



MEZINÁRODNÍ TESTOVÁNÍ DRŮBEŽE  
státní podnik. ÚSTRAŠICE

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**Performance test of laying type of hens**

**XXXXX**

**- cage system**

**Test no. 30/2023**

**The final report**

**2023 - 2024**

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Ústrašice, March 2024

## Material and methods of first part

### Test term

**Beginning of the test:** 18 October 2023

**End of the test:** 13 February 2024

### Material

In total there were 1440 layers of xxxxx delivered to the test station. There were compared 3 treatments in the trial. Each treatment consisted of 480 hens.

### Experimental treatments:

Tr. No.	Tr.	Description
1	T1	xxxxx
2	T2	xxxxx
3	T3	xxxxx

### Housing system

Hens were kept in windowless house with full control of the environment. They were kept in 3-tier enriched cage batteries.

Enriched cages provided 756 cm<sup>2</sup> of floor space per hen. Enriched cages were equipped with a perch, a nest, a roosting ash place and claw shortening devices in addition to feeders and drinkers.

Feed was manually filled in the feeders, water was supplied by automatic nipple drinkers. Droppings were removed by the conveyor belt. Eggs were collected manually, each sample separately.

### Conditions of the environment

Temperature was kept between 18 – 20°C. Relative humidity was 60 – 70 %. Temperature was regulated by transversal automatically controlled ventilation (fans and air inlets on the opposite side of the house), in cold weather a gas heater was used. Ventilation provided minimum ventilation rate of 3 m<sup>3</sup>/hour/kg live weight in winter and 5 m<sup>3</sup>/hour/kg live weight in summer.

### Lighting programme

Hens were kept in windowless house. All the birds were submitted to the following lighting programme.

Age	Hours of light
Week 19	14
Week 20	15
Week 21	15.5
Week 22 – end of the test	16

Luminous intensity 15 – 20 lx.

## Feeding

Hens were fed with N1 IT N. Complete feeds were in mash form and fed ad libitum.

Feed was supplied by xxxxx

		N1 IT N
Feed form		crushed
<b>Components – content in %:</b>		
Wheat		49.965
Extr. soybean groats		13.450
Maize		15.000
Sunflower meal		8.000
Soybean oil		2.500
DL-methionine		0.150
Lysine-HCL		0.150
L-threonine		0.030
Salt		0.260
Limestone		2.750
Limestone-roughly ground		6.400
MCP - monocalciumphosphate		0.610
Sodium bicarbonate		0.150
Premix of vitamins, enzymes		0.585
<b>Nutrient content (calculated values):</b>		
Crude protein	g/kg	160.29
Fat	g/kg	43.21
Linoleic acid	g/kg	23.94
Crude fiber	g/kg	40.43
ME	MJ/kg	11.41
Lysine	g/kg	7.91
Methionine	g/kg	4.07
Meth. +cysteine	g/kg	7.05
Threonine	g/kg	5.75
Tryptophan	g/kg	1.93
Ca	g/kg	37.01
P	g/kg	5.14
P (digestible)	g/kg	3.44
Vitamin A	U.I./kg	10739.67
Vitamin D3	U.I./kg	2080.00

## Veterinary precautions

House was cleaned, washed and disinfected by xxxxx before the pullet placement. Disinfection of shoes by solution of xxxxx before entry was used. Rodent control was provided regularly.

## **Evaluated parameters**

### **Feed consumption**

- per 1 hen in production period
- per 1 egg
- per 1 kg of egg mass
- per 1 feeding day

### **Live body weight**

- at the age of 18 weeks
- at the age of 35 weeks

### **Mortality**

- mortality of hens and it's causes

### **Egg production**

Egg production was recorded daily. Eggs were collected manually at the same time every day. Eggs of different samples were collected separately.

