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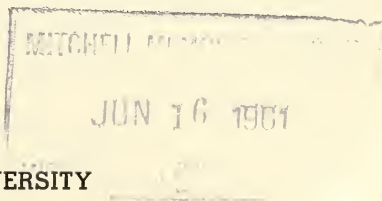
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# Effects Of Restricted Feeding On The

## Performance Of Laying Hens



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### Summary

Average mortality from eight weeks to housing was approximately three times greater for the restricted fed groups than the full fed groups, but the average mortality from housing to the end of the laying period was approximately the same for all groups except Group 2A which was highest. This group was fed 75% ration to 20 weeks of age.

Body weight of the restricted fed groups was considerably lower than the full fed groups at 20 weeks of age; however, the average weight of all groups was approximately the same at 18 months of age.

The average hen-housed egg production was approximately the same for all groups except Group 2A which was lower. Results indicate very conclusively that restricting the feed during the growing period will result in a delay in sexual maturity with a corresponding reduction in the number of small and pewee eggs if the restriction is continued until the birds reach approximately 5% production or if the restriction is extremely high. The increase in profits would possibly be greater to a poultryman who is producing hatching eggs than a poultryman producing commercial eggs because of the increase in price per dozen for medium and large hatching eggs.

The average labor income was approximately the same for all groups, except the group restricted 75% to 20 weeks of age.

# Effects of Restricted Feeding on the Performance of Laying Hens

By CHARLES H. THOMAS and R. C. ALBRITTON

Restricting the nutrient intake of pullets during the growing period can be accomplished either by limiting the amount of feed given the birds or by feeding a ration containing a large amount of fiber.

A high fiber ration requires a longer mixing time, has a higher delivery cost, and results in a higher feed consumption than a low fiber ration. These factors may result in an increase in the cost of feed per bird housed even though the actual cost of the feed on a per pound basis is lower than for a conventional or low fiber ration.

When the nutrient intake is restricted by limiting the amount of feed given the birds, these factors are removed; however, the savings in feed costs may be offset by the higher mortality that may result from the limited feed intake.

The research reported was begun in February, 1957 and completed in September, 1960 and was conducted at the Northeast Mississippi Branch Experiment Station. During this period three trials were conducted. In this study the birds were fed a conventional or lower fiber growing mash and oats during the growing period, and restriction was accomplished by limiting the daily amount of feed.

The objectives were to study the effects of restricting the feed during the growing period of Single Comb White Leghorn pullets on mortality, age at sexual maturity, body weight, egg size, egg production, and feed consumption.

Day-old White Leghorn pullets were full fed a starter ration to 8 weeks of age. Then they were weighed and equal numbers were randomly assigned to each of 3 groups in each trial. The restricted feeding program was begun at 9 weeks of age in Trials 1 and 2 and at 8 weeks of age in Trial 3. The pullets were moved to the range at 10 weeks of age in

Trial 1, at 9 weeks of age in Trial 2, and at 8 weeks of age in Trial 3.

All groups were fed a growing mash containing 18% protein from 8 weeks of age to housing, and the feeding of oats was begun at 10 weeks of age in Trial 1, 9 weeks of age in Trial 2, and 7 weeks of age in Trial 3. The pullets in Group 1 were full fed, and the pullets in Groups 2 and 3 were fed 75% and 50%, respectively, of the amount Group 1 consumed the previous week (Table 1).

All birds were vaccinated for Newcastle and Bronchitis at 4 days, 4 weeks, and 4 months of age and for Fowlpox at 8 weeks of age.

At 20 weeks of age the birds were weighed and 100 birds were randomly selected from each of the 3 groups and placed in the laying house where they had access to as much laying mash as they would eat. These laying house groups were designated as 1A, 2A, and 3A. The remaining birds in each of the initial groups were designated as Groups 1B, 2B, and 3B and remained on the range until they reached either 5% production or 26 weeks of age at which time 100 pullets from each group were placed in the laying house and full fed laying mash.

All eggs laid by each group were classified daily into the following weight classes: extra large, large, medium, small, and pewee. Egg production for each group was recorded from the first egg until 365 days after 5% production was reached. The birds received approximately 14 hours of light daily in the laying house.

