

# **The Establishment of a Preliminary Weight Profile for the 257 Table Birds within the Sheepdrove Organic Farm Organic Silvo-Poultry System.**

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**Sheepdrove**



**Organic Farm**



## Abstract.

1. A preliminary weight profile was produced for the organic silvo-poultry system on Sheepdrove organic farm. Seven batches (each of 20 hens and 20 cocks) were weighed over a two month period (January/February 2003). No current organic silvo-poultry weight profile was available but the weights achieved were found to exceed those of the nearest suggested profile (ISA 657) but were beneath the weights required for Sheepdroves markets. There was great and inconsistent variation between the batches and between sheds. This suggested that environment and management of particular houses could be having a large impact on final chicken weights. Further studies are required.

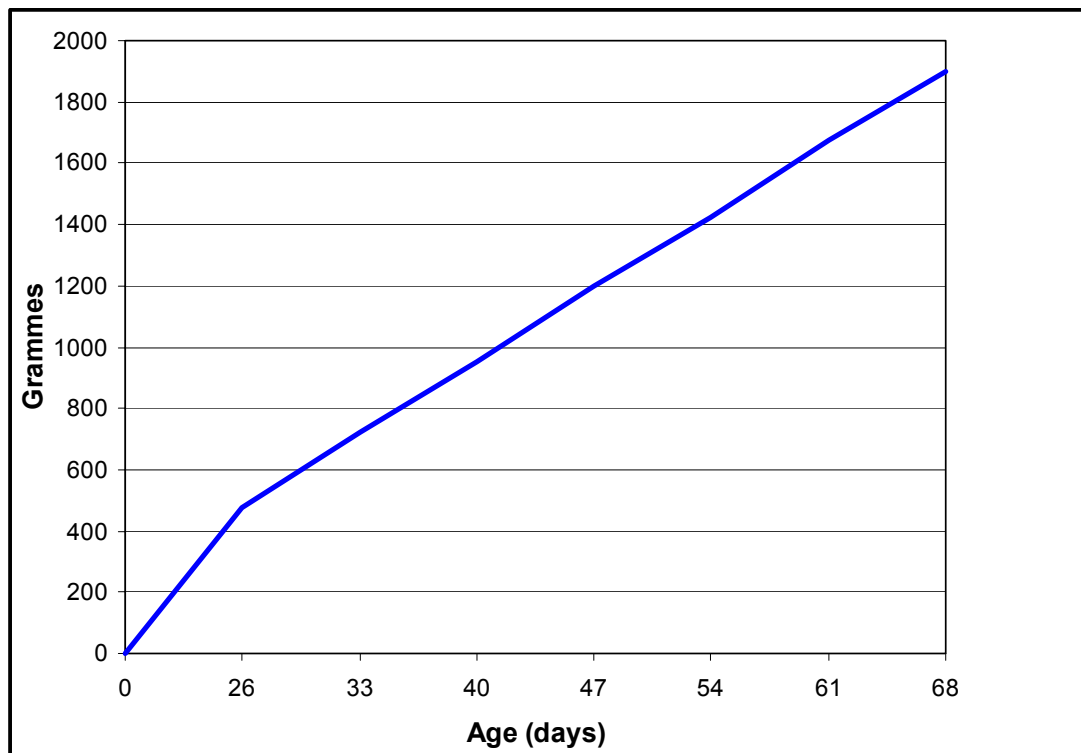
## Objective.

2. To establish a preliminary weight profile for the 257 birds within the organic silvo-poultry system on Sheepdrove Organic Farm.

## Background.

3. The organic silvo-poultry system was established on Sheepdrove Organic Farm (SOF) in 2002. However, at the time it was not known how the birds would perform within this system. The breed being raised on SOF is 257 and there are no available weight profiles for this breed within organic free-range systems. However, It was suggested that a profile for a similar breed, the ISA 657, may be suitable. Figure 1 shows the weight profile for the ISA 657.

Figure 1. Weight profile for ISA 657.



