

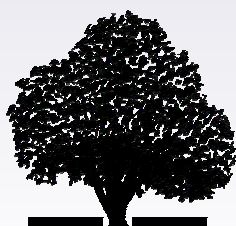
Investigation into the effect of “day one weight” on bird weight gain of ISA 257 table birds within the Sheepdrove Organic Farm organic silvo-poultry system

**Report
December 2004**

Sheepdrove



Organic Farm



**ELM FARM
RESEARCH CENTRE**

Executive Summary

- This report summarises the results of a preliminary trial undertaken to investigate the effect of day one chick weight on weight gain and final weight.
- The objectives of the trial were to ascertain the range in weights of day old chicks brought on to the farm and establish if any low or high weights were impacting on the weight gain and final weight of the birds.
- A sub-sample of the brooder intake of birds was weighed on arrival and marked in accordance with their weight.
- Marked birds were caught and re-marked weekly.
- At week four, prior to the move of the birds to the field sheds, the marked birds were caught weighed and re-marked.
- It was at this point that the trial was abandoned as, of the 150 birds marked at the start of the trial period; only 48 birds were recovered for re-weighing, despite weekly re-marking.
- Despite this, preliminary findings suggest that birds with low weight (below target weight) fail to perform and gain weight as well as birds that were heavier on day one.
- However, as discussed, these findings are based on a limited data set so further investigation needs to be undertaken to confirm this finding.
- Future trials should also investigate whether this trend of lower weight gain for birds that start at a lighter weight carries through to end weight.

1. Background

- 1.1. The issue of target weight is an important one when considering poultry in the Sheepdrove organic farm system. It has been noticed by the poultry and processing teams that each week there is a proportion of chickens that fail to reach the target processing weight.
- 1.2. It has also been noticed that each week a proportion of the birds brought on to the farm as day olds appeared to be very small and under the target start weight of 45 grams, desired by the poultry team. This has, however, not been formally investigated and confirmed.
- 1.3. In addition, at week four when moving to the field sheds, many of the birds appear to be under the target weight of 450 grams desired by the poultry team. Again this has not been formally investigated and confirmed.
- 1.4. It has been hypothesised that the birds starting below target weight may be failing to catch up with their 'above' and 'on-target' counterparts and hence not reach the target weight at processing.

2. Objectives

- 2.1. To ascertain the range in the weights of day old chicks brought on to the farm, by collecting additional data and examining historical data of day one weights.
- 2.2. To establish if birds below target weight on day one are remaining under target throughout the production period, by obtaining weights at week four and week ten.
- 2.3. To ascertain, if, overall, low or high day one weights are impacting on the weight gain and final weight of the birds.

3. Approaches

- 3.1. One batch of approximately one thousand mixed sexed ISA 257 birds were grown under organic free-range conditions conforming to Soil Association standards. Birds were housed in a typical production brooder shed for the first 3 weeks and moved to a typical production field shed for the remaining period.
- 3.2. A sub-sample of one hundred and fifty birds was weighed and marked accordingly on arrival (see appendix, protocol 1) and then re-marked each week (see appendix, protocol 2).
- 3.3. The day prior to being moved to the field shed, day twenty-four, the birds were re-weighed in addition to being re-marked (see appendix, protocol 3).
- 3.4. Birds from the brooder shed were moved as a whole group into one field shed.