In determining the cost and income the following prices were used: chick cost \$0.35, starting mash \$4.40 per 100 pounds, growing mash \$4.00 per 100 pounds, oats \$2.95 per 100 pounds, laying mash \$3.61 per 100 pounds, brooding and vaccination \$0.04 per bird, extra

large and large eggs \$0.42 per dozen, medium \$0.36 per dozen, small \$0.30 per dozen, pewee \$.24 per dozen, and old hens \$0.10 per pound.

### Mortality

The mortality from day-old to eight weeks of age averaged 7.4% for the three trials. The average mortality from eight weeks to housing was approximately three times greater for the restricted fed groups than the full fed groups. (Table 2.) This higher mortality is reflected in the higher cost per bird to housing and in some instances tended to offset the savings from the lower feed cost (Table 3).

The average mortality in the laying house was approximately the same for all groups except the group that was restricted 75% to twenty weeks of age. This group had extremely high mortality in the first trial (49%) and the highest mortality in the second trial (Table 2).

### Weight

The average weight of all birds at 8 weeks of age was approximately the same in all 3 trials (1.2 lbs.). The group restricted 75% weighed approximately one-half pound less and the group restricted 50% weighed approximately one pound less than the full fed group at 20 weeks of age. The average weight of the birds at 18 months of age was approximately the same for all groups (4.2 lbs. to 4.4 lbs.); however, the birds restricted 50% until 26 weeks of age were lighter than either full fed group in every trial at 18 months of age (Table 4.).

### Age At First Egg

The birds restricted 75% and housed at 20 weeks of age reached 5% production and 50% production at approximately the same time as the two full fed groups; however, those restricted 50% and housed at 20 weeks of age reached 5% production approximately 15 days later and 50% production approximately 23 days later than the full fed group. The birds that were left on the range

until they reached 5% production or 26 weeks of age reached 5% production approximately 14 days (75% full fed group) and 30 days (50% full fed group) later than the full fed group which remained on the range until it reached 5% production (Table 5). In this study the age at sexual maturity was governed not by the amount of restriction but also by the length of time the birds were restricted.

### Egg Production

Egg production records are given in Tables 6 and 7. The average percent hen housed production was approximately the same for all groups with the exception of the group that was restricted 75% and housed at 20 weeks of age. The low average production in this group resulted from the results obtained in the first 2 trials. The percent small and pewee eggs was reduced considerably in the groups restricted 50% and in the group restricted 75% until 5% production or 26 weeks of age. Restricting the feed 75% to 20 weeks of age did not result in a reduction in small and pewee eggs.

Since the birds restricted 75% to 20 weeks of age reached sexual maturity at approximately the same age as the full fed birds, a reduction in small and pewee eggs would not necessarily be expected. These results tend to indicate that restricting the feed of the birds should be continued until they begin to lay in order to obtain the greatest reduction in small and pewee eggs.

### Cost and Feed-Egg Ratio

The pounds of feed required to produce a dozen eggs were based on feed consumed after the birds reached 5% production. The average pounds of feed consumed per dozen eggs was approximately the same for all groups ranging from a low of 5.50 to a high of 5.82.

For the average of the 3 trials the pounds of feed required per dozen eggs decreased as the egg production for each group increased (Table 8). The cost and labor income per 100 birds housed is given in Table 9.

The group with the highest labor income was different in each trial. The groups restricted 50% to 20 and 26 weeks of age had a higher labor income than either full fed group in Trials 1 and 2; however, in Trial 3 these 2 groups had a lower labor income than either full fed group. The lower labor income in Trial 3 from the 50% restricted groups probably could be accounted for by the fact that mortality was as high or higher in these groups than it was in the full fed groups. This high mortality resulted

in considerably lower total income.

The average labor income for the 3 trials was highest for the full fed group housed at 20 weeks of age. The group restricted 75% to 5% production or 26 weeks of age and the groups restricted 50% ranked between the 2 full fed groups in average labor income for the 3 trials. The group restricted 75% to 20 weeks of age had the lowest average labor income although in the third trial the labor income for this group was higher than the labor income from the other restricted groups.

