock was greater than the average weight of the L-20 and L-22 flocks through 41 weeks. The weight of the L-20 and L-22 flocks differed slightly from 26 to 31 weeks, because the L-20 flock was switched from rearing to laying period feeding programs at an earlier age. From 44 to 65 weeks, the weights of the three flocks were quite similar, since the feeding treatments were gradually equalized after housing.

Onset Of Lay. Average ages at first egg and 20 per cent and 50 percent hen-day egg production (HDP) were used as indicators of the onset of lay. The onset of lay was delayed 6 days in the L-20 flock and an additional 3 days in the L-22 flock, as shown in Table 1. In other words, even though housing of the L-22 flock was delayed 14 days, they initiated production only 3 days later than the L-20 flock. The L-22 and L-20 flocks both reached peak production at 31 weeks. Therefore, the initiation of production occurred most rapidly in

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AU Notes

Auburn's Poultry Science Department, in conjunction with the Alabama Cooperative Extension Service, is committed to providing information to those involved in Alabama's poultry industry through a number of means, including direct contacts, instructional seminars, and printed publications. This newsletter is intended to provide information and ideas sparked by research at Auburn to those at all levels in the integrated poultry companies within the state. We have reached a large number of key decision makers-both in the integrated broiler companies and in allied industries to date, yet there are many more Alabamians who may benefit from information of this type. If you have service personnel or interested growers who may enjoy keeping up with developments at Auburn, feel free to forward their names to us and they will be put on our mailing list. Do not hesitate to reproduce any portion of these newsletters for distribution within your operations.

Table 1. Effects Of Delayed Housing On Low-Weight Breeder Pullets.

Measurement	S-20 Flock	L-20 Flock	L-22 Flock
Age at First Egg (days)	164	172	173
Age at 20% Production (days)	171	176	179
Age at 50% Production (days)	179	184	188
Pre-peak Period (%HDP)	40	31	26
Peak Period (%HDP)	74	72	75
Post-peak Period #1 (%HDP)	68	64	72
Post-peak Period #2 (%HDP)	46	50	54
Post-peak Period #3 (%HDP)	44	48	49
Total Egg Production (eggs/hen)	160	157	165
Mean Egg Weight (oz./dozen)	26.1	26.1	26.3
Total Settable Production (eggs/hen)	149	151	159
Total Feed Provided (lb./hen)	124.0	122.2	121.0
Feed per Dozen Eggs (lb.)	9.3	9.3	8.8
Feed per Dozen Settable Eggs (lb.)	10.0	9.7	9.1

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Current Concepts In Broiler Production is a publication of the Alabama Cooperative Extension Service with the cooperation of the Department of Poultry Science at Auburn University. This publication is designed to provide new and emerging concepts and information to those involved in broiler and breeder production.

Information on management, feeding, and disease will be compiled from research underway at Auburn University, as well as from other sources. New technologies and practices will be highlighted as they become available.

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response to housing in the L-22 flock. This was probably because of their greater age and weight at housing, since both of these factors result in more rapid sexual development in response to the long daylengths which were begun at housing.

Egg Production. Average production during the five production periods as well as the life of each flock are shown in Table 1. production levels of the L-22 flock were generally highest, except during the pre-peak period when they were lowest. The L-20 hens had lower production levels than S-20 hens during pre-peak, peak, and first post-peak periods; however, this relationship was reversed during the second and third post-peak periods. Total production by L-22 hens exceeded that of the other two flocks, which were similar. Housing low-weight pullets at the recommended age of 20 weeks negatively influenced total production. However, delaying housing until pullets reached standard weight resulted in an 8-egg increase in total production, even though it delayed the onset of lay and decreased pre-peak production. Based on these results, it appears that increased total production levels can be obtained from low-weight pullet flocks by housing them when they reach standard housing weight.

Egg Weight. Average egg weights did not differ among the three flocks. However, total settable (more than 21 ounces per dozen) egg production was greater in the L-22 flock than in the L-20 and S-20 flocks. This was because of the greater post-peak production of the L-22 flock, and the fact that egg weights increased markedly with age. These factors resulted in the L-22 flock producing a greater proportion of their eggs at ages when egg weights were increased. It has been well demonstrated that egg weights increase with age. On the other hand, differences in average egg weights due solely to differences in age or body weight at housing have generally not been observed in previous studies. Although average egg weights may be unaffected, increases in post-peak production can increase the production o settable eggs because egg weights increase with age.