4. Results and Discussion

4.1. Historical Day One Weights

4.1.1. For historical data, of day one weights collected over previous trials, see figures 1-4.

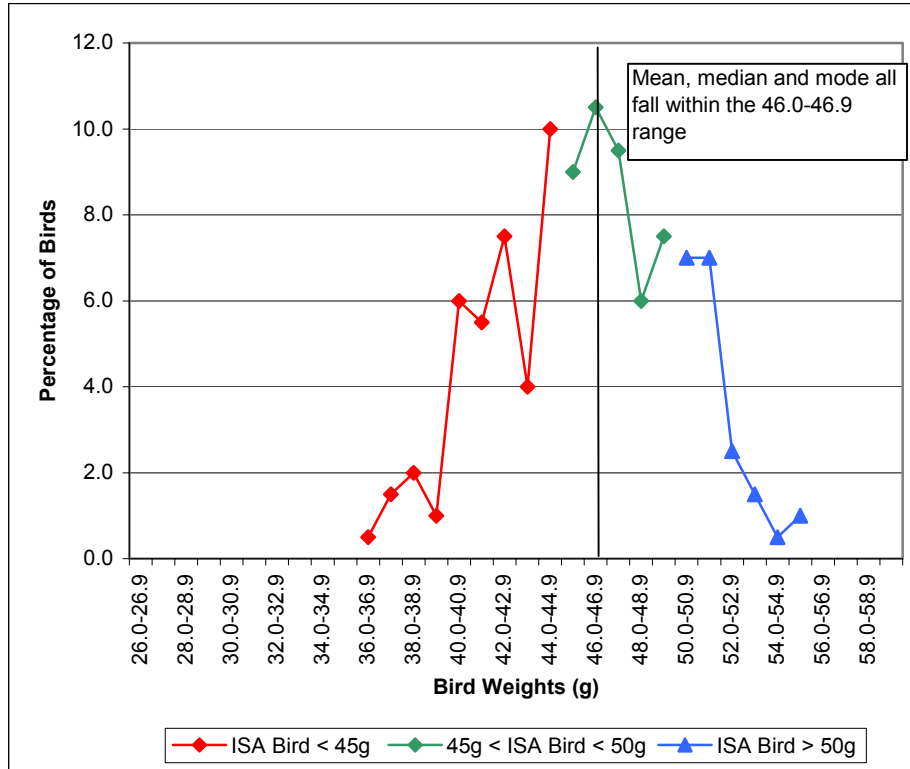


Figure 1: Population distribution curve for day olds brought in 01.03.04, showing percentage and distribution of birds under, within and over the target weight of 45g.

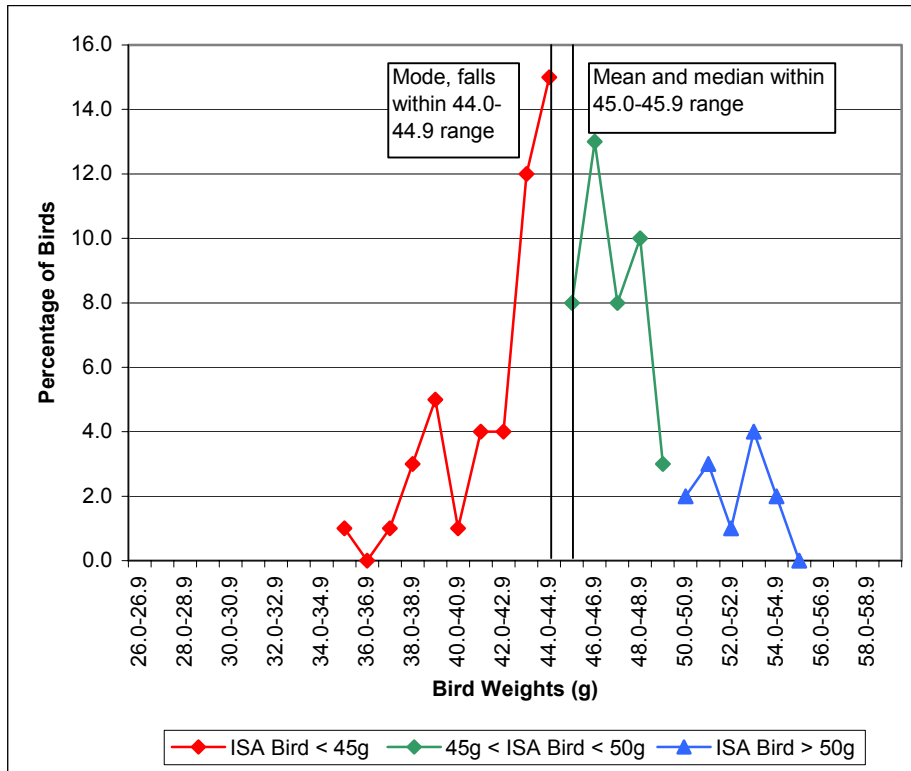


Figure 2: Population distribution curve for day olds brought in 19.04.04, showing percentage and distribution of birds under, within and over the target weight of 45g.

