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## APPENDIX 3.1.2

## Occurrences of Pacing of Different Intensities

Hen	****	Intensity of Pacing ***	Preceeding **	Observed Layings *	No Pacing
G34		L6 7	L8 9 11 20 35	L10 12-16 18 19 21-29 33 34 36 38-43	L17 30-32 37
G35		L2-4 6 7 9	L1 5 8 10-15 20	L16-19 21-26 28-30 32-34 36 37	L27 31 35
Y94		L2-4	L1 5-15 19-22 34	L16-18 23-33 35 36	
B99		L2 4-10	L1 3 11 13-22 26 28	L12 23-25 27 29-34	
B53			L1 3-6 9 10 14 28 29	L7 8 11-13 15-27 30-33	L2
G38			L1-5 7	L6 8-13 15-17 19 20 29	L14 18 21-28 30 31
Y90		L1-4	L5-14 16 19-20 26 27	L15 17 18 21-25 28-31	
Y91		L2 4-6 9 11	L1 3 7 8 10 12 13 21	L14-20 22 24-28 30 31	L23 29
G39			L2-4 7 15	L5 6 8-14 16 17 20 27 31	L1 18 19 21-26 28-30
Y93	L1 22	L2 3 17 21 29 31	L4-7 9-12 14 16 19 23-27 30	L8 13 15 18 20 28	
B00		L1-3 5 6	L4 7-11 13 16 17-19	L12 14 15 21 22 25 26 28-30	L20 23 24 27 31
G41		L1-3 8	L4-7 9-12 14 15	L13 16-19 21 24-26 28 29	L20 22 23 27 30
Y94			L1 3-6 13-15 22 23	L7-11 16-21 24-30	L2 12
Y99		L2-5 14	L1 6-9 11-13 15-17 20 21 24 28	L10 18 19 22 23 25-27 29	
G42		L1 2 4	L3 5 6 9 10 12	L7 8 11 13-19 21-24 26-28	L20 25
B51		L2 3	L1 4 5 13 17	L6-12 14-16 18 19 21 24 26	L20 22 23 25
G36			L1 2	L3-9 11-13 17-20 23	L10 14-16 21 22 24 25
W80	L8 12 14 18	L1-3 6 9 13 15 17	L4 5 7 10 11 21 22	L16 19 20 23 24	

continued next page

## APPENDIX 3.1.2 (cont.)

Hen	****	Intensity of Pacing ***	Preceding **	Observed Layings *	No Pacing
G40	L2 3 5 6 20	L4 7-11 13 15 16 18 22	L1 12 14 17 19 21		
B97		L1	L2 3 11 21	L2-10 12 13 16-18 20	L14 15 19 22
N.N.			L1-4	L5-7 10-12 14-17 19 20	L8 9 13 18
G43		L1 2	L3-7 9-13 15 16	L8 14 17-20	
W82	L1 3	L2 4-7 10 14 20	L8 0 11 13 15-19	L12	
B71			L1-3 9 12	L4-8 10 11 13 14 16 18 19	L15 17
Y96		L2 3 5 6	L1 4 7-11 13 15	L12 14 16-18	
Y98		L1	L2 3 5 11	L4 6-10 12-14 16	L15 17 18
W81			L1-5	L6 7 11 13 16	L8-10 12 14 15 17
W79		L4	L1-3 5-6 9 13	L7 8 10-12 14 15	
Y97		L2 6	L1 3-5 9 12	L7 8 10 11 13 14	
W84		L1-6 8	L7 9 10 12 14	L11 13	
Red	L1-2	L3 4 7 8 13	L5 6 9-12		
G37			L2	L1 3-6 8 9	L7 10 11
B98		L1 2	L3-5 7 10	L6 8 9	
Y92		L1-3 5	L4 6-8	L9	
W83		L1-6	L7 8		
B54		L2 6	L1 3-5 7 8		
Y00		L1-3	L4-6		

APPENDIX 3.1.3

Occurrences of Nest Building and Other Manipulative Activities

Hen	Rotations	Litter Raking	Laying Days on Which Nest Building Activities Occurred				M.G. After Lay
			Material Gathering (M.G.) to Chest	M.G. to Back	M.G. in Shed	M.G. After Lay	
G34	L6-43	L7 9-43	L12 14 15 16 19-26 28-34 37-43	L24 30 31 40	-	L30 35 36 43	
G35	L2-5 7-37	L5 8-37	L10 12-15 18-30 32 34-37	L22 33 34	-	L20 36	
Y94	L1-36	L2 3 6-18 20-36	L8 14-18 24 26-27 31	L17	-	-	
B99	L4-6 8-34	L5-6 8-16 18-34	L12-14 17 19-24 26 30-33	L26 33	L18 23 29 30	L24	
B53	L1 2 5-33	L7-10 12 14-16 20 22-26 28 30-33	L12 16-18 22 24-26 30 31	L26 30	-	L13 17 29 32	
G38	L1-31	L4-31	L6 7 9 11 14-18 20-31	L9 11 16-18 22-25 27 31	L11 15 18 24-25	L17 21 25	
Y90	L1-31	L2 4-31	L15 18 21 23 25 28-31	-	-	L20 25 28	
Y91	L1-5 7-31	L4 5 7 8 11-13 15-20 22 23 25-27 29-31	L12 13 17 19 20 22 26 27 29-31	L19 26 27 30	L19 22 27 31	L23 25 29	
G39	L2-31	L2-31	L6 7 9-12 14 16-19 22-27 30 31	L12 18-20 27 30	L 13 17	-	
Y93	L7 8 10-12 18 20 26 28	L7 10 11 20 27 28	L10 27	-	-	-	
B00	L3 4 6-31	L7-31	L8 10-13 15 17-20 23 24 26-31	L19 28	-	L20 24 26 27 31	
G41	L1 2 4-30	L5 6 8-13 15-30	L9 13 18-20 23-30	L19 24	-	L20 28	
Y95	L4-6 8-11 13-16 22-30	L9 13 14 23-26 28-30	L14 24-26 29-30	-	L29	L19 21	
Y99	L1-29	L2-29	L6 8-12 15 17-19 22 23 25-29	-	L19	L22 27	
G42	L2-28	L5-28	L6 8 9 12 15-17 20 21 23 25-27	L17	-	-	
B51	L1-26	L4-26	L6 7 9 11 12 14-16 18-20 23 25-26	L12 14-16 19-20 23 25-26	L15 25	L16 25	

APPENDIX 3.1.3 (cont.)

Hen	Rotations	Laying Days on Which Nest Building Activities Occurred				M.G. After Lay
		Litter Raking	Material Gathering (M.G.) to Chest	M.G. to Back	M.G. in Shed	
G36	L1-25	L2 4-25	L6-18 20-25	L20 25	-	-
W80	L1-11 24	L6-16 20-24	L7 9-10 16 19 20 22-24	L19 22 23	L15 20 22	L16 19 20
G40	L14 21	L14	-	-	-	-
B97	L1-22	L3 4 6 8 11 12 14 17-12 22	L8 11 12 14 15 17 19 20 22	-	-	L12 13 15 17 22
N.N.	L1-20	L6 7 9 11-13 16-20	L6 9 13 15 16 18 20	L16 18	L13 16 18	L15 20
G43	L2-20	L3-9 11-20	L7-9 12 14-18 20	L9 12 13 17 20	L12 14 17	-
W82	L3-20	L6 7 9-11 14-16 18 19	L15-17 19	L19	L16 19	-
B71	L2-8 10-19	L4-8 10-19	L7 8 10 11 13-19	L7 10 11 13 15- 18	L12 16 17	L10 14-16 18-19
Y96	L1-18	L3-7 9 10 12-15 17 18	L9 10 12 15 16 18	L18	L12 16	L14 17
Y98	L1-18	L3-7 9-12 14-18	L9 10 12 15 16 18	L9 16 18	L15	-
W81	L6 9-13 17	L11 17	L13	-	-	-
W79	L1-8 10-15	L8 L10-12 14-15	L12 15	-	-	L14
Y97	L2 5 7-10 14	L5 7 8 10	L8 10	-	-	-
W84	L4-8 12 13	L4 6-8 12	L12	-	L12	L13
Red	L1 2 5 6 10-12	L6 12	L12	L12	-	-
G37	L1-11	L1-11	L7 8 10 11	L11	L11	-
B98	L2-4 6-10	L6 8 9	L8 9	-	-	-
Y92	L1-9	L2-9	L7 9	-	-	-
W83	L5 8	L8	-	-	-	-
B54	L3-8	L5 7 8	L8	-	-	-
Y00	L1-6	L4-6	-	-	-	<

APPENDIX 3.1.4

Chi-Square Analyses of the Numbers of  
Hens Which, on Some Occasions, Post-Lay  
Cackled After Laying in Either Elevated Nests,  
Ground Nests or Floor Sites

	Observed				Expected			
	Elevated	Ground	Floor	Total	Elevated	Ground	Floor	Total
Cackled	5	2	2	9	1.44	1.80	5.76	9
Did not Cackle	3	8	30	41	6.56	8.20	26.24	41
	8	10	32	50	8	10	32	50

$$\chi^2_2 = 13.74^{**}$$

	Observed			Expected		
	Ground	Floor	Total	Ground	Floor	Total
Cackled	2	2	4	0.95	3.05	4
Did not Cackle	8	10	38	9.05	28.95	38
	10	32	42	10	32	42

$$\chi^2_1 = 1.68 \text{ N.S.}$$

	Observed			Expected		
	Elevated	Ground+Floor	Total	Elevated	Ground+Floor	Total
Cackled	5	4	9	1.44	7.56	9
Did not Cackle	3	38	41	6.56	34.44	41
	8	42	50	8	42	50

$$\chi^2_1 = 12.78^{**}$$

APPENDIX 3.1.5Occasions on Which 'Nuzzling Under' was  
Exhibited by Broiler Hens