Feed Consumption And Efficiency. The amount of feed provided during the lives of the three flocks differed only slightly. These differences were because of variations in allotments required early in the study to maintain differences between weight groups and later in the study because of differences in body weight and egg production. Although similar amounts of feed were provided, slight differences in feed provided compounded differences in total and total settable egg production when feed efficiencies were calculated. This resulted in more marked differences in feed efficiencies favoring the

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Reduce Energy Costs By Using Double Sidewall Curtains

Heat energy is used by broiler producers during the first 3 weeks of a growout to provide an optimum environment for bird survival. Depending upon time of year, brooding energy used during this time will range from 75 percent to 100 percent of the total energy used for the entire growout period. Heat supplied during the last 4 weeks serves primarily to improve feed conversion and efficiency. Since LP gas which is the primary source of heat utilized in broiler houses, is expensive relative to other energy sources, conservation is a major concern of broiler producers.

From an energy use consideration, the ideal poultry house would be a totally enclosed, insulated house for the brooding period with open curtains during the remainder of the growout.

For curtain sidewall houses that are currently being built in Alabama, the portion of the house energy losses that can be attributed to curtain area on houses using single curtains and half-house partial-area brooding is approximately 66 percent of the total for the house. The use of double curtains reduces this portion of the total house energy loss because of the curtain area of 48 percent. This has the potential to reduce overall heat loss from the house during the first 3 weeks by some 35 percent.

A study of this concept was conducted by the Alabama Agricultural Experiment Station (AAES) during four 48-day cold weather trials at the AU Poultry Research Unit to show the overall effect on energy use when using double curtains as compared to single curtains on poultry houses. While every effort was made to operate the systems in a manner similar to that used in industry, the size and type of house used in the demonstration prohibited the utilization of partial house brooding. Because partial house brooding was not used, total energy consumption was higher than would be expected in a typical broiler house. Comparisons of the relative amounts of energy used and relative energy savings can be made, however.

Two houses were equipped with single curtains, and two houses were equipped with double layers of curtain material. Air was allowed to enter the house by passing upward through the air space between the two curtains. This method of installation allows recovery of a portion of the heat loss through the curtain material and prevents condensation of moisture between layers of curtain material, which has been a problem when double curtains with closed bottom edges have been used. One curtain was installed outside the building and the second curtain was installed inside. The building wall was constructed using 3.5 x 3.5-inch posts, thus a 3.5-inch air space existed between the curtains The outer curtain was held away from the wall at the lower edge by a series of OS-inch tubes.

During early brooding periods when ventilation requirements are lowest, air flow was through the lower opening and up between the two curtain layers. A 1.5-inch slot opening was established at the top of the inside curtain. Both curtains could be lowered, and ventilation air passed through a 1.5-inch opening at the top of each curtain when ventilation requirements increased. The inner curtain opening could be closed completely when needed. Both curtains can be lowered completely to provide a P-foot opening for warm-weather operation. Table 1 summarizes the gas usage for the two types of curtain material for the four trials.

Overall gas usage for the four trials was reduced from 1,118 gallons for single curtain houses to 881 gallons for double curtain houses Use of double curtains gave an average gas usage reduction of 21 percent. This research indicates that maximum benefit of double curtains will be obtained by installation in the wall sections of the primary brooding area and should not be required for the entire house. It also indicates that reduction in gas usage, resulting from the use of double curtains, will depend on house construction and time of year the birds are grown. The most effective use of double curtains is during the first 3 weeks of production, and in most cases their use will be justified only in the partial house brooding area.

Adapted from work by J. L Koon; C. A. Flood, Jr.; R. D. Trumbull; and R N. Brewer originally published in *Highlights of Agricultural Research* 40 (2).

Table 1. Gas Usage For For Two Types Of Curtain Material.

Trial	Gas Usage For The Four Trials In Gallons Of LP		
	Single Curtain	Double Curtain	Percent Reduction
Trial 1	466	357	23
Trial 2	208	187	10
Trial 3	238	180	25
Trial 4	204	156	24

(Continued from page 2)

low weight birds, and particularly those housed at the later age. These results indicate that delaying the housing of low-weight pullet flocks should result in improved feed efficiency, and they also imply that it may be economically advantageous to house breeder pullet flocks at later ages but at body weights similar to those currently recommended.

This information was prepared by R J. Lien, *Assitant Professor, Poultry Science,* and J. B. Hess, *Extension Poultry Scientist.*
Source: Adapted from work presented at the 1993 Alabama Breeder, Hatchery, and Egg Industry Conference.

Withdrawal Feed Mineral Levels Influence Carcass Downgrading

A number of recently published research articles indicate that it is possible to remove the phosphate supplement and vitamin and trace mineral premixes from withdrawal feeds without affecting live performance. It has been clearly shown, however, that carcass characteristics and grade are often affected before live performance. Therefore, cooperation between the field and the plant is necessary to evaluate the advantages gained from a feed formulation change of this type.