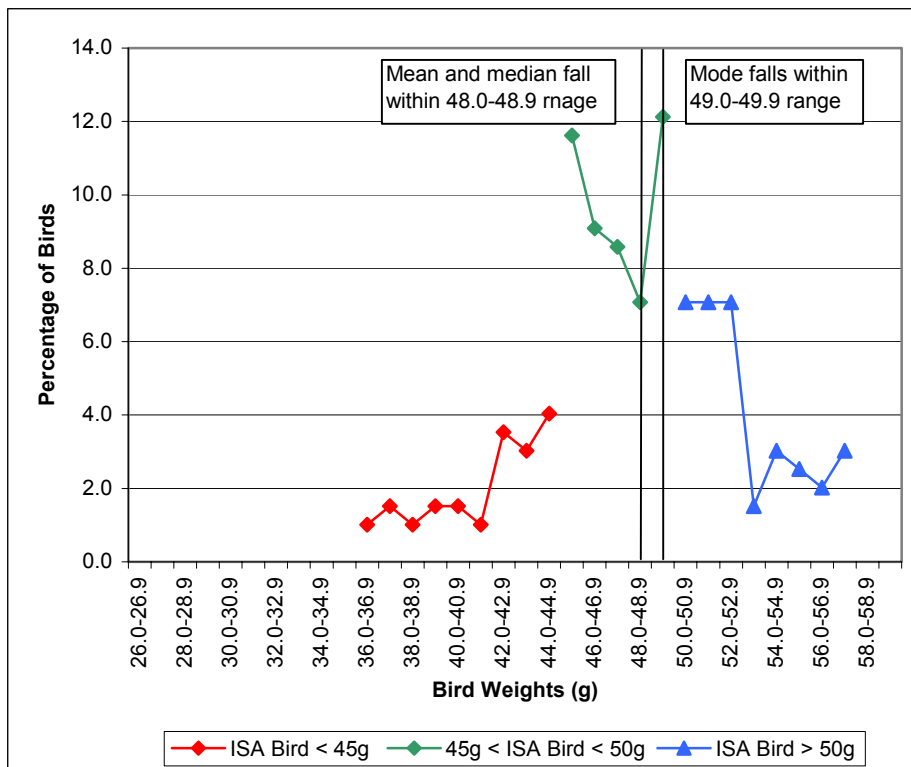


Figure 3: Population distribution curve for day olds brought in 26.07.04, showing percentage and distribution of birds under, within and over the target weight of 45g.

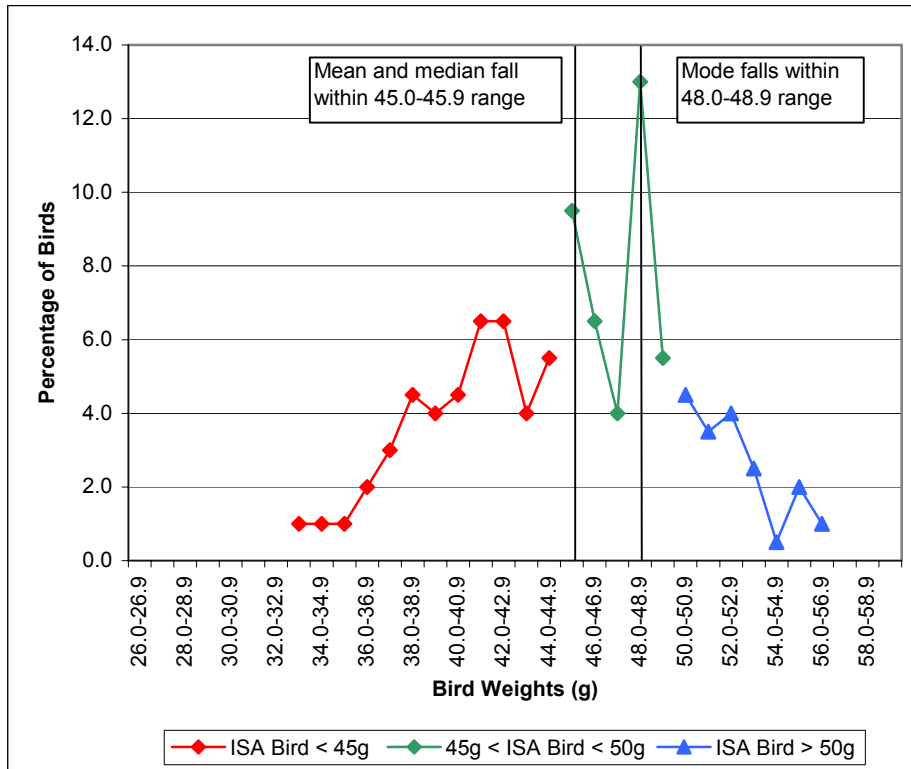


Figure 4: Population distribution curve for day olds brought in 20.09.04, showing percentage and distribution of birds under, within and over the target weight of 45g.