Results of the egg production:

- per 1 hen housed
- per 1 hen present
- per 1 hen housed for each period

### **Sexual maturity**

- age of the layers at 10 %. 30 %. 50 % and peak of lay

### **Egg weight**

- average egg weight for each period
- average egg weight for the whole production
- classification of eggs

### **Production of egg mass**

- per 1 hen housed
- per 1 hen present

### **Second quality eggs**

Second quality eggs were sorted out as:

- cracked eggs
- broken eggs
- double-yolk eggs
- shell-less eggs

### **Egg quality**

- egg weight
- yolk weight
- shell strength
- index of egg shape
- shell thickness
- Haugh's units
- yolk colour
- egg shell colour
- presence of blood spots on the yolk

## Results

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**Results of the egg production**

**Tab. No. 1**

Treatment No.	Treatment	Age at the yield					Egg production per				Egg weight	Egg mass per	
		10%	30%	50%	Max.		hen - housed		hen - day			g	hen - housed
					day	%	number	%	number	%	kg		kg
1	<b>T1</b>	140	138	144	178	98.54	94.75	84.60	94.75	84.60	57.67	5.46	5.46
2	<b>T2</b>	140	138	144	182	98.96	94.81	84.66	94.81	84.66	57.63	5.46	5.46
3	<b>T3</b>	140	138	144	178	99.38	95.50	85.27	95.50	85.27	57.74	5.51	5.51

**Feed consumption****Tab. No. 2**

<b>Treatment No.</b>	<b>Treatment</b>	<b>Feed consumption</b>			
		per 1 hen	per 1 egg	per 1 kg of egg mass	per 1 feeding day
		kg	g	kg	g
1	<b>T1</b>	13.94	147.12	2.55	124.45
2	<b>T2</b>	13.92	146.78	2.55	124.26
3	<b>T3</b>	13.93	145.86	2.53	124.37

**Live weight of laying hens****Tab. No. 3**

<b>Treatment No.</b>	<b>Treatment</b>	<b>Live weight (g)</b>	
		<b>Start live weight (18 weeks)</b>	<b>Final live weight (35 weeks)</b>
1	<b>T1</b>	1625.57	1995.64
2	<b>T2</b>	1602.33	1985.62
3	<b>T3</b>	1608.74	1986.96



**Mortality****Tab. No. 4**

<b>Treatment No.</b>	<b>Treatment</b>	<b>Number of hens</b>			
		<b>Initial flock</b>	<b>Final flock</b>	<b>Mortality</b>	
		Birds	Birds	Birds	%
1	<b>T1</b>	480	480	0	0.00
2	<b>T2</b>	480	480	0	0.00
3	<b>T3</b>	480	480	0	0.00

**Second quality eggs**

**Tab. No. 5**

Treatment No.	Treatment	Eggs layed	Cracked		Broken eggs		Double-yolked		Membranes		Nonstandard together	
		number	number	%	number	%	number	%	number	%	number	%
1	<b>T1</b>	45504	1514	3.33	830	1.82	4	0.01	317	0.70	2665	5.86
2	<b>T2</b>	45511	1493	3.28	812	1.78	0	0.00	270	0.59	2575	5.66
3	<b>T3</b>	45814	1418	3.10	815	1.78	1	0.00	267	0.58	2501	5.46

**Weight classes of eggs****Tab. No. 6**

<b>Treatment No.</b>	<b>Treatment</b>	<b>Egg weight</b>	<b>XL</b>	<b>L</b>	<b>M</b>	<b>S</b>
			(= > 73 g)	(63 - 73 g)	(53 - 63 g)	(= < 53 g)
		g	%	%	%	%
1	<b>T1</b>	57.67	1.02	18.13	64.03	16.81
2	<b>T2</b>	57.63	1.12	19.14	61.70	18.03
3	<b>T3</b>	57.74	1.14	18.81	63.07	16.98