- 3.1. The appropriateness of this profile must be questioned as the weight at 68 days (SOF kill out day) is only 1900g that would result in a finished product weight of 1330g (assuming a 30% reduction). This weight is below the target for SOF

markets of between 1800 and 1900g. To meet this target weight SOF birds should be coming off of the field at around 2,650g

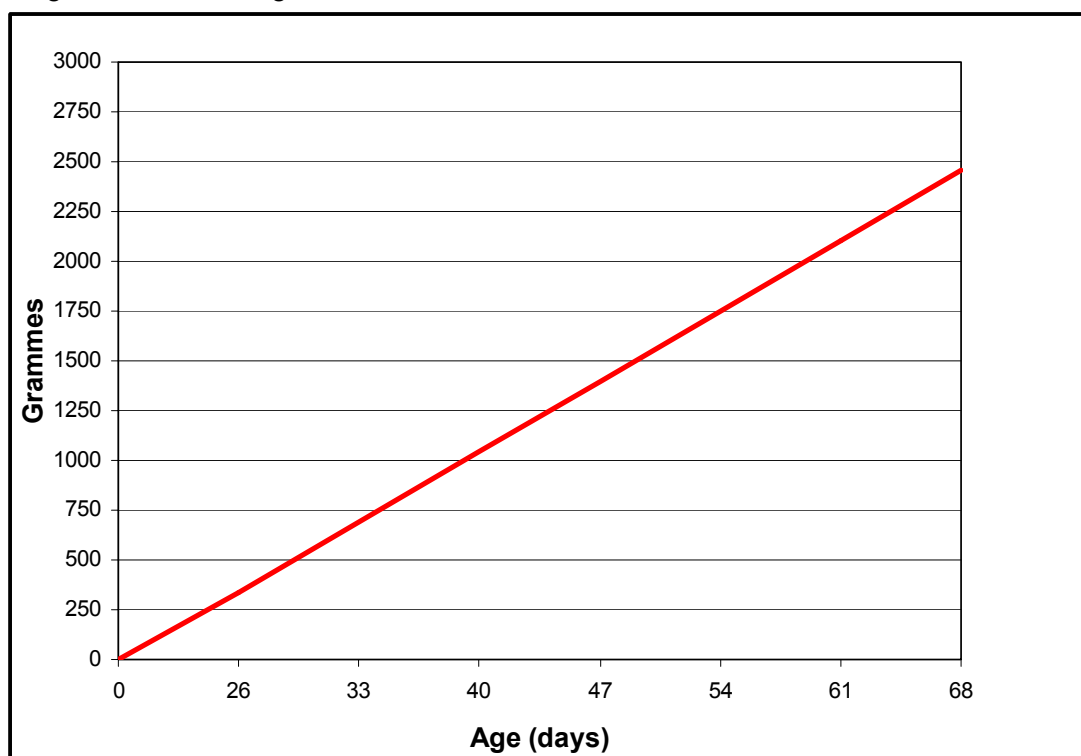
## Methods.

4. The data for this profile was collected in the months of January/February 2003.
  - 4.1. Weighing started when the birds were 22-25 old (week 4) and were being moved out of the brooder sheds and into the field sheds.
  - 4.2. Seven batches of birds were weighed weekly over the two month period. Twenty cocks and twenty hens were weighed separately from each batch.
  - 4.3. The last weighing date for each batch was at 68 days (10 weeks) 3 and 5 days prior to slaughter. This meant that within the study we had one sample of birds that were weighed every week for their entire time in the field and others were weighed from their time of being introduced to the field sheds until the termination of the experiment on 27 February 2003.

## Results.

5. Weights were collated and analysed.
  - 5.1. Figure 2 shows the mean weight of the pooled data at each week between week 4 and 10. Annex 1 is the complete data set.