Date	Percentage of birds		
	Under target weight (< 45g)	Within target range (45g < x < 50g)	Over target weight (> 50g)
01.03.04	38	42.5	19.5
19.04.04	46	42	12
26.07.04	18	48	33
20.09.04	43.5	38.5	18

Table 1: Block percentages of historical data for day olds demonstrating percentage of birds under, within and over the target weight of 45g.

- 4.1.2. The historical data demonstrates that although the average (mean, median and mode) target weight of birds brought in as data olds are within the target weight range, there is frequently a high percentage of birds brought in under the target weight.
- 4.1.3. These results confirm the doubts of the poultry team that day old birds are often brought in under weight.
- 4.1.4. This demonstrates the need to follow birds that are under weight on day one, and monitor their weight gain when compared with that of the birds at target weight on day one. This should demonstrate if a poor start is impacting on the long-term performance of the birds, and if these underweight birds can account for the birds not reaching a processing target weight.

4.2. Trial Weights

4.2.1. Day One

4.2.1.1. Figure 5 and 6 shows the population distribution and the percentages of weight distribution on day one for the trial birds.

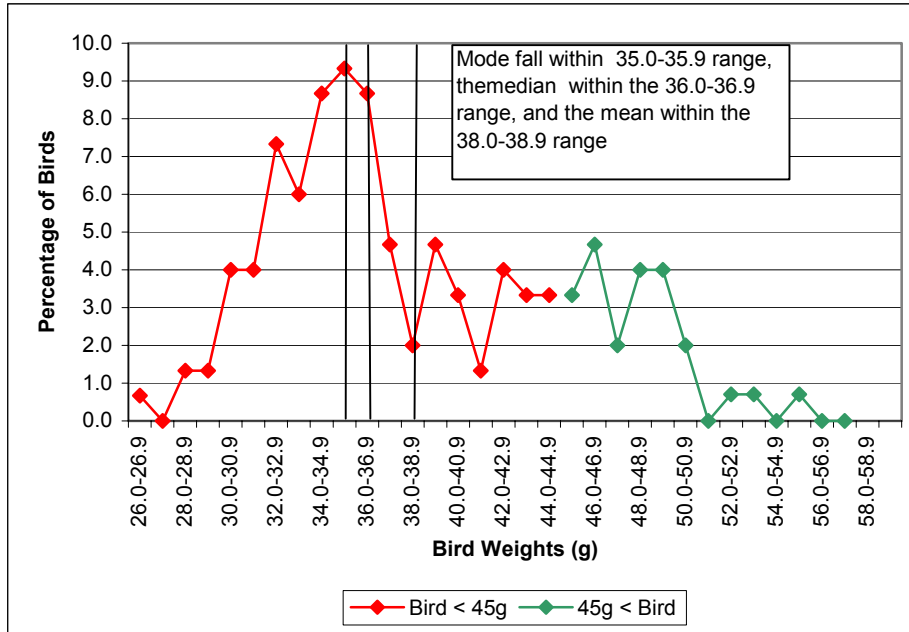


Figure 5: Population distribution curve for day olds brought in 11.10.04, showing percentage and distribution of birds under, within and over the target weight of 45g.