Table 1. Pounds of feed consumed per 100 birds from one day of age to housing (means of 3 trials).

| Weeks | Group 1 |      | Group 2 |      | Group 3 |      |
|-------|---------|------|---------|------|---------|------|
|       | Mash    | Oats | Mash    | Oats | Mash    | Oats |
| 0- 8  | 438     | 5    | 434     | 5    | 442     | 5    |
| 8- 9  | 88      | 29   | 78      | 25   | 68      | 19   |
| 9-10  | 83      | 30   | 70      | 25   | 57      | 22   |
| 10-11 | 71      | 29   | 50      | 32   | 35      | 22   |
| 11-12 | 82      | 42   | 50      | 23   | 36      | 16   |
| 12-13 | 89      | 44   | 67      | 34   | 47      | 24   |
| 13-14 | 90      | 31   | 73      | 35   | 52      | 25   |
| 14-15 | 78      | 34   | 74      | 27   | 52      | 18   |
| 15-16 | 87      | 30   | 65      | 28   | 47      | 21   |
| 16-17 | 86      | 24   | 72      | 25   | 52      | 18   |
| 17-18 | 89      | 26   | 71      | 20   | 50      | 14   |
| 18-19 | 83      | 34   | 73      | 24   | 52      | 16   |
| 19-20 | 80      | 29   | 70      | 28   | 50      | 21   |
| 20-21 | 91      | 28   | 64      | 24   | 42      | 13   |
| 21-22 | 109     | 30   | 76      | 25   | 52      | 16   |
| 22-23 | 99      | 37   | 97      | 28   | 61      | 16   |
| 23-24 | 101     | 30   | 88      | 36   | 61      | 19   |
| 24-25 | --      | --   | 88      | 34   | 61      | 17   |
| 25-26 | --      | --   | 88      | 15   | 61      | 17   |

Table 2. Percent mortality.

|                                 |         | Group 1A | Group 1B | Group 2A | Group 2B | Group 3A | Group 3B |
|---------------------------------|---------|----------|----------|----------|----------|----------|----------|
| 0-8 weeks                       | Mean    | 7.4      | 7.4      | 7.4      | 7.4      | 7.4      | 7.4      |
|                                 | Trial 1 | 8.3      | 8.3      | 8.3      | 8.3      | 8.3      | 8.3      |
|                                 | 2       | 7.8      | 7.8      | 7.8      | 7.8      | 7.8      | 7.8      |
|                                 | 3       | 6.2      | 6.2      | 6.2      | 6.2      | 6.2      | 6.2      |
| 8 weeks to housing              | Mean    | 4.4      | 5.0      | 13.4     | 13.7     | 17.9     | 19.5     |
|                                 | Trial 1 | 4.5      | 4.6      | 5.7      | 5.8      | 14.7     | 14.7     |
|                                 | 2       | 3.5      | 5.1      | 11.4     | 12.4     | 10.5     | 15.3     |
|                                 | 3       | 5.2      | 5.2      | 23.0     | 23.0     | 28.6     | 28.6     |
| Housing to end of laying period | Mean    | 13.0     | 12.7     | 26.3     | 11.0     | 10.7     | 15.0     |
|                                 | Trial 1 | 15.0     | 15.0     | 49.0     | 9.0      | 11.0     | 12.0     |
|                                 | 2       | 11.0     | 13.0     | 17.0     | 11.0     | 7.0      | 11.0     |
|                                 | 3       | 14.0     | 10.0     | 13.0     | 13.0     | 14.0     | 22.0     |