Hen	Observed Nestings	Hen	Observed Nestings
G34	L4 5 (L1 2 3 ?)	B97	-
G35	L1	N.N	L1
Y94	L1	G43	L1
B99	L1	W82	L1 2 3
B53	-	B71	L1
G38	-	Y96	L1 2
Y90	-	Y98	-
Y91	-	W81	L1
G39	-	W79	-
Y93	L1 3 4	Y97	L1
B00	L1	W84	L1
G41	L1 2	Red	L1 2
Y95	L1	G37	-
Y99	L1 2	B98	L1
G42	L1	Y92	L1 2
B51	L1	W83	L1
G36	-	B54	-
W80	L1	Y00	L1
G40	L1 2 3 5		



APPENDIX 3.1.6

Hens Which, for the Duration of the Observations,  
Were Predominantly 'Sociable' Nesters as Either  
Floor or Nest Layers

Hen	Description of Nesting
<u>Floor Layers</u>	
Red	On most occasions, repeatedly dashed about the pen from one hen/group of hens to another (preferably nesting hens), where she would remain until driven away by the other hens or until the other hens moved away or until she laid. However, she did tend to have preferred areas in which she would attempt to nest near others.
Y93	As for 'Red' above.
G40	Before becoming a nest layer. As for 'Red' above. Often laid 'on the run' between hens.
W84	As for 'Red', but not as vigorous in her pursuit of other birds about the pen.
W83	As for 'W84' above.
Y95	As for 'W84', before becoming a nest layer.
B53	Tried to nest in occupied sites. However, generally eventually forced to go to a regular laying site and lay alone.
G99	As for 'B53'. However, did not always display this tendency which was more evident in this hen's early laying history.
W80	Some attempt made to get near another hen at each nesting. However, generally ended up laying alone.
<u>Nest Layers</u>	
B98	Would walk along the front of the nest-set, examining nests, but would usually only enter occupied nests where she would remain until evicted by the hen occupying it, or until the other hen left, or until she laid.
Y92	As for 'B98'.
G40	As for 'B98' after developing a preference for nests rather than floor sites.
Y95	As for 'G40'. However, after being turned away from a number of nests she would often lay alone in any nest.
Y94	As for 'Y95'. However, she displayed a tendency to enter specific occupied nests.

APPENDIX 3.1.7

Number of Times Each Activity was Recorded on Each Laying Day

Activity	Frequency of Occurrence																					
	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15	L16	L17	L18	L19	L20	L21	
Nesting Call	No. times occurred	32	34	36	36	34	35	31	32	24	28	24	20	22	27	17	13	16	19	17	15	
	% of total possible	88.8	94.4	100	100	94.4	97.2	86.1	88.9	70.6	84.8	75.0	64.5	71.0	90.0	60.7	63.0	48.1	61.5	79.2	73.9	75.0
Pacing	No. times occurred	3	2	2	0	1	1	0	1	0	0	0	1	0	1	0	0	1	0	1	0	
	"	13	22	15	13	9	12	6	5	5	3	2	0	3	2	2	1	2	1	0	1	1
	"	18	10	17	18	20	13	17	12	17	15	16	14	13	10	10	7	6	3	7	6	7
	"	1	0	2	5	6	11	12	16	10	12	13	14	14	13	11	18	15	17	15	11	9
All Intentions	No. times occurred	35	34	36	36	36	37	35	34	32	30	31	29	30	26	23	26	22	22	19	17	
	% of total possible	97.2	94.2	100	100	100	100	97.2	94.4	94.1	90.9	96.9	93.5	96.8	86.7	82.1	96.3	85.2	84.6	91.7	82.6	85.0
Rotations	No. times occurred	19	26	25	29	31	31	30	33	28	31	29	27	27	27	25	24	23	21	21	18	
	% of total possible	52.8	72.2	69.4	80.6	86.1	83.8	83.3	97.7	82.4	93.9	90.6	87.1	87.1	90.0	89.3	88.9	88.5	87.5	91.3	90.0	
Litter Raking	No. times occurred	1	7	9	16	20	24	25	26	24	23	25	25	20	23	22	21	20	21	18	14	
	% of total possible	2.8	19.4	25.0	44.4	55.6	64.9	69.4	72.2	70.6	69.7	78.1	80.6	64.5	76.7	78.6	77.8	74.1	80.8	75.0	82.6	70.0
M.G. to Chest	No. times occurred	0	0	0	0	0	7	9	12	14	12	9	18	9	12	18	15	14	16	13	14	7
	% of total possible	0.0	0.0	0.0	0.0	0.0	18.9	25.0	33.3	41.2	36.4	28.1	58.1	29.0	40.0	64.3	55.6	51.9	61.5	54.2	60.9	35.0
M.G. to Back	No. times occurred	0	0	0	0	0	0	1	0	3	1	3	4	2	1	2	5	5	6	7	4	0
	% of total possible	0.0	0.0	0.0	0.0	0.0	0.0	2.8	0.0	8.8	3.0	9.4	12.9	6.5	3.3	7.1	18.5	18.5	23.1	29.2	17.4	0.0

APPENDIX 3.1.1.7 (cont.)

Activity	Frequency of Occurrence														Laying Day													
	L22	L23	L24	L25	L26	L27	L28	L29	L30	L31	L32	L33	L34	L35	L36	L37	L38	L39	L40	L41	L42	L43						
Nesting Call	14	9	10	12	11	7	10	7	6	6	3	5	3	2	2	1	1	0	1	0	0	0						
No. times occurred	70.0	50.0	55.6	70.6	68.8	46.7	66.7	50.0	46.2	54.5	*	1	0	0	0	0	0	0	0	0	0	0						
% of total possible																												
Pacing																												
****	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0						
***	1	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0						
**	4	2	2	1	3	2	3	1	1	0	0	0	1	1	0	0	0	0	0	0	0	0						
*	8	10	12	11	11	9	10	10	8	6	4	5	3	1	3	1	1	1	1	1	1	1						
All Inten-																												
sities	14	12	14	12	14	11	13	12	9	7	4	5	4	2	3	1	1	1	1	1	1	1						
No. times occurred	70.0	66.7	77.8	70.6	87.5	73.3	86.7	85.7	69.2	63.6	*																	
% of total possible																												
Rotations																												
No. times occurred	18	17	17	15	16	14	15	13	12	10	5	5	4	3	3	2	1	1	1	1	1	1						
% of total possible	90.0	94.4	97.4	88.2	100	93.3	100	92.9	92.3	90.9	*																	
Litter Raking																												
No. times occurred	17	17	16	16	15	13	14	12	12	10	5	5	4	3	3	2	1	1	1	1	1	1						
% of total possible	85.0	94.4	88.9	94.1	93.8	86.7	93.3	85.7	92.3	90.9	*																	
M.G. to Chest																												
No. times occurred	11	13	12	12	14	10	7	9	11	9	3	2	2	1	1	2	1	1	1	1	1	1						
% of total possible	55.0	72.2	66.7	70.6	87.5	66.7	46.7	64.3	84.6	81.8	*																	
M.G. to Back																												
No. times occurred	3	3	3	2	4	3	1	0	4	2	0	2	1	0	0	0	0	1	0	0	0	0						
% of total possible	15.0	16.7	16.7	11.8	25.0	20.0	7.7	0.0	30.8	18.2	*																	

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APPENDIX 3.1.7 (cont.)

Activity	Frequency of Occurrence		Laying Day																												
	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	L13	L14	L15	L16	L17	L18	L19	L20	L21										
M.G. in Shed	0	0	0	0	0	0	0	0	0	0	2	4	2	1	4	4	3	3	3	1	0										
% of total possible	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.3	12.9	6.5	3.3	14.3	14.8	11.1	11.5	12.5	4.3	0.0										
M.G. After Lay	0	0	0	0	0	0	0	0	1	0	1	3	3	3	3	4	1	3	6	2											
% of total possible	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	3.2	9.7	10.0	10.7	11.1	14.8	3.8	12.5	26.1	10.0											
Total Number of Observed Laying Days	36	36	36	36	36	37	36	36	34	33	32	31	31	30	28	27	27	26	24	23	20										

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APPENDIX 3.1.7 (cont.)

Activity	Frequency of Occurrence																	Laying Day						
	L22	L23	L24	L25	L26	L27	L28	L29	L30	L31	L32	L33	L34	L35	L36	L37	L38		L39	L40	L41	L42	L43	
M.G. in Shed	2	1	1	2	0	1	0	2	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
No. times occurred	10.0	5.6	5.6	11.8	0.0	6.7	0.0	14.3	7.7	9.1	*													
% of total possible																								
M.G. After Lay	2	1	2	4	1	2	2	2	1	1	1	0	0	1	2	0	0	0	0	0	0	0	0	
No. times occurred	10.0	5.6	11.1	23.5	6.3	13.3	13.3	14.3	7.1	9.1	*													
% of total possible																								
Total Number of Observed Laying Days	20	18	18	17	16	15	15	14	13	11	5	5	4	3	3	2	1	1	1	1	1	1	1	

\* %'s not calculated beyond L31 due to small numbers of contributing observations

APPENDIX 3.1.8

Distribution of Floor Site Nestings Between Pen Locations

Hen	a. Feeders/ Waterers			Along Walls											e. Along Nests		f. Mid-Pen + 15												
	1	2	25	26	27	3	4	12	16	24	5	6	7	8	9	10	11	17	18	19	20	13	14	21	22	23	15		
G35						1					1																		1
Y94						1	1																						2
B99	2	1				25			1				2							1									2
B53						2	25																						1
G38						31																							1
Y91						1	5	3																					1
G39						29																							1
Y93						3	16	5																					5
B00	1					29																							
G41	1					3	1																						
Y95						4	4			1																			2
Y99																													4
G42																													
B51																													
G36						25																							
W80						3	4	4		6																			1
G40						1		3		1																			2
N.N.										20																			
G43						10				9																			1

APPENDIX 3.1.8 (cont.)