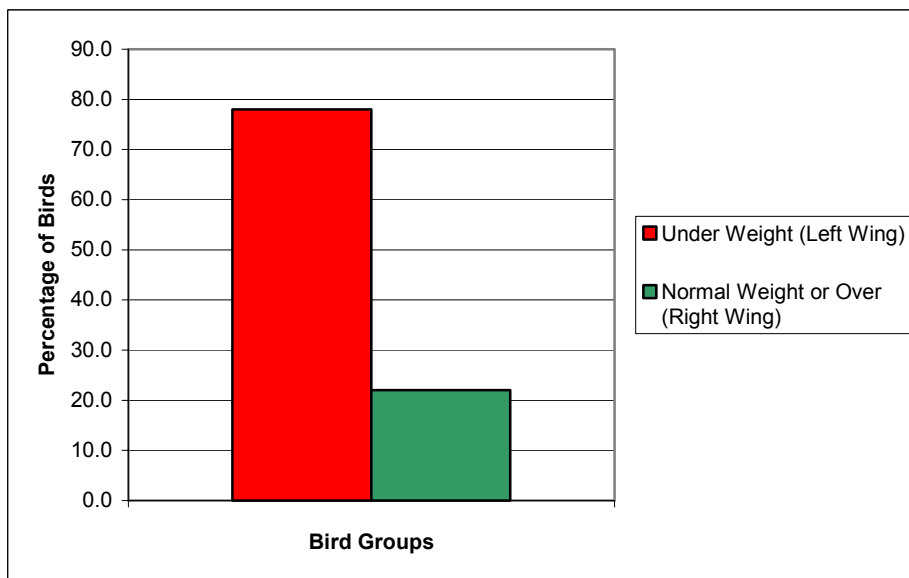


Figure 6: Block percentages for day olds brought in 11.10.04, demonstrating percentage of birds under, within and over the target weight of 45g.

4.2.1.2. The above figures demonstrate that for the birds followed in this trial a large percentage of them were under the target weight of 45 grams on day one. On average (mean, median and mode) these birds were well below the target weight.

4.2.1.3. This is what was expected after examining the historical data, however in this instance a very large percentage of the birds, 78 percent in total, were under the target weight.

4.2.2. Day Twenty Four

4.2.2.1. After re-marking each week the birds were re-weighed on day twenty four, before they were moved to the field sheds.

4.2.2.2. Unfortunately, despite weekly re-marking, only 34 percent of the birds under target weight on day one (40 out of 117) and 24 percent of the birds over target weight on day one (8 out of 33) were recovered for re-weighing, at day 24. The reason for this was unclear, but it maybe that as the birds were growing a large mark on a small chick was fading to be a small mark on a larger bird, and hence more difficult to identify.

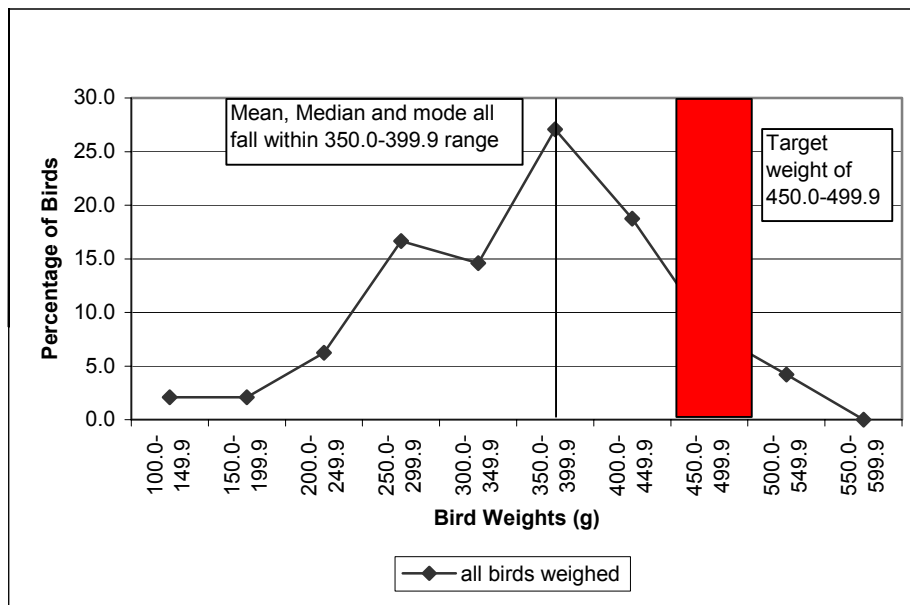


Figure 7: Population distribution curve for all marked birds regardless of day one weight, for day 24, with line to show target weight.