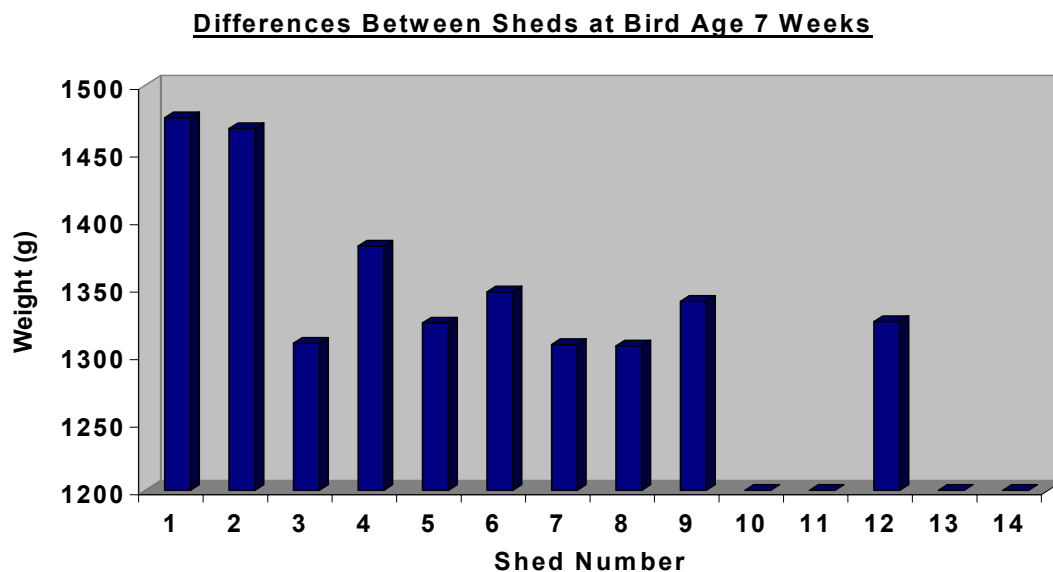
Figure 2. Mean weight of SOF 257 birds from week 4 to 10.



- 5.2. This data shows a mean kill out weight of 2454g for this period. Which would result in an approximate finished weight of 1700g.

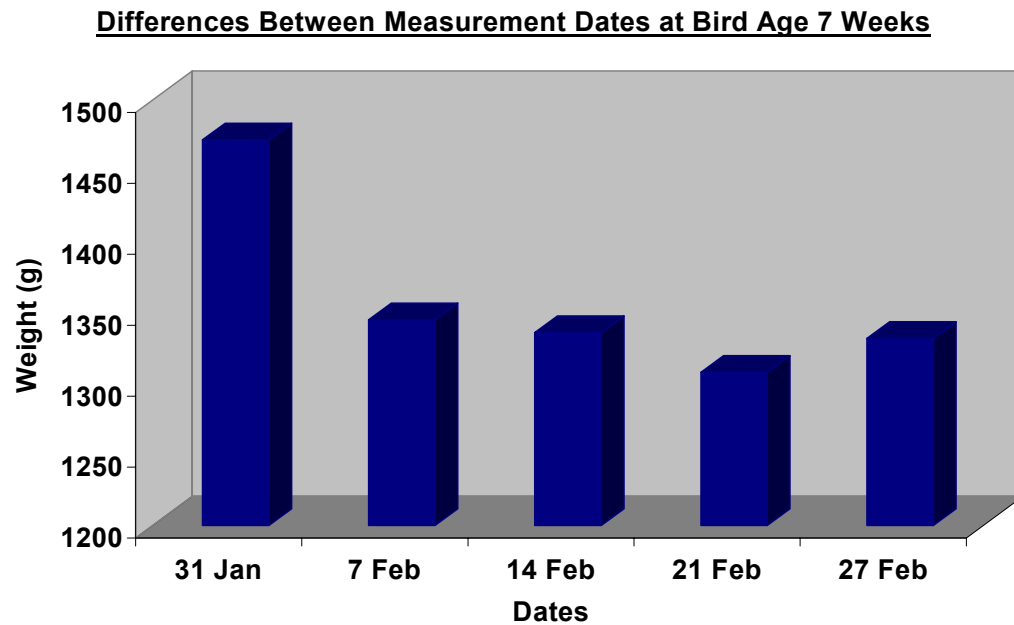
- 5.3. The data was further analysed to establish where the variation occurred within the system. It was thought this could occur due to the different sheds or due to the date at which weights were measured. The analysis of this information was undertaken on week 7 data as it was in the middle of the production run and there was data for most batches.
- 5.4. Figure 3 shows the differences between sheds at bird age 7 weeks. There were considerable differences between the sheds that are statistically different.

Figure 3. Differences between sheds at bird age 7 weeks (data not available for sheds 10, 11, 13, 14).



- 5.5. The differences between sheds are an indication of the imprecision of the Sheepdrove production system. It may be of interest to try to understand why sheds 1 and 2 performed well and sheds 7 and 8 performed badly on this assessment date. However, this pattern was not consistent between dates of measurements, i.e. other sheds performed best on other assessment dates. Therefore the variability between houses is an indication that small differences in management between houses are having large impacts on the variability of chicken weights. It would be of tremendous value to understand what the factors are causing this variability and hence the achievable level of precision of the Sheepdrove system.
- 5.6. Variation within the birds was also found between the measurement dates (figure 3). This shows that there was a general decline in the mean weight of 7 week old birds from 31 January to 27 February which are highly significant.

