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Controlled Lighting and Restricted Feeding for

DELAYING MATURITY IN REPLACEMENT PULLETS

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Recently considerable emphasis has been placed upon delaying the sexual maturity of replacement pullets. Delaying sexual maturity generally results in increased initial egg weight, increased rate of lay during the reproductive period and slightly improved egg production. Based on recent research data, it appears that either controlled light or restricted feed programs are effective in delaying sexual maturity of replacement pullets. However, controlled lighting appears to have a greater influence on rate of maturity than restricted feeding.

CONTROLLED LIGHT PROGRAMS

Two light control programs are available to delay the sexual maturity of replacement pullets. These two programs are:

A. Restricted light program used in conjunction with windowless houses.

B. Decreasing light program used in houses with windows.

Restricted Light

The restricted light program consists of rearing birds under natural light conditions until they are 8 to 10 weeks of age. The birds are then given 6 to 9 hours of light daily until they are 20-22 weeks of age (Figure 1). This program can be used throughout the entire year for fall, winter, spring and summer hatched pullets.

Decreasing Light

The decreasing light program follows a system which is similar to the natural lighting of June, July, or August hatched pullets. This consists of decreasing the daylength throughout the growing period. First, determine the total number of natural daylight hours (sunup to sundown) at the time that the birds will be 22 weeks of age. Then to this figure add 7 hours. This will give the amount

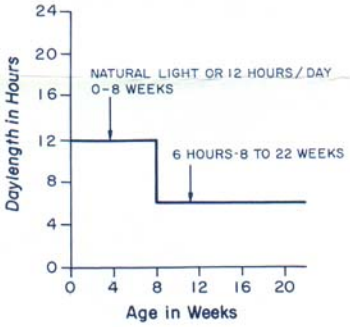

Figure 1. Restricted Light Program

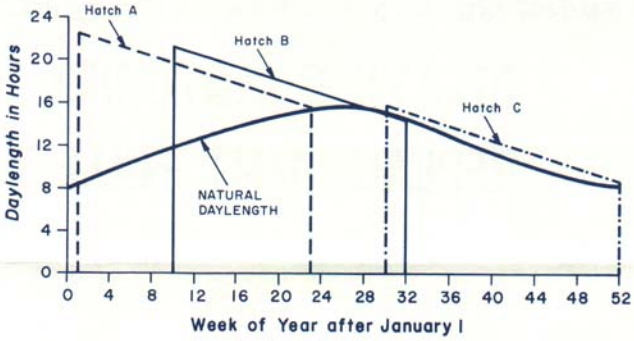

Figure 2. Decreasing Light Program

of light required during the first week of the rearing phase. After the first week, the daily light period is decreased 20 minutes per week until the birds are 22 weeks of age.

Decreasing light programs for three different hatches of replacement pullets are shown graphically in Figure 2.

1. Hatch A - January. Birds hatched during the first week of January would reach 22 weeks of age when there is 15.5 hours of natural daylight. Therefore, 15.5 hours plus 7 hours equal 22.5 hours of light to be provided the day-old chicks. Then once each week the daylength is decreased 20 minutes.

2. Hatch B - March. Birds hatched during the first week of March would reach 22 weeks of age when there is 14.5 hours of natural daylight. Therefore, 14.5 hours plus 7 hours equal 21.5 hours of light to be provided the day-old chicks. Then once each week the daylength is decreased 20 minutes.

3. Hatch C - July. Birds hatched during the third week of July would reach 22 weeks of age when there is 8.75 hours of natural daylight. Therefore, 8.75 hours plus 7 hours equal 15.75 hours of light to be provided the day-old chicks. Then once each week the daylength is decreased 20 minutes. Since this is very similar to natural daylength conditions, natural light may be used instead of artificial light.

Table 2 gives the actual number of hours of light to provide chicks hatched in January, March, July and October.

Advantages and Disadvantages

The advantage of controlled light for growing pullets over natural daylight is that sexual maturity can be delayed 1 to 3 weeks. The disadvantages of a restricted light program are that it requires a completely darkened building. Any light reaching the birds during the latter part of the growing period will stimulate the reproductive system and thus will not delay sexual maturity. An additional factor pullet growers must consider when using the restricted light program is that ventilation hazards are increased during hot weather or electrical power failure. The main advantage of the

decreasing light program is that the birds are always receiving more light daily than that occurring naturally. Therefore, no special environmental controls are needed.