Hen	a. Feeders/ Waterers			b.					c. Along Walls					d.			e. Along Nests		f. Mid-Pen + 15									
	1	2	25	26	27	3	4	12	16	24	5	6	7	8	9	10	11	17	18	19	20	13	14	21	22	23	15	
W82						2	18																					
B71						1				18																		
Y96						9	6			3																		
Y98										18																		
W81						3											3	5	5	1								
W79						12	2						1															
Y97						7	6																					1
W84						12	2																					
Red								1	2	10																		
G37						11																						
W83																		1					1				1	
B54						3	1																					1
Y00										5																		
Total	4	1	4	5	0	75	205	98	8	70	2	4	1	4	9	6	0	6	5	7	6	10	4	11	4	2	0	

APPENDIX 3.1.9

Chi-Square Analysis of the Number of  
Hens Preferring Different Floor Sites

	Floor Site											
	a	3	4	12	16	24	b	c	d	e	f	Total
Observed	1	6	10	4	2	5	0	1	1	1	0	31
Expected	0.87	0.22	0.22	0.22	0.22	0.22	1.87	2.32	2.53	0.92	21.39	31

$$\chi^2_{10} = 794.81***$$

$$*** = P < .001$$



APPENDIX 3.1.10

Chi-Square Analysis of the Number of Eggs Laid in Different Floor Sites

	a	3	4	12	16	24	b	7	19	24	d	e	f	Total
Observed	20	75	205	99	8	70	7	19	24	14	17	17	17	558
Expected	15.647	3.985	3.985	3.985	3.985	3.985	33.584	41.838	45.538	16.507	384.957	384.957	384.957	558

$$\chi^2_{10} = 15,167.36^{***} (P < .001)$$

Floor Sites Compared	$\chi^2$ Value	D.F.	Significance
4 vs 12	36.96	1	*** (P < .001)
3 vs 24	0.18	1	N.S. (P > .10)
12 vs (3,24)	5.76	1	* (.01 < P < .05)
16 vs a vs e	4.02	2	N.S. (P > .10)
(3,24) vs (16,a,e)	446.74	1	*** (P < .001)
d vs c vs b	4.99	2	- (.05 < P < .10)
(16,a,e) vs (d,c,b)	26.65	1	*** (P < .001)
(d,c,b) vs f	72.46	1	*** (P < .001)

After Partitioning:

$$4 > 12 > (3,24) > (16,a,e) > (d,c,b) > f$$

APPENDIX 3.2

Chi-Square Values and Significance Levels Calculated for Numbers of Hens Usually Performing Certain Activities in Different Pen Environments and Observation Periods

Chi-Square Classification	Observation Period		Activity						
	3-way	2-way	Calling	Pacing	Rotations	Raking	M.G.	Pacing Intensity †	
2-way (df = 5)	BM1 vs BM2 vs AM1 vs AM2 vs AR1 vs AR2		23.57***	12.06*	4.51 N.S.	5.77 N.S.	9.59 -	48.16***	
		BM1 vs BM2	0.0 N.S.	0.0 N.S.	0.36 N.S.	0.0 N.S.	1.06 N.S.	0.0 N.S.	
		AM1 vs AM2	1.02 N.S.	0.0 N.S.	0.58 N.S.	0.0 N.S.	0.0 N.S.	7.62*	
2-way (df = 1)	AR1 vs AR2		2.06 N.S.	3.14 -	0.58 N.S.	2.42 N.S.	3.14 -	6.27*	
		BM1 vs AM1 vs AR1	15.12***	8.37*	3.27 N.S.	2.56 N.S.	6.19*	29.35***	
2-way (df = 2)	BM2 vs AM2 vs AR2		6.92*	4.03 N.S.	0.25 N.S.	2.41 N.S.	3.66 N.S.	9.34 -	
		(1 vs 2) vs (BM vs (AM + AR))	21.09***	9.48**	4.51*	4.09*	5.61*	62.36***	
3-way (df = 1)	(1 vs 2) vs (AM vs AR)		3.75 -	9.21**	0.0 N.S.	2.64 N.S.	9.21**	20.45***	

Observation Period Classification: BM = before moved to new pen; AM = after moved to new pen; AR = after returned to original pen

1 - first observation period in each pen environment; 2 - second observation period in each pen environment.

df = degrees of freedom of the  $\chi^2$  for each activity. Degrees of freedom of  $\chi^2$  analysis - N.S. = (P < .1); - = (.05 < P < .10); \* = (.01 < P < .05); \*\* = (.001 < P < .01); \*\*\* = (P < .001)

† No hens usually performed \*\*\* intensity pacing, so this was not included in the analyses.

APPENDIX 3.3.1

Times from When Pacing was First Observed to Oviposition  
(in Minutes) for Each Hen Classified According to the  
Hour of Day in Which the Oviposition Occurred

Hen	Hour During Which Oviposition Occurred							
	7-8am	8-9am	9-10am	10-11am	11-12am	12am-1pm	1-2pm	3-4pm
Y94					100,162			
B99			41		145	130		346
B53								432
G38				172	107,140	120		
Y90			71					
Y91		57						
G39		73,77				105	168	
Y93		35	65	21,31				
B00		79,108					143	
Y95				55		135		
Y99		43			48			
G42					73	60		
B51	58	68				155		
W80	59			106				
G40			92			233,139		
G43		63	89	110			145	
W82	39			165		151		
B71		130	145,62	159,150	170			
Y96	39			77				
Y98			33,89,97				194	
W81	62		135					
W79				86	120		255	
W84	51			189,80				
Red		98					325	
G37		67						
Y92				116				
Y00			113					

APPENDIX 3.3.2

Times from First Mounting of the Nest-Set Approach to Oviposition  
(in Minutes) for All Elevated Nestings Classified According to  
Hour of Day in Which the Oviposition Occurred

Hen	Hour of Day During Which Oviposition Occurred							
	6-7am	7-8am	8-9am	9-10am	10-11am	11-12am	12am-1pm	1-2pm
G34		83,38			61,20	86,57	65	
G35		59	58					
Y94					9	72	94	
B99							92	
G38								132,66,76
Y90	50			70		55	140,124	105
Y91						55,74,43		
B00				64			81	
G41		33						
Y99		23	27			28,38		
G42								175,80
W80							20,85	
B97					50			
G43								84
W82						51,31	138	
Y98								155
W81							22	111
W79				54	63,107			
Y97					28			
Red				107			66	
B98				56			102,154	163
Y92					100			
W83					32			
Y00					64,93	53		

APPENDIX 3.3.3

Times from First Nest Entry to Oviposition (in Minutes) for All Hens Classified According to Hour of Day in Which the Oviposition Occurred and Whether it Related to a Nest or Floor Laying\*

Hen	Hour During Which Oviposition Occurred								
	6-7am	7-8am	8-9am	9-10am	10-11am	11-12am	12am-1pm	1-2pm	3-4pm
G34		70,30			51,20	85,54	64		
G35		58	58		36	116		200	
Y94				73	54,8	60,55,70	94		
B99				7		55	59,109		56
B53									231
G38					95	114,102,120	115	77,51,68	
Y90	45			51		40	139,124	105	
Y91		52	46			55,64,41			
G39			38,7				55	10	
B00			44,50	55			79	79	
G41		32							
Y95					44	41,10	97		
Y99		12	14			13,13,34			
G42						54	49	155,74	
B51		48	3			32,75	1,31		
W80		42			7		20,84		
G40							130		
B97					50		60		
N.N.					75,66	80,69			
G43			49	43	33			131,78	
W82		17			27	51,30	129,125		
B71			61	15,17,12	76,13	12			
Y96		34			27,95		147,58	230	
Y98				28,77,87				154	
W81		2		1			22	109	
W79				49	76,57,107	45		220	
Y97					28	1			
W84		6			9,14				
Red			97	107			65	384	
G37			67		12		58,108,101	60	
B98				49			102,152	163	
Y92					86	62			
W83					32				
Y00				47	26,58,90	52			

\* Times in italics represent floor layings, non-italic represent nest layings

APPENDIX 3.3.4

Analysis of Variance for Timed Data from Two Nest  
Environments (Nest vs Floor)

(a) Time from First Nest Entry to Oviposition

Source	D.F.	S.S.	M.S.	F
Between Nest Environments	1	107.58	107.58	
Within Nest Environments	147	407197.74	2770.05	0.039 N.S.
Total	148	407305.32		

(b) Time on Final Nest Before Oviposition

Source	D.F.	S.S.	M.S.	F
Between Nest Environments	1	52.89	52.89	
Within Nest Environments	147	123795.01	842.14	0.063 N.S.
Total	148	123847.90		

(c) Time on Nest After Oviposition (- G35 data)

Source	D.F.	S.S.	M.S.	F
Between Nest Environments	1	1288.43	1288.43	3.22 N.S.
Within Nest Environments	148	59157.71	399.71	
Total	149	60446.14		

N.S. = not significant ( $P > .10$ ); - = ( $.05 < P < .1$ )

Time on Nest After Oviposition (+ G35 data)