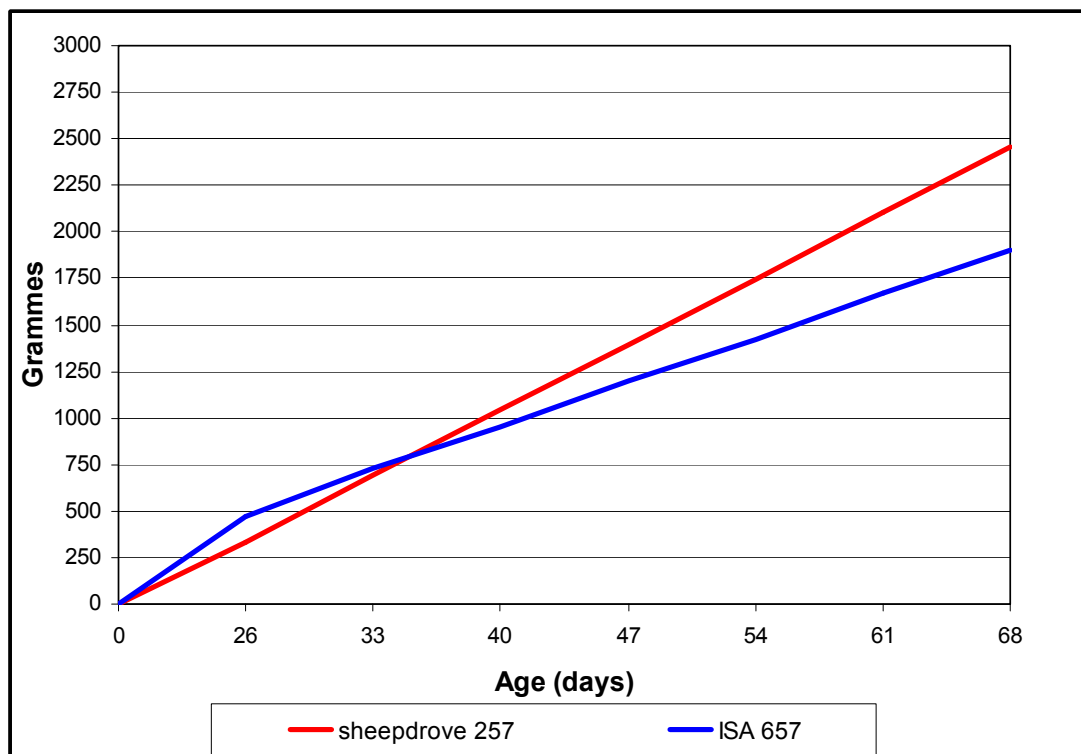
Figure 3. Differences between measurement dates at bird age 7 weeks.



#### Discussion.

- 5.7. The data collected confirms that the profile for ISA 657 is not appropriate for the SOF 257 birds. Figure 4 shows the two profiles plotted on the same figure.

Figure 4. SOF 257 and ISA 657 weight profiles.



- 5.8. Figure 4 shows that during the monitoring period the SOF 257 were out performing the ISA 657.
- 5.9. Further analysis of the data has produced a simple equation that could be used to monitor bird weight as an indicator of system performance.