**Egg quality – 19<sup>th</sup> week of age**

**Tab. No. 7a**

Treatment No.	Treatment	Egg weight	Yolk weight	Shell strength	Index of egg shape	Shell thickness	Haugh's units	Yolk colour				Egg shell colour			Blood spot
								L	a	b	Roche	L	a	b	
		g	g	N	mm										
1	<b>T1</b>	43.65	8.98	41.10	1.26	0.34	102.33	-7.85	4.7	7.3	13.73	58.19	20.9	24.8	1
2	<b>T2</b>	43.00	8.97	38.78	1.28	0.33	103.88	-8.77	4.8	6.6	14.15	57.04	20.7	24.7	1
3	<b>T3</b>	43.29	9.00	39.08	1.26	0.33	103.15	-7.98	4.7	7.3	13.73	57.73	21.0	25.5	3

In 19<sup>th</sup> week of age there were only 3 eggs per pen for the quality.

**Egg quality – 23<sup>rd</sup> week of age**

**Tab. No. 7b**

Treatment No.	Treatment	Egg weight	Yolk weight	Shell strength	Index of egg shape	Shell thickness	Haugh's units	Yolk colour				Egg shell colour			Blood spot
								L	a	b	Roche	L	a	b	
		g	g	N	mm										
1	<b>T1</b>	55.48	12.56	47.54	1.25	0.36	95.90	-8.38	4.4	6.7	13.69	55.57	23.2	28.9	1
2	<b>T2</b>	55.31	12.70	45.94	1.25	0.35	94.24	-8.55	4.4	6.7	13.70	56.15	23.4	29.4	1
3	<b>T3</b>	57.57	13.31	47.98	1.25	0.36	93.38	-8.25	4.4	6.9	13.64	55.84	23.6	29.2	1

Interpretative notes:

L - colour of egg ( 0=black. 100=white )

a - red colouring and it's fullness

b - yellow colouring and it's fullness

Egg quality – 27<sup>th</sup> week of age

Tab. No. 7c

Treatment No.	Treatment	Egg weight	Yolk weight	Shell strength	Index of egg shape	Shell thickness	Haugh's units	Yolk colour				Egg shell colour			Blood spot
								L	a	b	Roche	L	a	b	
		g	g	N		mm									
1	<b>T1</b>	59.81	14.74	45.84	1.26	0.35	96.99	-8.06	4.4	7.0	13.49	56.02	22.5	29.4	0
2	<b>T2</b>	60.19	15.05	47.61	1.25	0.34	94.17	-7.53	4.0	7.4	12.93	56.00	23.3	29.6	2
3	<b>T3</b>	60.36	15.61	47.57	1.25	0.34	91.43	-6.47	3.5	8.3	12.22	56.42	23.4	29.3	0

Egg quality – 31<sup>st</sup> week of age

Tab. No. 7d

Treatment No.	Treatment	Egg weight	Yolk weight	Shell strength	Index of egg shape	Shell thickness	Haugh's units	Yolk colour				Egg shell colour			Blood spot
								L	a	b	Roche	L	a	b	
		g	g	N		mm									
1	<b>T1</b>	60.70	15.36	45.61	1.26	0.35	96.71	-8.22	4.2	6.8	13.35	56.19	22.5	29.9	1
2	<b>T2</b>	61.96	15.67	46.38	1.26	0.36	95.71	-7.80	3.8	7.2	12.99	56.47	22.7	30.1	0
3	<b>T3</b>	61.18	15.74	47.68	1.26	0.37	94.44	-7.33	3.8	7.6	12.86	56.86	22.5	30.5	2

Interpretative notes:

L - colour of egg ( 0=black. 100=white )

a - red colouring and it's fullness

b - yellow colouring and it's fullness

Egg quality – 35<sup>th</sup> week of age

Tab. No. 7e

Treatment No.	Treatment	Egg weight	Yolk weight	Shell strength	Index of egg shape	Shell thickness	Haugh's units	Yolk colour				Egg shell colour			Blood spot
		g	g	N		mm		L	a	b	Roche	L	a	b	
1	<b>T1</b>	62.39	16.29	46.83	1.26	0.37	96.86	-7.81	3.9	7.2	13.09	56.23	22.0	29.5	1
2	<b>T2</b>	63.94	16.78	46.74	1.25	0.37	97.03	-7.40	3.9	7.5	12.92	56.19	22.5	29.6	0
3	<b>T3</b>	63.62	17.74	46.39	1.26	0.37	94.27	-7.08	3.5	7.8	12.43	57.04	22.8	29.7	0

Interpretative notes:

L - colour of egg ( 0=black. 100=white )

a - red colouring and it's fullness

b - yellow colouring and it's fullness

**Laying intensity****Tab. No. 8**

in four weeks long periods (%)

Treatment No.	Treatment	Period				
		1	2	3	4	5
1	<b>T1</b>	56.09	92.97	94.00	95.30	93.66
2	<b>T2</b>	57.13	92.52	93.81	95.16	93.69
3	<b>T3</b>	58.32	93.21	94.24	95.32	93.84

In the 5<sup>th</sup> period there is only 1 week of lay including.

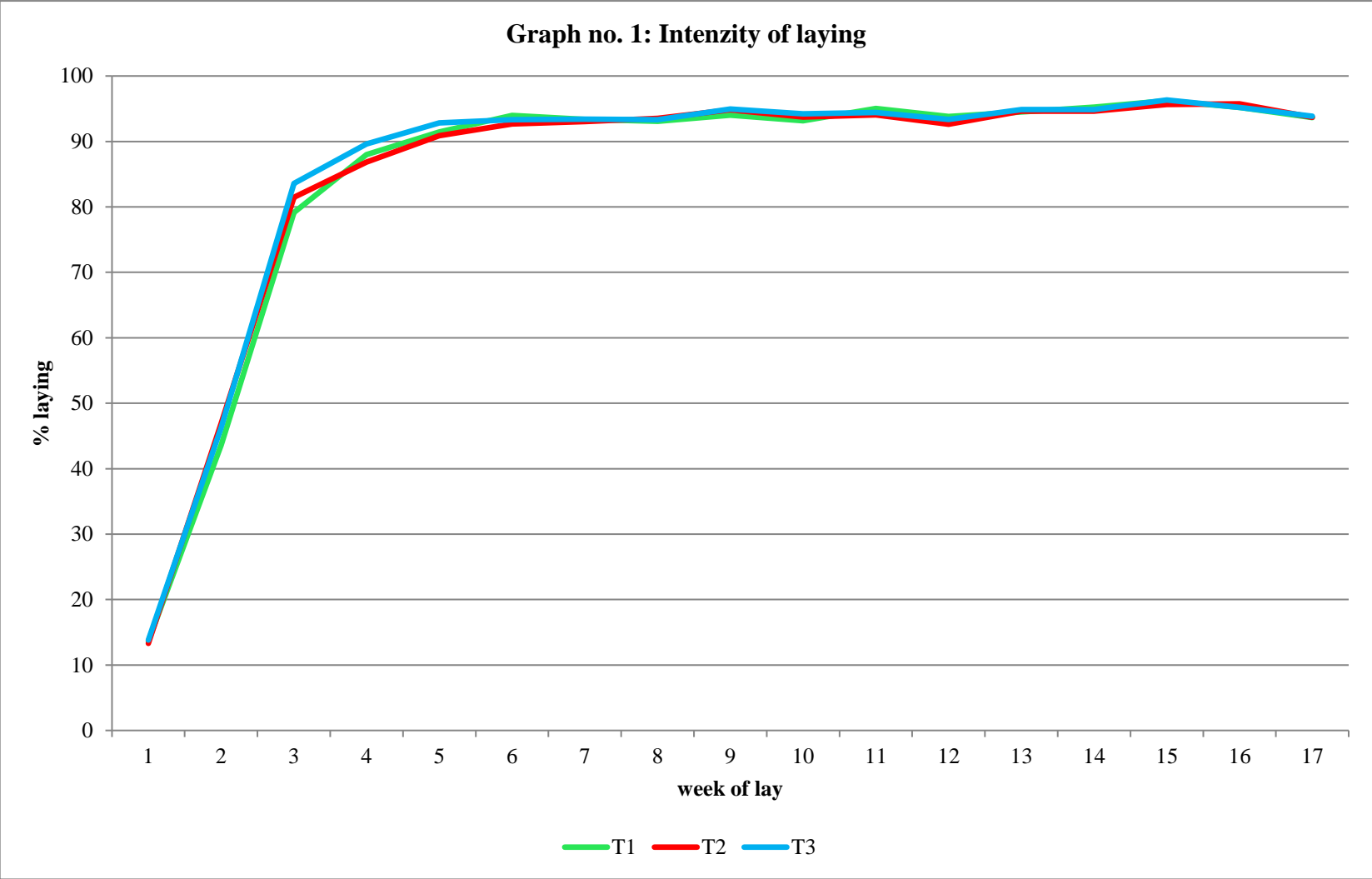
**Average weight of eggs****Tab. No. 9**