**Table 3. Cost per bird to housing. (Based on number of birds alive at housing).**

|             |       | Group 1A | Group 1B | Group 2A | Group 2B | Group 3A | Group 3B |      |
|-------------|-------|----------|----------|----------|----------|----------|----------|------|
| Chick cost  | Mean  | 0.40     | 0.40     | 0.44     | 0.45     | 0.47     | 0.48     |      |
|             | Trial | 1        | 0.42     | 0.42     | 0.42     | 0.43     | 0.47     | 0.47 |
|             |       | 2        | 0.39     | 0.39     | 0.43     | 0.43     | 0.42     | 0.43 |
|             |       | 3        | 0.39     | 0.39     | 0.48     | 0.48     | 0.53     | 0.53 |
| Feed cost   | Mean  | 0.72     | 0.90     | 0.66     | 0.87     | 0.57     | 0.78     |      |
|             | Trial | 1        | 0.71     | 0.90     | 0.60     | 0.81     | 0.52     | 0.66 |
|             |       | 2        | 0.76     | 0.93     | 0.68     | 0.88     | 0.56     | 0.81 |
|             |       | 3        | 0.68     | 0.88     | 0.70     | 0.92     | 0.62     | 0.88 |
| Total cost* | Mean  | 1.14     | 1.33     | 1.13     | 1.34     | 1.07     | 1.29     |      |
|             | Trial | 1        | 1.17     | 1.36     | 1.06     | 1.28     | 1.03     | 1.17 |
|             |       | 2        | 1.15     | 1.32     | 1.11     | 1.31     | 0.98     | 1.24 |
|             |       | 3        | 1.11     | 1.31     | 1.21     | 1.43     | 1.20     | 1.46 |

\*Four cents added per bird for brooding and vaccination.

**Table 4. Body weight (pounds).**

|           |       | Group 1A | Group 1B | Group 2A | Group 2B | Group 3A | Group 3B |     |
|-----------|-------|----------|----------|----------|----------|----------|----------|-----|
| 8 weeks   | Mean  | 1.2      | 1.2      | 1.2      | 1.2      | 1.2      | 1.2      |     |
|           | Trial | 1        | 1.3      | 1.3      | 1.3      | 1.3      | 1.3      | 1.3 |
|           |       | 2        | 1.2      | 1.2      | 1.2      | 1.2      | 1.2      | 1.2 |
|           |       | 3        | 1.2      | 1.2      | 1.2      | 1.2      | 1.2      | 1.2 |
| 20 weeks  | Mean  | 3.0      | 3.0      | 2.6      | 2.6      | 2.1      | 2.1      |     |
|           | Trial | 1        | 3.0      | 3.0      | 2.6      | 2.6      | 2.0      | 2.0 |
|           |       | 2        | 3.2      | 3.2      | 2.7      | 2.7      | 2.0      | 2.0 |
|           |       | 3        | 2.8      | 2.8      | 2.6      | 2.6      | 2.3      | 2.3 |
| 18 months | Mean  | 4.4      | 4.3      | 4.4      | 4.3      | 4.3      | 4.2      |     |
|           | Trial | 1        | 4.9      | 4.8      | 4.7      | 4.8      | 4.6      | 4.6 |
|           |       | 2        | 4.4      | 4.3      | 4.4      | 4.1      | 4.2      | 4.2 |
|           |       | 3        | 3.9      | 3.8      | 4.0      | 3.9      | 4.0      | 3.7 |

**Table 5. Program of full and restricted feeding, age at housing, and age at 5% and 50% production.**

|                         |       | Group 1A | Group 1B | Group 2A | Group 2B | Group 3A | Group 3B |     |
|-------------------------|-------|----------|----------|----------|----------|----------|----------|-----|
| 0-8 weeks               | Full  | Full     | Full     | Full     | Full     | Full     | Full     |     |
| 8-weeks to housing      | Full  | Full     | 75%*     | 75%*     | 50%*     | 50%*     | 50%*     |     |
| In laying house         | Full  | Full     | Full     | Full     | Full     | Full     | Full     |     |
| Age at housing**        | Mean  | 140      | 164      | 140      | 174      | 140      | 182      |     |
| (days)                  | Trial | 1        | 140      | 166      | 140      | 182      | 140      | 182 |
|                         | 2     | 140      | 159      | 140      | 162      | 140      | 182      |     |
|                         | 3     | 140      | 167      | 140      | 177      | 140      | 182      |     |
| Age at 5% Prod. (days)  | Mean  | 158      | 164      | 161      | 178      | 173      | 194      |     |
| Trial                   | 1     | 165      | 166      | 166      | 194      | 177      | 200      |     |
|                         | 2     | 150      | 159      | 157      | 162      | 176      | 193      |     |
|                         | 3     | 160      | 167      | 159      | 177      | 165      | 189      |     |
| Age at 50% Prod. (days) | Mean  | 184      | 185      | 186      | 202      | 207      | 218      |     |
| Trial                   | 1     | 189      | 192      | 194      | 221      | 220      | 225      |     |
|                         | 2     | 183      | 180      | 188      | 187      | 212      | 215      |     |
|                         | 3     | 179      | 184      | 176      | 198      | 189      | 214      |     |