$$\text{Weight (g)} = 353 \times \text{age (weeks)} - 1076$$

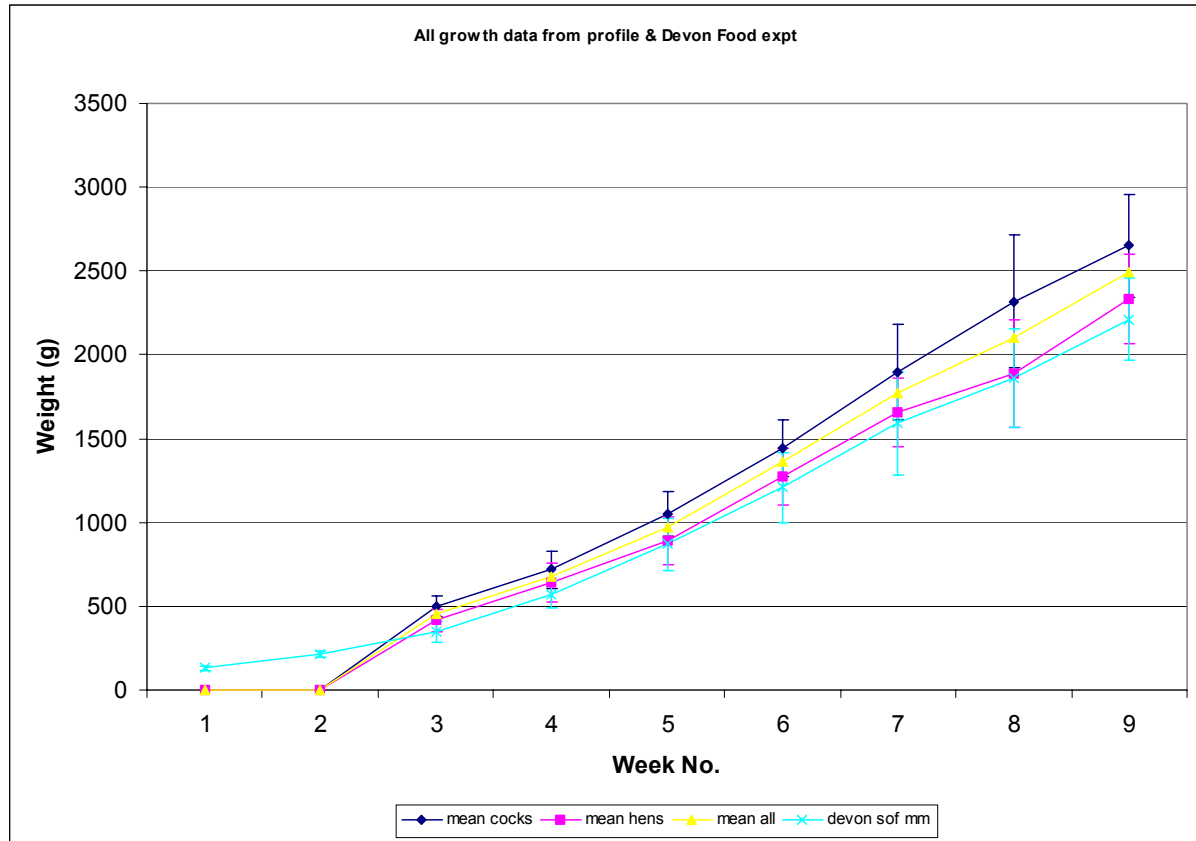
- 5.10. This is not 'target' weight monitoring as such, it is far better used as an indicator of system performance and failure than of individual bird success/failure. One of the best illustrations of this, is the variability in the system that is demonstrated in figures 2 and 3.
- 5.11. The mean kill out weight for this data set was 2454g that would suggest a finish weight of 1700g. Data provided from the processing plant shows that mean finished weights for the week 3 March 2003 were around 1650g and fell in the following weeks. This mean weight is close to that predicted by the study and reassures us that the work undertaken is meaningful and robust.
- 5.12. The SOF weight profile is only a preliminary profile that only covers a 2-month period in the mid-winter of 2003. The decreasing weights seen in figure 3 could be due to temperature in the field with the birds requiring more energy to maintain body temperature and so less is available for growth. This highlights two areas of further work.
- 5.13. To repeat the study at different times of year. The current study was very time demanding with the weighing taking two researchers a day each. However, this could be repeated in autumn, spring and summer to establish either a series of profiles or a single profile that addresses the complete year.
- 5.14. To establish a supplementary heating experiment within the SOF system to identify whether temperature is the limiting factor on bird growth during colder periods of year. Supplementary heating could be relatively easy to establish using the small research sheds with one having a heater in the field shed that would maintain a given minimum temperature while the other shed would be unheated.
- 5.15. It may be possible to obtain a greater understanding of the impact of temperature on the bird performance by a greater analysis of the processing data in conjunction with weather data. An analysis of temperature against mean finished could elucidate any relationship.
- 5.16. By comparing this data to other experimental data collected from SOF and other organic poultry producers (Fig 5) it can be seen that this profile is a reasonable estimate of the growth of birds on SOF and may be representative of the birds on other organic farms.

## **Conclusions and future**

- 5.17. The weight profile for ISA 657 is not appropriate for the SOF 257 birds even during the colder months of the year.
- 5.18. We now have a preliminary SOF 257 weight profile and equation that could be used to monitor the system performance on SOF.