F value = 3.90 -

## APPENDIX 3.3.5

Times from Final Entry into Nest to Oviposition (in Minutes) for All Hens, Classified According to Hour of Day in Which the Oviposition Occurred and Whether it Related to a Nest or Floor Laying\*

Hen	Hour During Which Oviposition Occurred								
	6-7am	7-8am	8-9am	9-10am	10-11am	11-12am	12am-1pm	1-2pm	3-4pm
G34		46,22			51,20	44,19	41		
G35		58	58		36	116		45	
Y94				73	54,8	60,55,70	64		
B99				1		9	51,6		46
B53									127
G38					55	114,102,120		35,51,68	
Y90	45			51		40	10,8	46	
Y91		22	12		2	64,34			
G39			13,7				20	10	
B00			12,47	55			66	73	
G41		30							
Y95					44	41,10	20		
Y99		9	9			13,13,34			
G42						46	24	63,100	
B51		20	3			32,51	1,31		
W80		42			7		16,12		
G40							14		
B97						40	60		
N.N.					75,66	80,69			
G43			11	30	9			81,45	
W82		5			10	11,30	71,25		
B71			20	5,17,23	49,13	12			
Y96		12			18,55		84,50	90	
Y98				23,71,7				47	
W81		2		1			16	33	
W79				42	28,33,61	19		80	
Y97					28	1			
W84		6			9,2				
Red			12	3			14	10	
G37			47		12		58,75,78	60	
B98				34			20,72	50	
Y92					68	1			
W83					22				
Y00				13	26,40,75	44			

\* Times in italics represent floor layings, non-italic represent nest layings

APPENDIX 3.3.6

Chi-Square Analyses of the Numbers of Hens Typically Orienting in Certain  
Ways at Oviposition in Either Elevated Nests or Corners

		<u>Elevated Nests</u>							<u>Corners</u>								
		A	B	C	D	E	F	G	Total								
Observed	6	4	2	1	1	2	0	16	Observed	10	8	4	1	0	2	1	26
Expected	2.28	2.28	2.28	2.28	2.28	2.28	2.28	16	Expected	3.71	3.71	3.71	3.71	3.71	3.71	3.71	26

$$X_6^2 = 11.20 -$$

$$X_6^2 = 25.75^{***}$$

		A	B	Total
Observed	6	4	10	
Expected	5	5	10	

$$X_1^2 = 0.4 \text{ N.S.}$$

		a	b	Total
Observed	10	8	18	
Expected	9	9	18	

$$X_1^2 = 0.22 \text{ N.S.}$$

		C	D	E	F	G	Total
Observed	2	1	1	2	0	6	
Expected	1.2	1.2	1.2	1.2	1.2	6	

$$X_4^2 = 2.34 \text{ N.S.}$$

		c	d	e	f	g	Total
Observed	4	1	0	2	1	8	
Expected	1.6	1.6	1.6	1.6	1.6	8	

$$X_4^2 = 5.75 \text{ N.S.}$$

		A,B	C,D,E,F,G	Total
Observed	10	6	16	
Expected	4.57	11.40	16	

		a,b	c,d,e,f,g	Total
Observed	18	8	26	
Expected	7.43	18.57	26	

$$X_1^2 = 9.03^{**}$$

$$X_1^2 = 21.06^{***}$$



## APPENDIX 3.3.7

Times Sat on the Nest After Oviposition (in Minutes) for All Hens,  
Classified According to Hour of Day in Which the Oviposition  
Occurred and Whether it Related to a Nest or Floor Laying\*

Hen	Hour During Which Oviposition Occurred								
	6-7am	7-8am	8-9am	9-10am	10-11am	11-12am	12am-1pm	1-2pm	3-4pm
G34		5,4			3,10	7,2	9		
G35		239	249		54	42		45	
Y94				64	48,11	33,38,19	41		
B99				0		1	1,22		2
B53			0		2		1		2
G38					39	98,20	100	30,10,15	
Y90	105			36		63	7,42	35	
Y91		9	7		14	6,3			
G39			1,0.5				1	1	
Y93			1	0	0	1			
B00			13,14,38				2	15	
Y95					25	17,30	73		
Y99		8	7			6,7,1			
G42						32	2	15,25	
B51		3	12			2,9	1,18		
W80		0			0		0,1		
G40				0	0		0,0		
N. N.					0,2	1,2			
G43			3	0	1			0,30	
W82		2			1	3,2	1,3		
B71			4	1,1,1	41,2	6			
Y96		58			2,1		1,13	30	
Y98				28,11,31				35	
W81		1		0			15	30	
W79				33	4,3,45	2		8	
W84		2		0	0,1				
Red			1	1			3	0	
G37			1		2		2,1,1	2	
B98				1			15,2	2	
W83			1		2	0	1		
Y00				1	26,33,40	26			

\* Times in italics represent floor layings, non-italic represent nest layings

APPENDIX 3.3.8

Analyses of Variance of Timed Data for  
All Individual Hens

Time from first nest entry to oviposition

Source	D.F.	S.S.	M.S.	F	Significance
Between Hens	33	73.23	2.22	3.13	***
Within Hens	115	81.55	0.71		
Total	148	154.78			

Time spent on final nest before oviposition

Source	D.F.	S.S.	M.S.	F	Significance
Between Hens	33	88.32	2.68	3.27	***
Within Hens	115	93.95	0.82		
Total	148	182.27			

Time spent on nest after laying (+ G35 data)

Source	D.F.	S.S.	M.S.	F	Significance
Between Hens	30	210.86	7.03	9.76	***
Within Hens	124	89.87	0.72		
Total	154	300.73			

Time spent on nest after laying (- G35 data)

F value 29/120 = 8.51\*\*\*

\*\*\* = (P < .001)

APPENDIX 3.4

Activities Recorded for Three White Leghorn and Three Game Bantam Hens on Three Occasions with, and Three Occasions Without, Cockerels Present in the Flock

Hen	Cockerels	Calling	Pacing Intensity	Onset of Nesting to Oviposition	Time (mins) from:		Final Nest Entry to Oviposition	Time (mins) on Nest After Lay	No. of Nest Entries	Material Gathering	Site* Laid	Post-Lay Cackle
					First Nest Entry to Oviposition	Final Nest Entry to Oviposition						
Bantam R49	present	yes	**	42	36	19	0	2	yes	12	no	
	present	yes	**	39	33	16	0	5	yes	12	no	
	present	yes	*	61	50	38	0	3	yes	12	no	
	absent	yes	**	66	50	32	2	6	yes	12	no	
	absent	yes	**	25	24	11	0	2	yes	12	no	
	absent	yes	**	31	22	13	0	6	yes	12	no	
Bantam G2	present	yes	*	28	21	10	12	3	yes	V	no	
	present	no	-	69	62	44	20	7	yes	VI	no	
	present	no	-	73	65	29	16	7	yes	VI	no	
	absent	no	*	53	51	28	8	6	no	VII	no	
	absent	no	-	42	33	17	11	4	yes	VI	no	
	absent	no	*	61	56	23	6	8	yes	VII	no	
Bantam G4	present	yes	*	46	40	36	0	2	yes	IV	yes	
	present	no	*	85	64	60	10	3	yes	IV	no	
	present	no	-	41	39	39	8	1	yes	V	yes	
	absent	yes	**	83	50	38	2	5	yes	IV	no	
	absent	yes	*	64	52	47	2	3	yes	IV	no	
	absent	no	*	48	26	25	8	2	yes	IV	yes	
Leghorn 12	present	yes	**	48	31	26	2	2	yes	3	no	
	present	yes	**	87	60	38	8	4	no	3	no	
	present	yes	*	89	57	29	2	4	no	4	no	
	absent	no	*	84	64	44	0	2	no	3	no	
	absent	yes	**	101	72	50	10	5	no	3	no	
	absent	yes	**	72	43	22	1	3	no	3	no	

continued next page

APPENDIX 3.4 (cont.)

Hen	Cockerels	Calling	Pacing Intensity	Onset of Nesting to Oviposition	Time (mins) from:		Time on Nest After Lay (mins)	No. of Nest Entries	Material Gathering	Site* Laid	Post-Lay Cackle
					First Nest Entry to Oviposition	Final Nest Entry to Oviposition					
Leghorn 15	present	no	-	45	36	11	6	5	yes	I	no
	present	yes	-	83	60	28	17	5	yes	I	yes
	present	no	-	72	55	26	7	3	no	III	no
	absent	no	-	61	59	31	1	2	no	II	no
	absent	no	*	63	48	25	4	4	no	I	no
	absent	yes	*	79	56	28	10	8	yes	II	no
Leghorn 11	present	yes	*	58	39	20	2	6	yes	VI	yes
	present	yes	*	117	74	24	9	7	yes	VI	yes
	present	yes	*	64	42	33	5	4	yes	VII	yes
	absent	no	*	41	30	19	5	8	no	VII	yes
	absent	yes	*	62	31	28	3	2	yes	VI	no
	absent	yes	*	93	66	39	6	4	yes	VII	yes

\* Floor and nest sites classified and named as in Study 3.1 (Figure 3.1.4)

Summarised Nesting Data for Several Hens in Cage or Pen Environments  
Hen 2 - (R x W) - In Cage