in four weeks long periods (g)

<b>Treatment No.</b>	<b>Treatment</b>	<b>Period</b>				
		1	2	3	4	5
1	<b>T1</b>	49.84	56.45	59.53	61.62	61.88
2	<b>T2</b>	49.41	56.09	59.67	62.05	61.91
3	<b>T3</b>	50.07	56.33	59.64	61.95	61.95

In the 5<sup>th</sup> period there is only 1 week of lay including.





## Material and methods of second part

### Test term

**Beginning of the test:** 6 March 2024

**End of the test:** 11 June 2024

### Material

In total there were 1440 layers of xxxxx. There were compared 4 groups in the trial. Each group consisted of 360 hens.

### Experimental treatments:

Tr. No.	Tr.	Description
1	T1	xxxxxx
2	T2	xxxxxx
3	T3	xxxxxx
4	T4	xxxxxx

### Housing system

Hens were kept in windowless house with full control of the environment. They were kept in 3-tier enriched cage batteries.

Enriched cages provided 756 cm<sup>2</sup> of floor space per hen. Enriched cages were equipped with a perch, a nest, a roosting ash place and claw shortening devices in addition to feeders and drinkers.

Feed was manually filled in the feeders, water was supplied by automatic nipple drinkers. Droppings were removed by the conveyor belt. Eggs were collected manually, each sample separately.

### Conditions of the environment

Temperature was kept between 18 – 20°C. Relative humidity was 60 – 70 %. Temperature was regulated by transversal automatically controlled ventilation (fans and air inlets on the opposite side of the house), in cold weather a gas heater was used. Ventilation provided minimum ventilation rate of 3 m<sup>3</sup>/hour/kg live weight in winter and 5 m<sup>3</sup>/hour/kg live weight in summer.

### Lighting programme

Hens were kept in windowless house.

Hours of light: 16

Luminous intensity 15 – 20 lx.

### **Feeding**

Hens were fed with N2 IT N. Complete feeds were in mash form and fed ad libitum.  
Feed was supplied by xxxxx

	<b>N2 IT N</b>
Feed form	crushed
<b>Components – content in %:</b>	
Wheat	56.475
Extr. soybean groats	15.000
Maize	5.000
Sunflower meal	4.500
Wheat bran	4.000
Soybean oil	3.500
DL-methionine	0.100
Lysine-HCL	0.110
L-threonine	0.030
Salt	0.260
Limestone	2.900
Limestone-roughly ground	6.900
MCP - monocalciumphosphate	0.370
Sodium bicarbonate	0.150
Premix of vitamins, enzymes	0.655

### **Veterinary precautions**

Disinfection of shoes by solution of xxxxx before entry was used. Rodent control was provided regularly.