- 5.19. Further work needs to be undertaken to produce a more robust weight profile for SOF 257. This could include repeating the study in autumn, spring and summer.
- 5.20. Investigate the impact of supplementary heating on bird performance.

Figure 5: Growth profiles of Devon food and SOF birds in the SOF system.



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**Annex 1: Raw data.****Sheepdrove Bird Weights**

Field Shed 1

Batch 51/161202

DO Weight = 42.3g

Date	31.1	Date	7.2	Date	14.2	Date	21.2
Bird Age	7wk	Bird Age	8wk	Bird Age	9wk	Bird Age	10wk
C	H	C	H	C	H	C	H
1783	1464	1830	1423	1877	1938	2695	2743
1621	1392	2286	1750	2648	1982	2485	2359
1643	1138	1843	1789	3031	2294	2464	2938
1562	1488	2055	1608	2367	1278	2951	2550
1680	1487	2179	1782	2004	2152	2474	1904
1446	1126	2284	1872	2674	1269	2584	2417
1864	0954	1728	1687	2460	1923	2521	2263
1736	1229	1804	1726	3022	2464	2383	2310
1482	1638	2232	1862	2427	2071	3151	2433
1497	1280	1915	1747	2764	1958	2862	2200
1631	1300	2015	1724	2537	1933	2657	2412

Field Shed 2

Batch 51/161202

DO Weight = 42.3g

Date	31.1	Date	7.2	Date	14.2	Date	21.2
Bird Age	7wk	Bird Age	8wk	Bird Age	9wk	Bird Age	10wk
C	H	C	H	C	H	C	H
1485	1120	1965	2438	2780	2158	3540	2335
1679	1465	1943	2114	3036	1965	2871	1846
1457	1198	2070	1880	2841	2702	2792	2462
1785	1366	2043	1649	3250	2689	2851	2662
1648	1602	2340	1493	2944	2086	2584	2663
1348	1375	2460	1971	3054	2122	3581	2845
1705	1385	2118	1648	2849	2098	2986	2544
1570	1307	1838	2023	2876	2156	2756	2730
1487	1494	2280	1716	2940	2510	2198	2450
1693	1190	1959	-	2585	2223	2779	2522
1586	1350	2101	1693	2916	2271	2894	2506



### Sheepdrove Bird Weights

Field Shed 3

Batch 52/221202

DO weight = 48.3g

Date	31.1	Date	7.2	Date	14.2	Date	21.2	Date	27.2
Bird Age	6wk	Bird Age	7wk	Bird Age	8wk	Bird Age	9wk	Bird Age	10wk
C	H	C	H	C	H	C	H	C	H
1098	1054	1214	1536	1783	1927	2008	1651	2566	1962
1105	.930	1468	1009	1774	1465	1791	1610	2040	2521
1049	1100	1461	1330	1935	1818	2064	1902	2737	1994
.942	.926	1531	1134	1956	1593	2551	2113	2267	1962
1039	.801	1283	1100	2069	2258	2075	2076	2583	2182
1105	.902	1319	1286	1713	1739	2379	1892	2702	2239
1046	.862	1336	1425	2249	1495	2481	1942	2884	1951
1183	.768	1502	1244	1761	1703	1933	2187	2777	2556
.906	.971	1294	1412	2057	1908	2000	2186	2666	2092
.903	.582	1218	1084	2595	1711	2065	2073	2188	2259
1053	.890	1363	1256	1989	1762	2135	1963	2541	2172

Field Shed 4

Batch 52/221202

DO weight = 49.3g

Date	31.1	Date	7.2	Date	14.2	Date	21.2	Date	27.2
Bird Age	6wk	Bird Age	7wk	Bird Age	8wk	Bird Age	9wk	Bird Age	Wk10
C	H	C	H	C	H	C	H	C	H
1138	1077	1422	1080	2005	1711	2128	2089	2122	2577
1235	1008	1368	1202	1950	1714	1640	2111	2286	2786
1267	.983	1272	1108	2059	1673	2365	2032	2790	2272
1094	.976	1293	1534	2314	1665	2304	1726	2738	2056
1143	.883	1312	1610	1747	1928	3163	2091	2498	2280
1020	.819	1500	1275	1984	1683	3027	1721	2340	2197
1031	.946	1410	1403	2011	2031	1766	1863	2330	2408
.884	.987	1578	1359	2283	1627	2076	2035	2968	2261
1094	.902	1641	1379	2051	1706	2355	1080	2594	2570
1113	.886	1473	1408	1963	1923	1784	1131	2908	2209
1102	.947	1426	1335	2027	1600	2261	1788	2557	2362