First Activity Showed	Nesting Call		Maximum Intensity		Sitting		Escape Movements		Other Pre-Lay	Time Laid	Orientation	First Activity	30 Minutes After Lay	Other Post-Lay
	Maximum Intensity	Time	Maximum Intensity	Time	Maximum Intensity	Time	Maximum Intensity	Time						
Calling -42	--	-12 (1) -30 (10)	+++	-25 (5) -15 (5)	-39 (8) -11 (9)	--	-20 (4) -2 (2)		Rotations in cage	8.35	B (climbing on back wire)	Feeding	Feeding	-
Restlessness -34	++	-8 (4)	++	-32 (14) -8 (4)	-12 (4) -4 (3)	--	-1 (1)		Rotations in cage	8.31	B	Feeding	Feeding	-
Restlessness -37	++	-16 (7)	++	-16 (7)	-6 (4)	++	-37 (17) -2 (2)		-	8.14	B (climbing on back wire)	Feeding	Feeding	-
Calling -77	++	-77 (5) -47 (8) -20 (4)	++	-71 (3) -25 (13) -8 (3)	-10 (2)	++	-5 (1)		-	9.36	B (head through back wire)	Feeding	Feeding	-
Calling -114	++	-114 (25) -76 (14) -65 (12) -36 (11)	+++	-75 (4) -36 (7)	-16 (15)	++	-29 (4) -1 (1)		Drank while straining to lay	10.04	B (head through back bars)	Feeding	Feeding	-
Calling -112	--	-112 (18) -92 (4) -62 (5) -16 (5)	+++	-53 (5) -27 (5) -10 (4) -6 (4)	-32 (5) -21 (5) -6 (4)	++	-56 (3) -15 (4) -2 (2)		Drank while straining to lay	10.20	B (head through back bars)	Feeding	Feeding	-
Calling -131	++	-131 (4) -115 (6) -72 (12)	+++	-62 (5) -37 (4) -21 (10)	-95 (6) -10 (5)	+++	-43 (9) -29 (5) -1 (17)		Drank while straining to lay	12.12	B (head through back bars)	Feeding	Feeding	-
Calling -32	--	-32 (21)	++	-27 (12)	-3 (2)	++	-8 (5) -1 (1)		-	8.12	B	Feeding	Feeding	Called again after lay at 8.21
Calling and Restlessness -79	++	-79 (8) -32 (8)	++	-79 (7) -42 (5) -20 (5) -14 (14)	-71 (10) -55 (11) -2 (5)	++	-78 (2) -26 (4) -15 (1)		Rotations in cage	12.34	B	Manipulated egg, fed	Feeding	-
Calling and Restlessness -21	++	-71 (6) -42 (4) -9 (4)	+++	-71 (5) -21 (12)	-5 (5)	++	-65 (3) -42 (9)		Drank while straining to lay	10.57	B	Feeding	Feeding	-
Calling -169	++	-169 (16) -120 (8) -89 (12) -24 (6)	+++	-58 (6) -48 (4) -24 (10)	-77 (7) -14 (6) -7 (7)	++	-42 (4) -32 (2)		Rotations, drank while straining	3.55	B	Feeding	Feeding	-
Calling -21	++	-21 (7) -12 (4)	++	-20 (6) -5 (4)	-8 (2) -1 (1)	-	-		Rotations, drank while straining	8.55	B	Feeding	Feeding	-
Calling -24	++	-24 (3) -16 (6)	++	-23 (10) -8 (5)	-10 (2) -1 (8)	-	-		Rotations, drank while straining	9.19	B	Feeding	Feeding	-
Calling -52	++	-52 (7) -26 (6)	++	-30 (6) -15 (2)	-32 (12) -12 (12)	++	-50 (3)		Rotations, drank while straining	9.57	B	Manipulated egg, fed	Feeding	-
Calling -66	++	-66 (6) -33 (6) -23 (10)	++	-30 (3) -23 (5)	-13 (13)	-	-		Rotations, drank while straining	9.57	B	Manipulated egg, fed	Feeding	-

APPENDIX 3.5.1 (cont.)

Hen 5 - (B x W) - In Cage

First Activity Shown	Nesting Call		Pacing		Sitting		Escape Movements		Other Pre-Lay	Time Laid	Orientation	First Activities	30 Minutes After Lay	Other Post-Lay
	Maximum Intensity	Time	Maximum Intensity	Time	Maximum Intensity	Time	Maximum Intensity	Time						
Sitting -178	+	-20 (3)	+	-29 (3) -20 (5)	-178(20) -6 (6)	+	-55 (4) -47 (9) at -30(4)			3.23	B	Manipulated egg, then fed	Feeding	-
Calling -101	+	-30 (4)	+	-26 (3)	-72 (6) -23(23)	-	-	'Glicking' call -101(4)		10.55	B	Manipulated egg, fed	Feeding	-
Sitting -180	+	-13 (5)	+	-58 (6)	-180(12) -104(16) -52(18)	+	-13(12)	-		12.20	B	Manipulated egg, fed	Feeding	-
Pacing -40	++	-33 (5)	++	-40(16)	-24 (5) -11(11)	++	-19 (8)	'Glicking' call -39(6)		8.35	B	Manipulated egg, fed	Feeding	-
Pacing -64	++	-4 (2)	+	-64 (7)	-57 (5) -28(16)	+	-4 (4)	'Glicking' call -62(4)		11.18	B	Manipulated egg, fed	Feeding	-
Sitting -136	+	-16 (3)	+	-64 (4)	-136(10) -98 (5) -56(14) -12(10)	+	-2 (2)	'Glicking' call -63(3)		11.53	B/E	Feeding	Feeding	-
Pacing -36	+	-18 (2)	+	-36 (6) -25 (6)	-16(10) -4 (4)	-	-	'Glicking' call -34(3)		9.21	B	Manipulated egg, fed	Feeding	-
Sitting -152	+	-23 (2)	+	-72 (9) -25 (3)	-152(13) -63(16) -11(10)	+	-1 (1)	'Glicking' call -72(4)		1.04	B	Manipulated egg, fed	Feeding	-
Sitting -112	+	-30 (4)	+	-63 (6) -32 (4)	-112(10) -51(14) -10(10)	-	-	'Glicking' call -14(10) -60(8)		4.16	B	Feeding	Feeding	-
'Glicking' Call -66	+	-56(12)	++	-52(12) -36 (8)	-20 (4) -12 (8)	+	-4 (4)	'Glicking' call -66(10)		9.09	B	Feeding	Feeding	-
Sitting -105	+	-40 (2)	+	-40 (3)	-105(10) -36(34)	-	-	'Glicking' call -85(11) -74(33)		10.48	B	Looked for egg, fed	Feeding	-
Sitting -188	++	-18 (3)	++	-33 (3)	-188(48) -75(10) -27 (3) -16(16)	-	-	'Glicking' call 119( ) -100(20) -75(8) -40(13)		1.36	B	Looked for egg, fed	Feeding	-
Sitting -38	+	-16 (2)	+	-25 (4)	-38(12) -10 (8)	+	-2 (2)	'Glicking' call -23(2)		8.15	B	Manipulated egg, fed	Feeding	-
Sitting -43	+	-29 (2)	+	-35 (2)	-43 (5) -5 (5)	-	-	'Glicking' call -32(3)		9.58	B	Manipulated egg, fed	Feeding	-
Sitting -73	+	-30 (2)	+	-57 (4) -35 (6)	-73 (9) -10 (8)	+	-1 (1)	'Glicking' call -56(3)		10.12	B	Feeding	Feeding	-

APPENDIX 3.5.1 (Cont.)

Hen 5 - (B x W) - In Pen

First Activities Shown	Nesting Call		Pacing		Sitting	Escape Movements Maximum Intensity	Nest Examinations	Time Laid In	Mest Laid In	First Activity	30 Minutes After Lay	Mo. Nest Entries	Other
	Maximum Intensity	Time	Maximum Intensity	Time									
Nest Examination -31	-	-	-	-	-15(15)	-	-31(16)	10.32	C	Sitting (to 29)	Sitting /	1	Rotations
Nest Examination -42	-	-	-	-	-36(36)	-	-42(8)	11.56	B	Sitting to 3 then drank	Feeding	5	Rotations
Nest Examination -203	++	-196(22) -138(11) -131(5) -92(2)	+	-151(1)	-172(8) -157(4) -150(2) -133(2) -99(7) -50(50)	-	-203(31) -158(11) -151(1) -141(3) -131(5) -92(2)	12.14	B	Sitting (to 30)	Sitting	27	Rotations; manipulated egg just before leaving nest, then drank, fed
Nest Examination -69	-	-	-	-	-57(6) -40(12)	-	-69(4) -43(2)	10.11	C	Sitting (to 15)	Sitting	12	"
Nest Examination -52	++	-48(8) -34(3)	+	-30(2)	-28(8) -9(9)	-	-52(4) -20(1)	9.05	C	Sitting (to 22)	Sitting	6	"
Nest Examination -26	+	-23(4)	-	-	-18(18)	-	-26(3) -19(1)	9.32	C	Sitting (to 16)	Sitting	8	"
Nest Examination -38	++	-28(7)	+	-21(1)	-20(20)	-	-38(10)	9.46	B	Sitting (to 11)	Feeding	2	Rotations; drank, fed after lay
Nest Examination -38	+	-32(4)	-	-	-28(8) -15(15)	-	-38(6) -20(5)	9.00	B	Sitting to 3 then drank	Feeding	2	"
Nest Examination -78	-	-	-	-	-60(3) -29(5)	-	-78(15) -31(2)	10.12	D	Sitting (to 12)	Sitting	2	Rotations; manipulated egg; drank, fed
Nest Examination -106	+	-83(12) -44(2)	-	-	-54(7) -22(22)	-	-106(21) -47(3) -24(2)	10.45	D	Sitting (to 30)	Sitting	6	"
Nest Examination -73	+	-68(9)	-	-	-58(12) -34(14)	-	-73(13) -36(2)	10.57	D	Sitting (to 16)	Sitting	5	"
Nest Examination -29	-	-	-	-	-25(6) -9(9)	-	-29(4) -10(1)	8.06	C	Sitting (to 38)	Sitting	7	Rotations; drank, fed after lay
Nest Examination -38	-	-	-	-	-34(10) -12(12)	-	-38(3) -14(2)	8.38	B	Sitting (to 34)	Sitting	4	"
Nest Examination -36	+	-28(4)	+	-22(2)	-20(4) -10(10)	-	-36(8) -16(2)	8.40	C	Sitting (to 42)	Sitting	3	Rotations; manip. egg before leaving; then drank, fed
Nest Examination -61	+	-44(9)	-	-	-29(29)	-	-61(17) -35(6)	9.50	C	Sitting (to 13)	Sitting	4	Rotations; drank; then fed after

APPENDIX 3.5.1 (cont.)