\*Group 2 was fed 75% and Group 3 was fed 50% as much feed as Group 1 consumed the previous week.

\*\*A Groups housed at 20 weeks. B Groups housed at 5% production or 26 weeks of age.

**Table 6. Egg production per group to end of laying period (age at 5% production plus 365 days) and number of each size.**

|             |         | Group 1A | Group 1B | Group 2A | Group 2B | Group 3A | Group 3B |
|-------------|---------|----------|----------|----------|----------|----------|----------|
| TOTAL       | Mean    | 20388    | 19887    | 18337    | 20349    | 20092    | 19910    |
|             | Trial 1 | 17680    | 17724    | 14479    | 19144    | 18112    | 18875    |
|             | 2       | 21199    | 20295    | 19243    | 21203    | 21038    | 21158    |
|             | 3       | 22285    | 21642    | 21288    | 20699    | 21126    | 19697    |
| Extra Large | Mean    | 1528     | 1249     | 1098     | 1293     | 1427     | 1323     |
|             | Trial 1 | 1358     | 850      | 365      | 1339     | 533      | 916      |
|             | 2       | 1936     | 1638     | 1860     | 1273     | 1991     | 1773     |
|             | 3       | 1290     | 1259     | 1070     | 1266     | 1756     | 1279     |
| Large       | Mean    | 12444    | 12176    | 10680    | 12689    | 12680    | 13540    |
|             | Trial 1 | 10288    | 10114    | 7457     | 11673    | 10245    | 11555    |
|             | 2       | 12909    | 12426    | 11826    | 13200    | 14222    | 15448    |
|             | 3       | 14136    | 13987    | 12756    | 13193    | 13572    | 13616    |
| Medium      | Mean    | 5057     | 5321     | 5261     | 5633     | 5206     | 4712     |
|             | Trial 1 | 5004     | 5775     | 5502     | 5631     | 6623     | 6028     |
|             | 2       | 5103     | 5019     | 4626     | 5971     | 4418     | 3734     |
|             | 3       | 5065     | 5168     | 5654     | 5297     | 4578     | 4375     |
| Small       | Mean    | 1086     | 915      | 1035     | 636      | 666      | 307      |
|             | Trial 1 | 819      | 773      | 808      | 429      | 593      | 327      |
|             | 2       | 899      | 895      | 711      | 619      | 343      | 184      |
|             | 3       | 1541     | 1078     | 1586     | 861      | 1063     | 409      |
| Pewee       | Mean    | 272      | 226      | 263      | 98       | 113      | 29       |
|             | Trial 1 | 211      | 212      | 347      | 72       | 118      | 49       |
|             | 2       | 352      | 317      | 220      | 140      | 64       | 19       |
|             | 3       | 253      | 150      | 222      | 82       | 157      | 18       |