Recent research completed by Dr. E T. Moran's group at Auburn University examined the removal of dicalcium phosphate from the withdrawal feed of two strain crosses of broilers fed to 7 weeks of age. As reported previously, live performance variables were not affected by phosphate removal for either strain used (Table 1). There were, however, substantial differences in grade A birds between feed treatments and between strains. Removing the phosphate supplement did not increase the incidence of any one defect substantially, yet the combined affect on the proportion of grade A carcasses was significant.

Skinless boneless meat yields were different between strain crosses but not between groups fed differing withdrawal feeds (Table 2). However, defective parts were included in the yield measurements. Meat yield may have been lower if parts trim had been taken into account. It was observed that broken bones and "blood-splashed" meats were higher in those birds fed a withdrawal with the phosphate source removed.

This information was prepared by J. B. Hess, *Extension Poultry Scientist.*

Table 1. Live Performance And Carcass Responses Of Males To Omitting Dicalcium Phosphate From The Withdrawal Feed.

Treatment Contrast	g Wt. 7 Weeks	F/G Total	Abdom. Fat, g	Carcass w/o Fat		% Brst. Blister	Grade A %
				g Wt.	% Yield		
Strain	-	NS	-	-	NS	-	-
PxAA	2574^{x}	1.79	49^{x}	1667^{xy}	64.8	87.7^{x}	9.7^{z}
R x R	2594^{x}	1.80	49^{x}	1708^{x}	65.2	29.7^{y}	64.2^{y}
HYxHY	2483^{y}	1.83	44^{y}	1630^{y}	65.5	12.5^{z}	76.4^{x}
HYxFF	2545^{xy}	1.82	47^{xy}	1653^{xy}	63.7	33.5^{y}	57.1^{x}
	NS	NS	NS	NS	NS	NS	-
Control	2549	1.81	47	1670	65.4	39.5	54.3
w/o Dical	2550	1.81	48	1659	64.1	42.2	49.3

$^{x-z}$ Values in rows corresponding to strain that have a common superscript do not differ (P > 0.05).

Table 2. Further-Processing Yields From Chilled Carcasses Of Males From Several Strains And Their Response To Omitting Dicalcium Phosphate From The Withdrawal Feed.

Treatment Contrast	Wings %	Drumsticks %	Fillets %	Tenders %	Thigh Meat %	Cage %
Strain	-	NS	-	-	-	-
PxAA	12.5^{x}	14.8^{x}	16.9^{x}	4.1^{x}	15.4^{x}	35.6^{x}
RxR	11.8^{x}	14.4^{y}	18.8^{y}	4.6^{xy}	15.3^{x}	33.9^{y}
HYxHY	11.8^{y}	14.0^{z}	19.7^{y}	4.7^{x}	14.7^{y}	33.6^{y}
HYxFF	11.9^{y}	14.3^{yz}	18.9^{y}	4.5^{y}	15.0^{xy}	34.2^{y}
	NS	NS	NS	NS	NS	NS
Control	12.0	14.4	18.4	4.5	15.1	34.3
w/o Dical	12.1	14.4	18.7	4.5	15.1	34.3

^{xz} Values involve a total of 32 pens with each pen being represented by 12 carcasses that were further processed. No interactions occurred between strain and withdrawal feed treatment (P > 0.05); thus, data are given as contrasts.

$^{x-z}$ Values in rows corresponding to strain that have a common superscript do not differ (P > 0.05).

Identity-Preserved Corn Varieties

The concept of identity-preserved corn varieties refers to grains with characteristics sufficiently different from normal trading standards that end users are willing to pay a premium to maintain the identity of a variety from the field to the feed mill. This concept is not new in grain handling, and those using white corn (for corn chips) and malt barley have traditionally separated products by cultivar. Corn breeders have also introduced varieties with enhanced nutritional or handling qualities such as higher levels of the amino acid lysine (Opaque 2 corn) and high levels of amylopectin (Waxy corn). To date, corn has, for the most part, been traded as one of three classes with five grades in each class

Several corn cultivars are becoming available in commercially important quantities that may be of interest to poultry producers. These include both high protein and high oil corn varieties. High protein varieties from several seed companies are currently being field tested. Wilson Seed's product, according to Dr. George Speers of Land-O-Lakes, averages 2 percentage points higher in protein and has 0.5 to 1 percentage point more oil. In addition, this variety shows increases in lysine of 20 to 40 percent and 10 to 30 percent increases in methionine over standard corn varieties. An added advantage of these varieties is that they may be more disease resistant than other corn varieties.

DuPont's Optimum Quality Grain Group has produced several corn varieties with high levels of oil. Oil levels, metabolizable energy values, and field production yields are outlined in Table 1.