Hen 3 - (B x R) - In Cage

First Activity Shown	Nesting Call		Pacing		Escape Movements		Other Pre-Lay	Time Laid	Orientation	First Activity	30 Minutes After Lay	Other Post-Lay
	Maximum Intensity	Time	Maximum Intensity	Time	Maximum Intensity	Time						
Sitting -71	+	-21(2)	+	-65(4) -35(12) -16(3)	-	-23(3)	Rotations and foot scraping	12.56	E	Feeding	Feeding	-
Calling -96	+	-96(4) -77(4) -45(3)	++	-27(16) -5(5)	-	-	Rotations and foot scraping	1.25	E	Feeding	Feeding	Nesting call at 62 Post-lay cackle at 63
Sitting -50	+	-38(2)	+	-36(4) -24(4)	-	-	Rotations and foot scraping	8.19	B	Drank then fed	Feeding	Post-lay cackle at 20
Sitting -52	-	-	-	-	-	-	Rotations and foot scraping	9.48	B	Drank then sat on egg	Sitting on egg	Nesting call at 33 Post-lay cackle at 34
Sitting -42	-	-	-	-	-	-	Rotations and foot scraping	10.11	B	Sat on egg	Sitting on egg	Nesting call at 22 Post-lay cackle at 18
Sitting -57	-	-	-	-	-	-	Rotations and foot scraping	10.20	B	Sat on egg	Sitting on egg	Nesting call at 48 Post-lay cackle at 49
Sitting -90	-	-	-	-	-	-	Rotations and foot scraping	11.00	B	Drank then sat on egg	Sitting on egg	-
Sitting -87	-	-	-	-	-	-	Rotations and foot scraping	12.36	B	Drank then sat on egg	Sitting on egg	Post-lay cackle at 38 Cackled and called until 54
Sitting -77	-	-	-	-	-	-	Rotations and foot scraping	12.01	B	Drank then sat on egg	Sitting on egg	Post-lay cackle at 48
Sitting -85	-	-	-	-	-	-	Rotations and foot scraping	12.30	B	Drank then sat on egg	Sitting on egg	Nesting call at 53 Post-lay cackle at 55
Sitting -106	-	-	-	-	-	-	Rotations and foot scraping cackle at -80	10.25	E	Drank then sat on egg	Sitting on egg	Post-lay cackle at 35
Sitting -70	-	-	-	-	-	-	Rotations and foot scraping	11.25	B	Drank then sat on egg	Sitting on egg	Post-lay cackle at 45
Sitting -98	+	-81(3)	+	-90(4)	-	-	Rotations and foot scraping pre-lay cackle -80	1.10	B	Drank then sat on egg	Sitting on egg	Post-lay cackle at 12
Sitting -112	-	-	-	-	-	-	Rotations and foot scraping	3.02	B	Drank then sat on egg	Sitting on egg	Post-lay cackle at 81
Sitting -66	-	-	-	-	-	-	Rotations and foot scraping	11.20	B	Drank then sat on egg	Sitting on egg	Nesting call at 48 Post-lay cackle at 49

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APPENDIX 3-5.1 (cont.)

Hen 3 - (B x R) - In Pen

First Activity Shown	Nesting Call		Pacing		Sitting	Escape Movements		Nest Examination	Time Laid	Nest Laid In	First Activity	30 Minutes After Lay	No. Nest Entries	Other
	Maximum Intensity	Time	Maximum Intensity	Time		Maximum Intensity	Time							
Pacing and Calling -83	++	-83(39)	+	-83(12)	-34(24) -9(9)	-	-	-67(33)	12:58	B	Manip. egg gathered material in shed; drank	Feeding	3	Pre-lay nest-building and material gathering on nest
Pacing and Calling -106	++	-106(12)	+	-106(12)	-68(24) -43(43)	-	-	-83(14)	9:28	B	"	Feeding	2	"
Pacing and Calling -96	++	-96(35)	+	-96(11)	-52(10) -46(46)	-	-	-69(17) -50(4)	10:12	B	"	Feeding	3	"
Pacing and Calling -115	+	-115(43)	+	-115(20)	-42(20) -16(16)	-	-	-86(26) -20(3)	11:55	B	"	Feeding	2	"
Pacing and Calling -113	++	-113(37) -56(3)	+	-113(10) -90(6) -53(3)	-50(31) -17(17)	-	-	-89(31) -19(2)	11:48	B	"	Feeding	2	"
Pacing and Calling -83	+	-83(12)	+	-83(12)	-50(17) -26(26)	-	-	-70(16) -34(3)	10:17	C	"	Feeding	4	Pre-lay nest-building
Pacing and Calling -78	++	-78(28)	++	-78(14)	-68(10) -31(21) -7(7)	-	-	-54(9)	10:21	B	"	Feeding	5	Pre-lay nest-building and material gathering on nest
Pacing and Calling -56	++	-56(12) -38(2)	+	-56(2)	-36(21) -13(13)	-	-	-54(14) -15(1)	9:53	C	"	Feeding	3	"
Pacing and Calling -76	++	-76(26) -29(2)	++	-76(27) -29(4)	-40(11) -24(24)	-	-	-49(9) -25(1)	9:38	C	"	Feeding	2	"
Pacing and Calling -121	+	-121(42)	+	-121(13)	-51(26) -19(19)	-	-	-100(39) -55(4)	11:17	A	"	Feeding	2	"
Pacing and Calling -70	+	-70(35)	+	-70(10) -50(3)	-40(11) -26(26)	-	-	-69(17) -46(6)	9:08	A	"	Feeding	2	"
Pacing and Calling -42	+	-42(13)	+	-42(13)	-23(23)	-	-	-29(6)	8:44	B	"	Feeding	4	"
Pacing and Calling -51	++	-51(21)	+	-56(6)	-26(6) -18(18)	-	-	-34(6)	8:47	B	"	Feeding	4	"
Pacing and Calling -48	++	-48(16) -25(1)	+	-48( )	-32(10) -20(20)	-	-	-38(6)	9:06	B	"	Feeding	2	"
Pacing and Calling -75	+	-75(15)	+	-75(11)	-40(20) -8(8) -18(8)	-	-	-53(13)	9:15	C	"	Feeding	4	Pre-lay nest-building

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## APPENDIX 3.5.2

Activity Charts of Several B x W, R x W and B x R Hens in  
Pens and Cages from 200 Minutes Before Oviposition to  
OvipositionLegend to the Activity Charts

Time before oviposition:

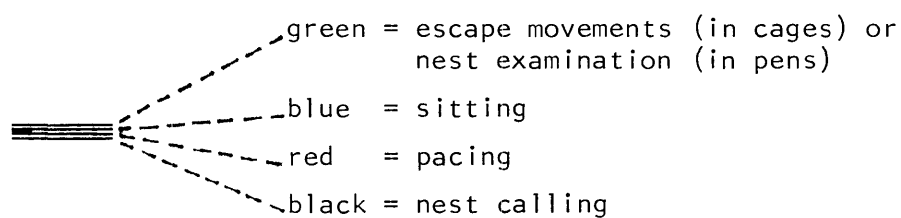
-t : time (t minutes) before oviposition

0 : time of oviposition

Days:

1-15 : nesting occasion recorded, from the oviposition  
which occurred latest in the day (Day 1) to the  
earliest oviposition (Day 15)

Activity:



APPENDIX 3.5.3

Analysis of Variance for Time from Onset of Nesting  
Behaviour to Oviposition - Group A

Source	D.F.	S.S.	M.S.	F	Significance
Strain	2	6231.23	3115.61	0.69	N.S.
Environment	1	24120.15	24120.15	5.37	*
Strain x Environment	2	16813.81	8406.91	1.87	N.S.
Hens Within Strain	15	101303.60	6753.57	1.50	N.S.
Error (a)	15	67419.54	4494.64		
Days w Environment	28	60132.53	2147.59	1.46	-
Strain x Day w Environ- ment	56	96684.19	1726.50	1.18	N.S.
Error (b)	420	616455.02	1467.75		
Total	539	989160.05			

Analysis of Variance for Time Spent in Sitting  
During the Nesting Phase - Group A

Source	D.F.	S.S.	M.S.	F	Significance
Strain	2	43412.94	21706.47	10.12	**
Environment	1	309.78	309.78	0.14	N.S.
Strain x Environment	2	1866.34	933.17	0.44	N.S.
Hens Within Strain	15	64243.78	4282.92	2.00	-
Error (a)	15	32159.58	2143.97		
Days w Environment	28	8998.74	321.38	1.53	-
Strain x Day w Environ- ment	56	12741.73	227.53	1.08	N.S.
Error (b)	420	88391.13	210.46		
Total	539	252124.02			

Analysis of Variance for Time Spent in Escape  
Behaviour During the Nesting Phase - Group A