RESTRICTED FEED PROGRAM

Methods

There are two major methods of restricting the caloric intake or replacement pullets:

A. Limiting the total feed intake on a poundage basis.

B. Increasing the fiber content of the feed. Limiting the total intake may be accomplished by either decreasing the amount of feed fed daily or by covering the feeder for a specific period of time each day.

Results

Use of oat hulls, corn cobs or other high fiber feed ingredients generally result in retarded growth, slightly delayed sexual maturity and increased feed per unit of gain. Feeding of high, medium or low energy feeds during the growing period has very little effect on laying house performance. Since

Table 1. Decreasing Light Schedule

for January, March, July and October Hatched Chicks (Total hours of light)

Age in weeks	January 1	March 1	July 21*	October 1
0-1	22:30**	21:30**	15:45**	18:30**
1-2	22:10	21:10	15:25	18:10
2-3	21:50	20:50	15:05	17:50
3-4	21:30	20:30	14:45	17:30
4-5	21:10	20:10	14:25	17:10
5-6	20:50	19:50	14:05	16:50
6-7	20:30	19:30	13:45	16:30
7-8	20:10	19:10	13:25	16:10
8-9	19:50	18:50	13:05	15:50
9-10	19:30	18:30	12:45	15:30
10-11	19:10	18:10	12:25	15:10
11-12	18:50	17:50	12:05	14:50
12-13	18:30	17:30	11:45	14:30
13-14	18:10	17:10	11:25	14:10
14-15	17:50	16:50	11:05	13:50
15-16	17:30	16:30	10:45	13:30
16-17	17:10	16:10	10:25	13:10
17-18	16:50	15:50	10:05	12:50
18-19	16:30	15:30	9:45	12:30
19-20	16:10	15:10	9:25	12:10
20-21	15:50	14:50	9:05	11:50
21-22	15:30	14:30	8:45	11:30

*Same as natural daylight
**Hours and minutes

growing pullets consume more of the high fiber ration, feed costs may be increased on these low energy rations.

Restricting the feed intake of growing pullets 20 to 30 percent increases the age at sexual maturity 7 to 21 days, increases initial egg size, decreases body weight at 20 to 22 weeks of age, slightly decreases the growing period feed consumption and increases growing period mortality. Restricting the feed intake during the growing period decreases laying house mortality but has no real effect on subsequent egg production, egg weight, body weight after 4 to 6 weeks of egg production or feed consumption during the laying period.

Recommendations

Utilization of a restricted feed program requires a great deal of work and effort on the part of the pullet grower in order to economically produce pullets which will later perform well in the laying house. Several recommendations which will be of beneficial value are as follows:

A. Limited feed program

1. Start restricted feed program when pullets are 7-9 weeks of age.

Table 2. Feeding Guide*

Age (wks)	Pounds feed daily (100 birds)
6 - 7	8
7 - 8	9
8 - 9	10
9 - 10	11
10 - 11	12
11 - 12	13
12 - 13	14
13 - 14	15
14 - 15	16
15 - 22	17

*Ringrose, R.C. (1958) Restricted Feeding of Growing Pullets. Sta. Bul. 456, University of New Hampshire Agricultural Exp. Sta.

2. Restrict feed intake as much as 20-30 percent on a poundage basis.

3. Provide enough feeder space so that all birds can eat at one time.

4. Feed twice daily.

5. In case of disease outbreaks, full feed during the course of the disease.

Remember that when the feed is restricted in this manner, the vitamins, minerals and drugs are also restricted, thus the percentage of these particular nutrients may have to be increased.

B. High fiber feeding program.

1. Start providing growing pullets with a high fiber diet when they are 7-9 weeks of age.

2. Provide a high fiber diet with 15-18% fiber and 15-18% protein.

3. Full-feed the high fiber diet starting at 7 or 9 weeks of age to 20 or 22 weeks of age.

C. A feeding guide which may be followed in utilizing the restricted feed program is given in Table 1.

SUMMARY

Either restricted feeding or controlled lighting will delay the sexual maturity of replacement pullets. Limiting the feed intake on a poundage basis appears to be superior to increasing the fiber content of the feed for a restricted feed program. Either restricted light or decreasing light are beneficial in delaying sexual maturity. The choice depends on the availability of an environmental, windowless house needed to use the restricted light program. Based on present research, it appears that controlled lighting is more effective than restricted feeding in delaying sexual maturity. Controlled lighting instead of restricted feeding is recommended for replacement pullets.

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