**Table 7. Percent production hen housed and percent of each size laid to end of laying period.**

|             |         | Group 1A | Group 1B | Group 2A | Group 2B | Group 3A | Group 3B |
|-------------|---------|----------|----------|----------|----------|----------|----------|
| TOTAL       | Mean    | 55.86    | 54.48    | 50.24    | 55.75    | 55.05    | 54.55    |
|             | Trial 1 | 48.44    | 48.56    | 39.67    | 52.45    | 49.62    | 51.71    |
|             | 2       | 58.08    | 55.60    | 52.72    | 58.09    | 57.64    | 57.97    |
|             | 3       | 61.05    | 59.29    | 58.32    | 56.71    | 57.88    | 53.96    |
| Extra Large | Mean    | 7.53     | 6.23     | 5.74     | 6.37     | 6.90     | 6.57     |
|             | Trial 1 | 7.68     | 4.80     | 2.52     | 6.99     | 2.94     | 4.85     |
|             | 2       | 9.13     | 8.07     | 9.67     | 6.00     | 9.46     | 8.38     |
|             | 3       | 5.79     | 5.82     | 5.03     | 6.11     | 8.31     | 6.49     |
| Large       | Mean    | 60.84    | 60.97    | 57.63    | 62.33    | 62.81    | 67.79    |
|             | Trial 1 | 58.19    | 57.06    | 51.50    | 60.98    | 56.57    | 61.22    |
|             | 2       | 60.90    | 61.23    | 61.46    | 62.26    | 67.60    | 73.01    |
|             | 3       | 63.43    | 64.63    | 59.92    | 63.74    | 64.25    | 69.13    |
| Medium      | Mean    | 25.03    | 27.06    | 29.53    | 27.72    | 26.41    | 23.93    |
|             | Trial 1 | 28.30    | 32.58    | 38.00    | 29.41    | 36.57    | 31.94    |
|             | 2       | 24.07    | 24.73    | 24.04    | 28.16    | 21.00    | 17.65    |
|             | 3       | 22.73    | 23.88    | 26.56    | 25.59    | 21.67    | 22.21    |
| Small       | Mean    | 5.26     | 4.58     | 5.57     | 3.11     | 3.31     | 1.56     |
|             | Trial 1 | 4.63     | 4.36     | 5.58     | 2.24     | 3.27     | 1.73     |
|             | 2       | 4.24     | 4.41     | 3.69     | 2.92     | 1.63     | 0.87     |
|             | 2       | 6.91     | 4.98     | 7.45     | 4.16     | 5.03     | 2.08     |
| Pewee       | Mean    | 1.33     | 1.15     | 1.53     | 0.48     | 0.57     | 0.15     |
|             | Trial 1 | 1.20     | 1.20     | 2.40     | 0.38     | 0.65     | 0.26     |
|             | 2       | 1.66     | 1.56     | 1.14     | 0.66     | 0.31     | 0.09     |
|             | 3       | 1.14     | 0.69     | 1.04     | 0.40     | 0.74     | 0.09     |



**Table 8. Laying mash consumed and pounds of feed per dozen eggs (based on feed consumed after 5% production).**

|                                  |         | Group 1A | Group 1B | Group 2A | Group 2B | Group 3A | Group 3B |
|----------------------------------|---------|----------|----------|----------|----------|----------|----------|
| Consumption before 5% production | Mean    | 454      | 0        | 498      | 111      | 662      | 253      |
|                                  | Trial 1 | 600      | 0        | 612      | 333      | 771      | 421      |
|                                  | 2       | 271      | 0        | 430      | 0        | 601      | 275      |
|                                  | 3       | 490      | 0        | 452      | 0        | 615      | 64       |
| Consumption after 5% production  | Mean    | 9286     | 9335     | 8782     | 9453     | 9361     | 9324     |
|                                  | Trial 1 | 8953     | 9126     | 7792     | 9435     | 8922     | 9496     |
|                                  | 2       | 9277     | 9194     | 8997     | 9669     | 9353     | 8976     |
|                                  | 3       | 9627     | 9685     | 9557     | 9256     | 9807     | 9500     |
| Total consumption                | Mean    | 9739     | 9335     | 9280     | 9564     | 10023    | 9577     |
|                                  | Trial 1 | 9553     | 9126     | 8404     | 9768     | 9693     | 9917     |
|                                  | 2       | 9548     | 9194     | 9427     | 9669     | 9954     | 9251     |
|                                  | 3       | 10117    | 9685     | 10009    | 9256     | 10422    | 9564     |
| Pounds of feed/doz. eggs.        | Mean    | 5.50     | 5.66     | 5.82     | 5.58     | 5.60     | 5.63     |
|                                  | Trial 1 | 6.08     | 6.18     | 6.46     | 5.91     | 5.91     | 6.02     |
|                                  | 2       | 5.25     | 5.44     | 5.61     | 5.47     | 5.33     | 5.09     |
|                                  | 3       | 5.18     | 5.37     | 5.39     | 5.37     | 5.57     | 5.79     |