Source	D.F.	S.S.	M.S.	F	Significance
Strain	2	5.11	2.56	0.03	N.S.
Environment	1	1543.65	1543.65	15.78	***
Strain x Environment	2	1.78	0.89	0.01	N.S.
Hens Within Strain	15	1462.21	97.48	1.00	N.S.
Error (a)	15	1467.67	97.85		
Days w Environment	28	255.43	9.12	1.27	N.S.
Strain x Day w Environ- ment	56	336.55	6.01	0.84	N.S.
Error (b)	420	3014.96	7.18		
Total	539	8087.35			

## APPENDIX 3.5.4

Analysis of Variance for Time from Onset of Nesting  
Behaviour to Oviposition - Group B

Source	D.F.	S.S.	M.S.	F	Significance
Strain	2	20091.95	10045.97	2.68	N.S.
Environment	1	3172.41	3172.41	0.85	N.S.
Strain x Environment	2	53695.12	26847.56	7.16	*
Hens Within Strain	9	92771.07	10307.90	2.75	-
Error (a)	9	33746.17	3749.57		
Days w Environment	8	60432.93	7554.12	1.32	N.S.
Strain x Day w Environ- ment	16	88254.77	5515.92	0.96	N.S.
Error (b)	72	413005.50	5736.19		
Total	119	765169.92			

Analysis of Variance for Time Spent in Nest  
Calling During the Nesting Phase - Group B

Source	D.F.	S.S.	M.S.	F	Significance
Strain	2	10821.02	5410.51	36.70	***
Environment	1	4141.87	4141.87	28.09	***
Strain x Environment	2	2733.95	1366.97	9.27	**
Hens Within Strain	9	4538.67	504.30	3.42	*
Error (a)	9	1326.87	147.43		
Days w Environment	8	1026.87	128.36	1.13	N.S.
Strain x Day w Environ- ment	16	2025.03	126.56	1.11	N.S.
Error (b)	72	8195.70	113.83		
Total	119	34809.99			

Analysis of Variance for Time Spent in Pacing  
Activity During the Nesting Phase - Group B

Source	D.F.	S.S.	M.S.	F	Significance
Strain	2	726.35	363.17	2.68	N.S.
Environment	1	85.01	85.01	0.63	N.S.
Strain x Environment	2	127.52	63.76	0.47	N.S.
Hens Within Strain	9	1705.27	189.47	1.40	N.S.
Error (a)	9	1219.37	135.49		
Days w Environment	8	1356.33	169.54	3.71	***
Strain x Day w Environ- ment	16	974.97	60.94	1.23	N.S.
Error (b)	72	3575.01	49.65		
Total	119	9769.83			

continued next page

## APPENDIX 3.5.4 (cont.)

Analysis of Variance for Time Spent Sitting  
During the Nesting Phase - Group B

Source	D.F.	S.S.	M.S.	F	Significance
Strain	2	5538.05	2769.02	3.20	-
Environment	1	11446.53	11446.53	13.24	**
Strain x Environment	2	8414.72	4207.36	4.86	*
Hens w Strain	9	20257.95	2250.88	2.60	-
Error (a)	9	7783.15	864.79		
Days w Environment	8	5718.47	714.81	2.56	*
Strain x Day w Environ- ment	16	4340.73	271.30	0.97	N.S.
Error (b)	72	26782.40	278.98		
Total	119	90281.99			

Analysis of Variance of Time Spent in Escape  
Behaviour During the Nesting Phase - Group B

Source	D.F.	S.S.	M.S.	F	Significance
Strain	2	1036.32	518.16	1.77	N.S.
Environment	1	4538.70	4538.70	15.53	**
Strain x Environment	2	954.05	477.02	1.63	N.S.
Hens Within Strain	9	2563.85	284.87	0.98	N.S.
Error (a)	9	2629.45	292.16		
Days w Environment	8	126.80	15.85	0.43	N.S.
Strain x Day w Environ- ment	16	520.30	32.52	0.87	N.S.
Error (b)	72	2679.70	37.22		
Total	119	15049.17			

Analysis of Variance of Number of  
Nest Entries - Group B

Source	D.F.	S.S.	M.S.	F	Significance
Strain	2	3007.14	1503.57	7.97	*
Error (a)	9	1697.55	188.62		
Day	4	812.90	203.22	1.72	N.S.
Day x Strain	8	1247.90	155.99	1.32	N.S.
Error (b)	36	4241.20	177.81		
Total	59	11006.69			

## APPENDIX 4.1.3

Numbers of Eggs Laid in Nests with (E) or Without (∅) Nest-Eggs  
and With (N) or Without (∅) Nesting Material Each Day and Results of  
Analyses of Variance Performed on These Data

Day	White Leghorns				Old English Game Bantams				Significance of the variance ratio (F) for factors:		
	E+	E+∅	∅+N	∅+∅	E+N	E+∅	∅+N	∅+∅	Breed (B)	E	N
1	7	0	0	0	5	1	0	0	N.S.	*	-
2	9	0	2	0	4	2	0	0	N.S.	*	*
3	8	0	2	0	3	2	0	0	N.S.	*	-
4	7	0	3	0	4	1	1	0	N.S.	*	***
5	9	0	1	0	5	1	0	0	N.S.	**	***
6	6	0	6	0	3	1	2	0	N.S.	*	*
7	6	0	3	0	8	1	1	0	N.S.	*	**
8	7	0	4	0	5	1	0	0	N.S.	N.S.	*
9	9	0	2	0	6	1	0	0	N.S.	N.S.	-
10	10	0	6	0	2	0	4	0	*	N.S.	***
11	11	0	6	0	4	0	2	0	**	*	***
12	11	0	4	0	3	0	1	0	*	N.S.	*
13	12	0	5	0	3	0	1	0	**	*	***
14	10	0	5	0	5	0	0	0	-	**	***
15	11	-	3	-	5	0	0	0	*	***	***
16	13	0	3	0	4	0	2	0	-	**	***
17	11	0	5	0	3	0	2	0	*	**	***
18	10	0	5	0	4	0	2	0	-	*	***
19	15	0	0	0	2	0	2	0	*	***	***
20	12	0	0	0	1	0	1	0	*	***	***
21	12	0	3	0	2	0	2	0	N.S.	N.S.	**
22	13	0	4	-	4	-	-	-	N.S.	*	**

APPENDIX 4.3.1

Analyses of Variance Performed on Numbers of Eggs Laid in  
Nests with Different Entrances by First Generation  
'Feral' Hens - Top and Bottom Nest Levels

## Analysis for bottom level nests

Source	D.F.	S.S.	M.S.	F	Significance
Entrance	5	539.55	107.90	82.37	***
Recording Period	5	12.55	2.51	1.92	N.S.
Position in Set	5	10.89	2.18	1.66	N.S.
Error	20	26.23	1.31		
Total	35	589.22	16.83		

## Analysis for top level nests

Source	D.F.	S.S.	M.S.	F	Significance
Entrance	5	34.00	6.80	11.66	***
Recording Period	5	2.67	0.53	0.92	N.S.
Position in Set	5	2.67	0.53	0.92	N.S.
Error	20	11.66	0.58		
Total	35	51.00			

## APPENDIX 5.1

## Analyses of Variance for Floor-Egg % in Experiment I

## Analysis for weeks 1-8

Source	D.F.	S.S.	M.S.	F	Source	D.F.	S.S.	M.S.	F
Base (open/closed)	1	0.0855	0.0855	0.50 N.S.					
Curtains	1	0.0020	0.0020	0.01 N.S.					
Base x Curtains	1	0.0579	0.0579	0.34 N.S.					
Reps x Base x Curtains	8	1.3705	0.1713						
Week	7	0.3125	0.0445	12.15 ***	Linear	1	0.2260	0.2260	61.59 ***
					Quadratic	1	0.0608	0.0608	16.57 ***
					Residual	5	0.0257	0.0051	1.40 N.S.
Base x Week	7	0.0300	0.0043	1.17 N.S.					
Curtains x Week	7	0.0221	0.0032	0.86 N.S.					
Base x Curtains x Week	7	0.0404	0.0058	1.57 N.S.					
Reps x Base x Curtains x Week	56	0.2058	0.0037						
TOTAL	95	2.1267							

## Analysis for weeks 9-16

Source	D.F.	S.S.	M.S.	F	Source	D.F.	S.S.	M.S.	F
Base	1	0.0002	0.0002	0.01 N.S.					
Curtains	1	0.0052	0.0052	0.16 N.S.					
Base x Curtains	1	0.0696	0.0696	2.20 N.S.					
Reps x Base x Curtains	8	0.2529	0.0316						
Week	4	0.3717	0.0929	13.60 ***	Linear	1	0.0848	0.0848	12.41 ***
					Quadratic	1	0.2623	0.2623	38.40 ***
					Residual	2	0.0247	0.0082	1.20 N.S.
Base x Week	4	0.0030	0.0008	0.11 N.S.					
Curtains x Week	4	0.0152	0.0038	0.56 N.S.					
Base x Curtains x Week	4	0.0406	0.0101	1.48 N.S.					
Reps x Base x Curtains x Week	32	0.2187	0.0068						
TOTAL	59	0.9772							



APPENDIX 5.2

Analyses of Variance for Floor-Egg % in Experiment 2

Week	Approach F value	Week	Approach F value	Week	Approach F value
1	1.81 N.S.	5	3.63 -	9	10.86 **
2	4.56 *	6	3.19 -	10	3.55 -
3	3.50 -	7	3.34 -	11	3.65 -
4	5.84 *	8	6.68 *	12	3.68 -
				16	5.62 *