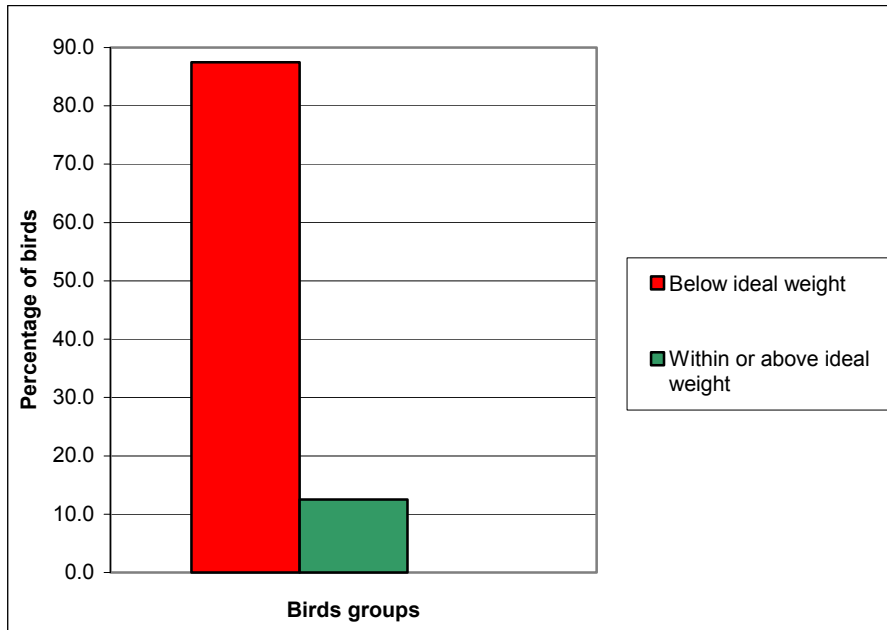


Figure 8: Block percentages for all marked birds regardless of day one weight, for day 24, split into groups over and under target weight at this stage.

4.2.2.3. Figures 7 and 8 demonstrate that at this stage a large percentage of the birds were under weight (87.5 percent), with the population distribution indicating an average 355.7g (mean), 94.3–144.3g under target weight.

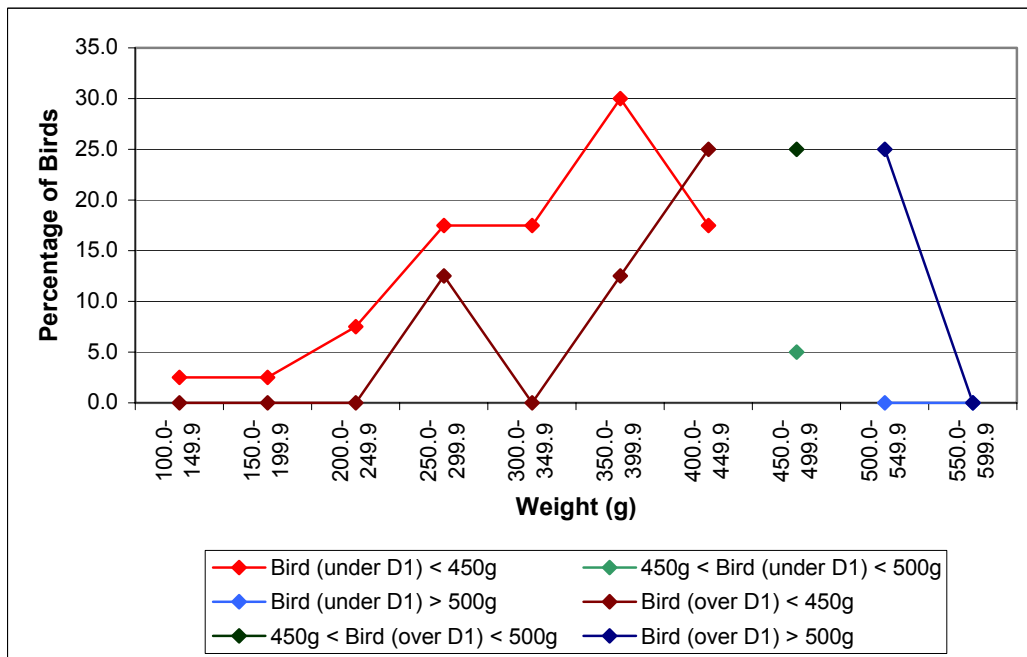


Figure 9: Population distribution curve for marked birds on day 24, 03.11.04, taking into account day one weight, showing percentage and distribution of birds under, within and over the target weight of 450g.