As the table shows, these corn varieties contain significantly more energy than standard corn, making them more attractive and more valuable to poultry producers. These corn varieties have also shown 1 to 2 percentage point higher protein levels than standard varieties.

Field trials conducted by DuPont with broiler feeds in southern Georgia indicate that feed energy levels can be maintained with little or no addition of fat using hi h oil corn. Savings of 5.00 per ton were realized with no alterations in performance. Nutritional comparisons completed by Dr. Stan Savage at the University of Georgia indicate that nutritional enhancements of the type reported in this paper, whether for oil or protein content, would be worth 4.4 cents per bushel per one percentage point increase in nutritional profile.

Table 1. Dupont's Optimum Quality Grain Group.

Variety Yields	Oil (%)	Metabolizable Energy (Kcal/lb)	Production (%)
Standard	3.0-4.0	1,530-1,560	92-98
Conventional	6.0-6.5	1,590-1,600	92-98
Top Cross	8.0-10.0	1,620-1,640	88-96

As more and more genetically engineered grains are introduced into commercial channels, the poultry industry and other livestock producers must consider methods for making use of the advantages they offer. The increasing use of NIR technologies in grain receiving will allow rapid identification of feed ingredients with altered nutrient levels, making it easier to buy grains based on nutrient levels.

This information was prepared by J. B. Hess, *Extension Poultry Scientist,* and P. L Mask, *Extension Agronomist.*

We would like to compile an updated list of individuals interested in receiving *Current Concepts In Broiler Production* on a regular basis. If others in your organization would like to receive this publication, please fill out this form and return it to:

Joe Hess
251 Animal Sciences Building
Department of Poultry Science
Auburn University, AL 36849-5416

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Research Shorts

Recent poultry research of interest to poultry managers.

Broilers and Breeders

1. Bilgili, S. F., M. K. Eckman, and R D. Bushong. 1993. Broiler skin strength: Influence of age, sex, and feathering rate. *Journal of Applied Poultry Research* 2 (2): 135-41.

Males and females from slow and fast feathering strains were compared weekly for skin strength using a puncture technique. Skin strength was higher for males than females and increased linearly over time. Skin from slow feathering birds was less elastic than that from fast feathering birds.

2. Grimes, J. L. 1993. Predicting fatty liver hemorrhagic syndrome in lay-

ing hens from comb color. *Egg Industry* 99 (5): 14-16.

Fatty livers were associated with pale combs in this research completed with Leghorn hens Comb color may be used as a tool to monitor the potential for hemorrhagic syndrome in a flock of layers or breeders.

3. Xin, H., I. L. Berry, T. L. Barton, and G. T. Tabler. 1993. Sidewall effects on energy use in broiler houses. *Journal of Applied Poultry Research* 2 (2): 176-83.

Fuel usage was estimated for broiler houses with insulated sidewalls vs. uninsulated curtains. Insulated sidewalls reduced propane use by 22 percent in conventional houses and 17 percent in tunnel ventilated houses. Electricity increases due to ventilation, however, were 25 percent for conventional houses and 7 per cent for tunnel ventilated houses Savings per year were $254.00 for conventional houses and $93.00 for tunnel ventilated houses.

Feeds and Feed Milling

4. Johnsen, E. 1993. Integrating quality control and production. *Feed Management* 44 (10): 28-30.

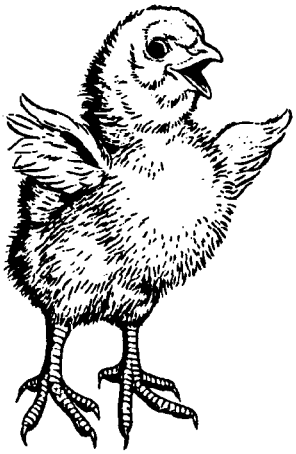
Near infrared reflectance (NIR) was linked to the feed formulation system of several feed companies to give a rapid turnaround on ingredient nutrient profiles. NIR was evaluated as a rapid and inexpensive method of monitoring ingredients and finished feeds.

Comment: NIR could add significantly to the accuracy of our feed formulations and save money if it could rival wet chemistry analysis.

5. Tillman, P. B. 1993. Ascorbic acid in poultry breeder feeds. *Feed Management* 44 (10): 31-38.

Ascorbic acid (Vitamin C) has been shown to improve breeding performance in male and female broiler breeders under he. stress conditions In male breeders, semen volume and sperm concentration were improved at 250 ppm ascorbic acid. Male broilers from breeders fed ascorbic acid showed improved live performance.

Those interested in more information on the papers reviewed in this column should contact Joe Hess at Auburn University (phone 205-844-2611).



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