### Sheepdrove Bird Weights

Field Shed 5

Batch 1/301202

DO Weight = Not Recorded

Date	31.1	Date	7.2	Date	14.2	Date	21.2	Date	27.2
Bird Age	5wk	Bird Age	6wk	Bird Age	7wk	Bird Age	8wk	Bird Age	9wk
C	H	C	H	C	H	C	H	C	H
578	573	987	728	1349	1378	1613	1555	1957	1621
611	562	993	883	1329	1092	2030	1794	1977	1742
753	564	965	859	1495	1014	1857	1505	1940	1968
682	726	1344	1110	1032	1056	1743	1409	2545	1932
839	645	978	.808	1501	1447	1706	1337	2407	2400
592	531	994	.923	1361	1263	1818	1569	2105	2187
598	631	944	1049	1715	1102	1849	1809	2174	1458
657	661	950	.886	1386	1545	1883	1672	2403	1503
561	522	1029	.869	1418	1322	2044	1643	2299	1448
584	606	1128	.904	1223	1447	1962	1459	1563	1562
645	602	1031	901	1381	1267	1851	1575	2137	1782

Field Shed 6

Batch 1/301202

DO Weight = Not recorded

Date	31.1	Date	7.2	Date	14.2	Date	21.2	Date	27.2
Bird Age	5wk	Bird Age	6wk	Bird Age	7wk	Bird Age	8wk	Bird Age	9wk
C	H	C	H	C	H	C	H	C	H
680	630	.950	.923	1567	.920	1722	1662	2049	1724
444	751	1302	.973	1458	1010	1893	1691	2053	2409
698	620	1088	.812	1465	1337	2288	1742	2172	1284
805	472	.975	.554	1294	1119	2331	1541	2344	1830
774	556	1137	.924	1372	1372	1005	1495	1741	1806
661	597	1181	.790	1379	1476	1900	1683	1809	1806
602	685	1020	.899	1295	1270	2498	1752	1931	1289
607	624	.979	1118	1706	1259	1444	1754	1968	1871
662	661	1006	.826	1556	1367	1710	1525	2326	2115
846	511	1129	1018	1293	1433	1314	1420	2331	1754
678	611	1076	.883	1439	1256	1811	1627	2072	1789

### Sheepdrove Bird Weights

Field Shed 7

Batch 2/060103

DO Weight = 49g

Date	31.1	Date	7.2	Date	14.2	Date	21.2	Date	27.2
Bird Age	4wk	Bird Age	5wk	Bird Age	6wk	Bird Age	7wk	Bird Age	8wk
C	H	C	H	C	H	C	H	C	H
				.950	1010	1428	1179	1352	1447
				1068	.805	1309	1503	1926	1416
				1037	.908	1460	1421	1924	1591
				.966	.678	1467	1223	2182	1515
				.929	.644	1325	1025	1595	1482
				1067	.886	1446	1392	1906	1626
				.988	.840	1165	1280	1764	1617
				1105	.671	1513	1067	1746	1574
				1009	.850	1261	0996	2079	1673
				.963	.770	1535	1174	1877	1553
416	323	646	489	1008	8062	1391	1226	1835	1549

Field Shed 8

Batch 2/060103

DO Weight = 49g

Date	31.1	Date	7.2	Date	14.2	Date	21.2	Date	27.2
Bird Age	4wk	Bird Age	5wk	Bird Age	6wk	Bird Age	7wk	Bird Age	8wk
C	H	C	H	C	H	C	H	C	H
541	310			1041	1068	1183	1112	1793	1616
491	371			.793	1002	1440	1097	2309	1511
552	404			.997	.879	1245	1181	1445	1747
453	352			.884	.918	1415	1277	2011	1206
404	414			.925	.840	1820	.890	1598	1548
460	386			1134	.652	.996	1472	1510	1707
420	366			.894	.904	1285	1413	1632	1589
411	400			1068	.764	1553	1055	1814	1682
491	484			1139	.923	1700	1511	1828	1639
554	476			1270	.763	1419	1070	1522	1547
478	396	709	629	1.015	0.871	1208	1208	1746	1579