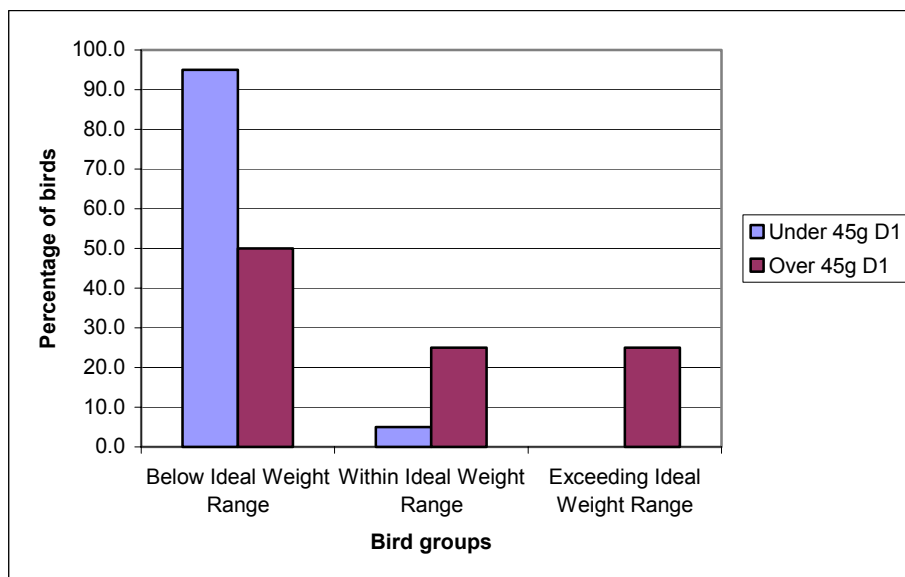


Figure 10: Blocked percentages for marked birds on day 24, 03.11.04, taking into account day one weight, showing percentage of birds under, within and over the target weight range of 450g-500g.

- 4.2.2.4. Figures 9 and 10 demonstrate that on day twenty-four, birds that were brought in under weight on day one almost all failed to reach target weight at this stage. Whereas, birds that were brought in heavier were hitting, and exceeding, the target weight more often.
- 4.2.2.5. This supports the ideas that birds that are 'light' or below target weight on day one are not making up the weight whilst in the brooders and are out-performed by the birds that are heavier when they are brought in, at this stage.
- 4.2.2.6. However, the fact that the data set used at this stage was very much reduced from the original and, in particular, the heavier group represents just 8 individuals, needs to be considered.
- 4.2.2.7. In light of this it is fair to say that these results suggest that a 'bad start' for a bird carries through to the end of brooding but more work must be undertaken to confirm this.

4.2.3. Post Day Twenty-four

- 4.2.3.1. Originally the study had planned to follow the marked birds through to the end of production and obtain, weights and gait scores for these birds on day seventy-two. However, due to the small size of the remaining data set and the potential for further loss of marked individuals in the field, as a result of marks rubbing off, migration, death and predation, the study was abandoned at this stage.

5. Conclusions & Recommendations

- 5.1. Overall this study demonstrates that Sheepdrove does have a problem with a large percentage of birds each week being brought in under target weight.
- 5.2. It also indicates, through following under target weight birds that these birds are not 'catching up' with their heavier counter-parts. They are struggling to meet the target weight desired by the poultry team before moving from the brood sheds and into the field shed environment. This is not entirely conclusively due to limitations with the data set.
- 5.3. On the basis of these limited findings, it was felt that the size of chicks was a significant factor in the production profiles of the final birds. This causes a major problem for Sheepdrove as it suggests, as previously believed, that the underweight birds are a common occurrence and they are affecting the system by maintaining lower weights through production.
- 5.4. It is hypothesised that this situation would be maintained and potentially exacerbated (due to lower temperatures) throughout the period the birds spend in the field sheds.
- 5.5. It is recommended that further study be undertaken in this area to deal with the limitations of the current study and obtain more conclusive results in this area.