Analysis for weeks 1-8

Source	D.F.	S.S.	M.S.	F	Source	D.F.	S.S.	M.S.	F
Approach	3	1.5326	0.5108	4.33 *					
Rep x Approach	8	0.9437	0.1180						
Week	7	0.7341	0.1049	36.40 ***	Linear	1	0.6358	0.6358	220.77 ***
Approach x Week	21	0.0780	0.0037	1.29 N.S.	Quadratic	1	0.0806	0.0806	27.99 ***
Reps x Approach x Week	56	0.1613	0.0029		Residual	5	0.0177	0.0035	1.23 N.S.
TOTAL	95	3.4497							

Analysis for weeks 9-16

Source	D.F.	S.S.	M.S.	F	Source	D.F.	S.S.	M.S.	F
Approach	3	0.8779	0.2927	5.54 *					
Rep x Approach	8	0.4224	0.0528						
Week	4	0.0429	0.0107	4.77 ***	Linear	1	0.0074	0.0074	3.27 -
Approach x Week	12	0.0384	0.0032	1.42 N.S.	Residual	3	0.0355	0.0118	5.26 ***
Reps x Approach x Week	32	0.0719	0.0023						
TOTAL	59	1.4535							

APPENDIX 5.3

Analyses of Variance for Floor-Egg % in Experiment 3

Week	Treatment F value	Week	Treatment F value	Week	Treatment F value
1	3.33 -	5	3.72 -	9	0.90 N.S.
2	3.16 -	6	3.44 -	10	0.43 N.S.
3	9.18 **	7	4.26 *	11	0.40 N.S.
4	1.61 N.S.	8	4.07 *	12	0.48 N.S.
				16	0.39 N.S.

Analysis for weeks 1-3

Source	D.F.	S.S.	M.S.	F	Source	D.F.	S.S.	M.S.	F
Treatment	3	0.8323	0.2774	4.99 *					
Rep x Treatment	8	0.4445	0.0556						

Week	D.F.	S.S.	M.S.	F	Source	D.F.	S.S.	M.S.	F
1	2	0.1167	0.0584	10.25 **	Linear	1	0.0937	0.0937	16.44 ***
					Residual	1	0.0230	0.0230	4.04 -
Treatment x Week	6	0.0324	0.0054	0.95 N.S.					
Rep x Treatment x Week	16	0.0911	0.0057						

TOTAL 35 1.5169

Analysis for weeks 4-8

Source	D.F.	S.S.	M.S.	F
Treatment	3	1.0073	0.3358	3.68 -
Rep x Treatment	8	0.7299	0.0912	
Week	4	0.0391	0.0098	1.76 N.S.
Treatment x Week	12	0.0353	0.0029	0.53 N.S.
Rep x Treatment x Week	32	0.1782	0.0056	

TOTAL 59 1.9899

Analysis for weeks 9-16

Source	D.F.	S.S.	M.S.	F	Source	D.F.	S.S.	M.S.	F
Treatment	3	0.2298	0.0766	0.51 N.S.					
Rep x Treatment	8	1.2096	0.1512						
week	4	0.1614	0.0404	7.57 ***	Linear	1	0.1585	0.1585	29.73 ***
					Residual	3	0.0029	0.0010	0.18 N.S.
Treatment x Week	12	0.0408	0.0034	0.64 N.S.					
Rep x Treatment x Week	32	0.1705	0.0053						

TOTAL 59 1.8121

APPENDIX 5.4

Analyses of Variance for Floor-Egg % in Experiment 4

Week	Nest-Back F Value	Nest-Egg F Value	Back x Egg F Value	Week	Nest-Back F Value	Nest-Egg F Value	Back x Egg F Value
1	0.2682 N.S.	0.7028 N.S.	0.0167 N.S.	7	2.5257 N.S.	0.6917 N.S.	0.2220 N.S.
2	1.8998 N.S.	0.3215 N.S.	0.4569 N.S.	8	1.3564 N.S.	0.1481 N.S.	1.0454 N.S.
3	5.3373 *	0.8077 N.S.	0.2354 N.S.	9	1.6857 N.S.	0.0263 N.S.	0.0961 N.S.
4	2.0719 N.S.	0.6522 N.S.	0.0401 N.S.	10	0.1310 N.S.	0.5417 N.S.	0.3435 N.S.
5	6.2315 *	0.7328 N.S.	0.9360 N.S.	11	0.6195 N.S.	0.6973 N.S.	0.4984 N.S.
6	4.2140 -	2.4121 N.S.	1.2689 N.S.	12	0.9168 N.S.	0.0158 N.S.	4.5215 -
				16	0.2974 N.S.	0.9410 N.S.	0.3248 N.S.

Analysis for weeks 1-8

Source	D.F.	S.S.	M.S.	F	Source	D.F.	S.S.	M.S.	F
Nest-Back	1	0.1795	0.1795	3.7094 -	Linear	1	0.8158	0.8158	214.68 ***
Nest-Egg	1	0.0248	0.0248	0.5123 N.S.	Quadratic	1	0.1389	0.1389	86.55 ***
Nest-Back x Nest-Egg	1	0.0253	0.0253	0.5234 N.S.	Residual	5	0.0466	0.0093	2.45 *
Rep x Nest-Back x Nest-Egg	8	0.3872	0.0484						
Week	7	1.0013	0.1430	36.76 ***					
Nest-Back x Week	7	0.0189	0.0027	0.71 N.S.					
Nest-Egg x Week	7	0.0312	0.0045	1.17 N.S.					
Nest-Back x Nest-Egg x Week	7	0.0125	0.0018	0.47 N.S.					
Rep x Nest-Back x Nest-Egg x Week	56	0.2127	0.0038						
TOTAL	95	1.8934							

Analysis for weeks 9-16

No significant differences detected

APPENDIX 5.5

Significant Analyses of Variance for %  
Nest Eggs Laid in Bottom Nests

Experiment 1

Week Area underneath nests (open/closed) F value  
12 6.05 \*

Analysis for weeks 9-16

Source	D.F.	S.S.	M.S.	F
Base (open/closed)	1	0.3202	0.3202	4.08 -
Curtains	1	0.0414	0.0414	0.53 N.S.
Base x Curtains	1	0.0618	0.0618	0.79 N.S.
Reps x Base x Curtains	8	0.6273	0.0784	
Week	4	0.0286	0.0072	4.27 **
Base x Week	4	0.0035	0.0009	0.51 N.S.
Curtains x Week	4	0.0111	0.0028	1.63 N.S.
Base x Curtains x Week	4	0.0028	0.0007	0.41 N.S.
Reps x Base x Curtains x Week	32	0.0544	0.0017	
TOTAL	59	1.1510		

Experiment 2

Week	Approach F value	Week	Approach F value	Week	Approach F value
1	4.51 *	5	24.02 ***	9	22.68 ***
2	14.58 **	6	12.47 **	10	27.62 ***
3	11.18 **	7	37.47 ***	11	21.80 ***
4	24.33 ***	8	31.83 ***	12	28.44 ***
				16	11.12 **

Analysis for weeks 1-8

Source	D.F.	S.S.	M.S.	F
Approach	3	2.0199	0.6733	27.10 ***
Rep x Approach	8	0.1987	0.0248	
Week	7	0.0686	0.0098	1.97 -
Approach x Week	21	0.1300	0.0062	1.24 N.S.
Rep x Approach x Week	56	0.2791	0.0050	
TOTAL	95	2.6962		

Analysis for weeks 9-16

Source	D.F.	S.S.	M.S.	F
Approach	3	0.9392	0.3131	25.21 ***
Rep x Approach	8	0.0994	0.0124	
Week	4	0.0236	0.0059	6.37 ***
Approach x Week	12	0.0418	0.0035	3.76 **
Rep x Approach x Week	32	0.0296	0.0009	
TOTAL	59	1.1336		

## APPENDIX 5.5 (cont.)

Experiment 3

Week	Treatment F value
3	7.25 *
4	8.46 **

## Analysis for weeks 4-8

Source	D.F.	S.S.	M.S.	F
Treatment	3	2.3203	0.7735	5.22 *
Rep x Treatment	8	1.1856	0.1482	
Week	4	0.0046	0.0011	0.26 N.S.
Treatment x Week	12	0.1014	0.0085	1.94 -
Rep x Treatment x Week	32	0.1395	0.0044	
TOTAL	59	3.7514		

Experiment 4

Week	Nest-Back x Nest-Egg F value
9	5.46 *

APPENDIX 5.6

Mean Times (Hours) that Hens Spent in the Final Nest in  
Laying for Each Pen in Each Experiment

Treatment	Pen (rep)	Time (Hours) in Final Nest							
		Exper.1		Exper.2		Exper.3		Exper.4	
		Top	Bottom	Top	Bottom	Top	Bottom	Top	Bottom
1	1	1.85	1.71	1.62	1.19	1.63	1.18	1.71	1.28
	2	1.77	1.37	1.31	1.29	1.81	1.25	1.38	1.75
	3	1.38	1.26	1.27	1.37	1.46	1.43	1.83	1.38
2	1	1.42	1.43	1.78	1.31	1.37	1.35	1.77	1.15
	2	1.50	1.70	1.13	1.67	1.43	1.40	1.54	1.06
	3	1.85	1.26	1.63	1.28	1.63	1.53	1.38	1.46
3	1	1.56	1.72	1.50	1.34	1.52	1.46	1.00	1.29
	2	1.30	1.32	1.67	1.50	2.17	1.46	1.57	1.47
	3	1.67	1.63	1.62	1.78	1.92	1.30	1.91	1.39
4	1	1.64	1.51	1.56	1.70	1.69	1.50	1.85	1.75
	2	1.68	1.29	1.50	1.24	1.46	1.30	1.65	1.38
	3	1.44	1.52	1.46	1.40	1.42	1.08	1.75	1.33