### Sheepdrove Bird Weights

Field Shed 9

Batch 3/130103

DO Weight = 36.8g

Date	7.2	Date	14.2	Date	21.2	Date	27.2
Bird Age	4wk	Bird Age	5wk	Bird Age	6wk	Bird Age	7wk
C	H	C	H	C	H	C	H
495	462	696	852	1124	.799	1574	1184
543	432	737	707	1283	1191	1550	1157
575	482	950	599	1166	.981	1397	1505
584	503	794	610	1229	1283	1288	1152
555	427	593	851	.995	.948	1353	1105
607	412	659	586	748	.983	1609	1177
500	314	1029	843	1066	.733	1299	1456
453	415	806	874	1120	.606	1356	1296
481	514	699	725	1232	1019	1476	1182
578	481	772	673	1129	.898	1329	1349
537	437	774	732	1.109	944	1423	1256

Field Shed 12

Batch 3/130103

DO Weight = 36.8g

Date	7.2	Date	14.2	Date	21.2	Date	27.2
Bird Age	4wk	Bird Age	5wk	Bird Age	6wk	Bird Age	7wk
C	H	C	H	C	H	C	H
374	504	851	.700	.886	.793	1467	1332
455	446	874	1008	.951	1065	1574	1219
502	348	827	.711	1389	.996	1153	1196
542	512	646	.540	1040	.870	1376	1330
471	539	972	.531	1067	1000	1358	1333
560	403	835	.677	1082	.912	1352	1277
513	504	828	.585	1216	.993	1382	1183
654	442	755	.328	1189	.916	1209	1237
516	427	722	.724	1054	1111	1339	1423
430	476	753	.668	1060	1093	1456	1302
501	460	806	647	1093	975	1367	1283

### Sheepdrove Bird Weights

Field Shed 10

Batch 4/220103

DO Weight = 39g

Date	14.2	Date	21.2	Date	27.2
Bird Age	4wk	Bird Age	5wk	Bird Age	6wk
C	H	C	H	C	H
526	363	591	578	1135	765
429	369	820	680	.906	711
449	357	671	698	.918	730
501	466	669	567	.755	723
411	384	668	566	.675	827
615	401	753	598	1096	889
446	421	628	654	.992	687
452	465	672	649	1057	751
467	386	648	593	.819	755
404	345	668	666	.979	782
470	396	679	625	933	762

Field Shed 11

Batch 4/220103

DO Weight = 39g

Date	14.1	Date	21.2	Date	27.2
Bird Age	4 wk	Bird Age	5 wk	Bird Age	6wk
C	H	C	H	C	H
528	394	779	756	.996	.770
493	380	720	685	1080	.760
491	283	683	677	1281	1320
603	425	881	712	1112	.828
460	425	693	662	.861	.811
422	506	677	553	1097	1124
401	453	628	504	1305	.812
491	466	685	359	.958	.819
555	213	732	742	1132	.845
511	354	749	730	1227	.943
496	390	723	638	1105	903

### Sheepdrove Bird Weights

Field Shed 13

Batch 50/091202

DO Weight = 43g

Date	31.1	Date	7.2	Date	14.2
Bird Age	8wk	Bird Age	9wk	Bird Age	10wk
C	H	C	H	C	H
1619	1663	2133	1842	2862	2151
1483	1965	1615	1938	2543	2248
1342	1492	2319	2017	2258	2108
1936	1282	2245	1611	2484	2319
1537	1507	2836	1549	2218	1820
2267	1892	2024	1724	2834	2460
1990	1332	2208	1561	3029	2461
1562	1347	2207	1858	2403	2065
1884	1389	2272	1986	2641	2228
2203	1507	2142	1906	2928	1771
1782	1537	2.200	1799	2620	2163

Field Shed 14

Batch 50/091202

DO Weight = 43g

Date	31.1	Date	7.2	Date	14.2
Bird Age	8wk	Bird Age	9wk	Bird Age	10wk
C	H	C	H	C	H
1595	1384	2153	2036	2325	2098
1824	1605	2517	1730	2920	2393
1627	1473	2058	1664	2400	2287
1436	1438	2227	1747	2740	2567
1507	1401	2791	1669	2475	2653
2066	1889	2373	1721	2765	2262
1592	1418	2227	1802	2617	2380
2114	1824	2097	1759	2814	2765
1993	1394	2077	1826	2879	2052
2010	1931	2403	1877	2392	2292
1776	1575	2292	1783	2633	2375