6. Further study

- 6.1. It is proposed that over a period of time, a number of pairs of brooder houses are followed to obtain a large data set with some repetition to help eliminate spurious results.
- 6.2. All the chicks within the brooder should be weighed and marked accordingly when they are brought in to gain knowledge of their start weight.
- 6.3. By weighing all the birds in the brooder on day one and marking them, this should cut down on the number of individuals 'lost' when re-collecting weight data on day twenty four, as all the birds should have a mark on them therefore all should be re-marked and weighed when necessary.
- 6.4. The birds should be weighed at the different target weight points, day one, day twenty-four and day seventy-two. Also, gait scoring should be undertaken on a sub-sample of birds on day seventy-two if possible.
- 6.5. In addition the poultry team should be advised to mark mortalities according to cause of death if possible and wing mark so mortalities for lighter and heavier birds can be examined.

7. Acknowledgements

- 7.1. I would like to thank the EFRC research team including Claire Aspray, Sarah Pepler and Lois Philipps for their help with data collection, and Bruce Pearce for his comments on the report. In addition, I would like to thank Gez Cleaver and the poultry team for their help and support with the running of the trial.

Appendix

Protocols

1. Chick Arrival Weighing and Marking

- Time of arrival varies, from any time after 1pm, minimum of 2 people required
- The chicks arrived in the afternoon as hatched mixed sex birds in crates with 130-150 birds per crate.
- Two crates were selected at random and 150 birds were weighed out of the two crates by selecting birds at random from each crate and alternating between the two.
- Birds were weighed using a Welltech 'chick weigher', and marked with blue staining antiseptic spray on the right wing if they were target weight (45 grams) or over, and on the left wing if they were below target weight.
- Spray marking was carried out using a hole punched laminated sheet as a guide, so not to saturate the day old chicks.
- The remaining birds were counted out of crates and total number recorded.

2. Weekly re-marking in Brood Sheds

- This was carried out weekly, and required a minimum of 2 people.
- Using corrugated cardboard, 3 or 4 temporary holding pens (depending on size of chicks) were constructed in the corners of the brooder. Leaving an opening in order for the chicks to enter.
- Chicks were herded into the temporary holding pens by identifying a large group of individuals and using an additional piece of cardboard to herd the chicks towards an open pen. This was done slowly by approaching the birds from the rear of the group and walking slowly behind the chicks, herding them into the pen taking care to minimise stress. The cardboard was secured using a feeder to support the end.
- Suffocation was a risk, therefore bird numbers were assessed in each pen and individuals were released if necessary.
- Herding was repeated until all the birds were in pens.
- The birds were then picked individually and their wings were checked for marks, if they were not marked they were released into the main brooder.
- If a bird was marked, it was re-marked using the spray, and hole-punch guide if necessary. Care was taken to ensure that the spray did not transfer to the unmarked wing of marked birds, whilst it is wet, by preventing the bird from flapping.
- Once re-marked and dry, the bird was released back into the main brooder.

3. Weighing and re-marking in Brood Sheds

- This was carried out before the birds were moved to the field shed, and required a minimum of 2 people
- Using corrugated cardboard, 3 or 4 temporary holding pens (depending on size of chicks) were constructed in the corners of the brooder. Leaving an opening in order for the chicks to enter.
- Chicks were herded into the temporary holding pens by identifying a large group of individuals and using an additional piece of cardboard to herd the chicks towards an open pen. This was done slowly by approaching the birds from the rear of the group and walking slowly behind the chicks, herding them into the pen taking care to minimise stress. The cardboard was secured using a feeder to support the end.

- Suffocation was a risk, therefore bird numbers were assessed in each pen and individuals were released if necessary.
- Herding was repeated until all the birds were in pens.
- Each bird was picked up and checked for wing marks, if a bird was not marked it was released from the holding pen.
- If a bird was marked, it was weighed using the Welltech 'chick weigher', and its weight and the wing that was marked was recorded.
- In addition marked birds were re-marked using the spray, and hole-punch guide if necessary, before they were released.
- Care was taken to ensure that the spray did not transfer to the unmarked wing of marked birds, whilst it is wet, by preventing the bird from flapping.
- Once re-marked and dry, the bird was released back into the main brooder.