**Table 9. Cost and income per 100 birds housed.**

|                                       |         | Group 1A | Group 1B | Group 2A | Group 2B | Group 3A | Group 3B |
|---------------------------------------|---------|----------|----------|----------|----------|----------|----------|
| Cost to housing                       | Mean    | \$114.33 | \$133.00 | \$112.67 | \$134.00 | \$107.00 | \$129.00 |
|                                       | Trial 1 | 117.00   | 136.00   | 106.00   | 128.00   | 103.00   | 117.00   |
|                                       | 2       | 115.00   | 132.00   | 111.00   | 131.00   | 98.00    | 124.00   |
|                                       | 3       | 111.00   | 131.00   | 121.00   | 143.00   | 120.00   | 146.00   |
| Cost of laying mash                   | Mean    | 351.59   | 336.99   | 335.00   | 345.27   | 361.83   | 345.74   |
|                                       | Trial 1 | 344.86   | 329.45   | 303.38   | 352.62   | 349.92   | 358.00   |
|                                       | 2       | 344.68   | 331.90   | 340.31   | 349.05   | 359.34   | 333.96   |
|                                       | 3       | 365.22   | 349.63   | 361.32   | 334.13   | 376.23   | 345.26   |
| Total cost                            | Mean    | 465.92   | 469.99   | 447.67   | 479.27   | 468.83   | 474.74   |
|                                       | Trial 1 | 461.86   | 465.45   | 409.38   | 480.62   | 452.92   | 475.00   |
|                                       | 2       | 459.68   | 463.90   | 451.31   | 480.05   | 457.34   | 457.96   |
|                                       | 3       | 476.22   | 480.63   | 482.32   | 477.14   | 496.23   | 491.26   |
| Income from eggs                      | Mean    | 673.35   | 656.89   | 601.18   | 676.21   | 668.83   | 669.79   |
|                                       | Trial 1 | 582.42   | 580.56   | 465.97   | 636.52   | 593.10   | 626.48   |
|                                       | 2       | 702.18   | 671.52   | 689.96   | 703.96   | 709.85   | 719.74   |
|                                       | 3       | 735.44   | 718.60   | 697.62   | 688.14   | 703.54   | 663.16   |
| Income from sale of old hens 0.10/lb. | Mean    | 38.03    | 37.70    | 31.32    | 38.19    | 38.23    | 35.48    |
|                                       | Trial 1 | 41.61    | 40.94    | 23.13    | 44.12    | 40.80    | 40.07    |
|                                       | 2       | 39.10    | 37.78    | 36.12    | 36.61    | 39.32    | 37.42    |
|                                       | 3       | 33.37    | 34.38    | 34.71    | 33.84    | 34.57    | 28.94    |
| Total income                          | Mean    | 711.37   | 694.59   | 632.50   | 714.40   | 707.06   | 705.27   |
|                                       | Trial 1 | 624.03   | 621.50   | 489.10   | 680.64   | 633.90   | 666.55   |
|                                       | 2       | 741.28   | 709.30   | 676.08   | 740.57   | 749.17   | 757.16   |
|                                       | 3       | 768.81   | 752.98   | 732.33   | 721.98   | 738.11   | 692.10   |
| Labor income                          | Mean    | 245.45   | 224.60   | 184.80   | 235.13   | 238.23   | 230.53   |
|                                       | Trial 1 | 162.17   | 156.05   | 79.72    | 200.02   | 180.98   | 191.55   |
|                                       | 2       | 281.60   | 245.40   | 224.67   | 260.52   | 291.83   | 299.20   |
|                                       | 3       | 292.59   | 272.35   | 250.00   | 244.84   | 241.88   | 200.84   |