## **Evaluated parameters**

### **Feed consumption**

- per 1 hen in production period
- per 1 egg
- per 1 kg of egg mass
- per 1 feeding day

### **Live body weight**

- at the start of trial
- at the end of trial

### **Mortality**

- mortality of hens and it's causes

### **Egg production**

Egg production was recorded daily. Eggs were collected manually at the same time every day. Eggs of different samples were collected separately.

Results of the egg production:

- per 1 hen housed
- per 1 hen present
- per 1 hen housed for each period

### **Egg weight**

- average egg weight for each period
- average egg weight for the whole production
- classification of eggs

### **Production of egg mass**

- per 1 hen housed
- per 1 hen present

### **Second quality eggs**

Second quality eggs were sorted out as:

- cracked eggs
- broken eggs
- double-yolk eggs
- shell-less eggs

### **Egg quality**

- egg weight
- yolk weight
- shell strength
- index of egg shape
- shell thickness
- Haugh's units
- yolk colour
- egg shell colour
- presence of blood spots on the yolk

## Results

Tab. No. 1	Results of the egg production
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Tab. No. 8	Intensity of lay
Tab. No. 9	Average egg weight
Graph No. 1	Intensity of lay

**Results of the egg production – in 3 periods**

**Tab. No. 1**

Treatment No.	Treatment	Egg production per				Egg weight	Egg mass per	
		hen - housed		hen - day			hen - housed	hen - day
		number	%	number	%	g	kg	kg
1	<b>T1</b>	77.90	92.74	78.33	93.25	62.35	4.86	4.88
2	<b>T2</b>	78.44	93.38	78.44	93.38	62.70	4.92	4.92
3	<b>T3</b>	78.08	92.96	78.25	93.15	62.81	4.90	4.91
4	<b>T4</b>	78.98	94.02	79.13	94.20	62.91	4.97	4.98

**Feed consumption – in 3 periods****Tab. No. 2**

<b>Treatment No.</b>	<b>Treatment</b>	<b>Feed consumption</b>			
		per 1 hen	per 1 egg	per 1 kg of egg mass	per 1 feeding day
		kg	g	kg	g
1	<b>T1</b>	11.16	142.50	2.29	132.88
2	<b>T2</b>	11.11	141.64	2.26	132.26
3	<b>T3</b>	11.08	141.66	2.26	131.96
4	<b>T4</b>	11.18	141.29	2.25	133.10

**Live weight of laying hens****Tab. No. 3**

<b>Treatment No.</b>	<b>Treatment</b>	<b>Live weight (g)</b>	
		Start live weight	Final live weight
1	<b>T1</b>	2008.98	2072.71
2	<b>T2</b>	2063.85	2093.09
3	<b>T3</b>	2036.45	2080.08
4	<b>T4</b>	2008.08	2051.20



Mortality and it's causes – in 3 periods

Tab. No. 4

Treatment No.	Treatment	Number of hens				Causes														
		Start of lay	End of lay	Mortality		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		birds	birds	birds	%															
1	T1	360	357	3	0.83		1							1		1				
2	T2	360	360	0	0.00															
3	T3	360	359	1	0.28											1				
4	T4	360	358	2	0.56									2						

Mortality and it's causes – the whole test

Treatment No.	Treatment	Number of hens				Causes														
		Start of lay	End of lay	Mortality		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		birds	birds	birds	%															
1	T1	360	357	3	0.83		1							1		1				
2	T2	360	359	1	0.28									1						
3	T3	360	358	2	0.56									1		1				
4	T4	360	353	7	1.94									4		3				

Diagnostic:

- 1 - Viral diseases
- 2 - Bacterial diseases
- 3 - Fungal diseases
- 4 - Parasitary diseases
- 5 - Tumors

- 6 - Injuries
- 7 - Digestive tract diseases
- 8 - Respiratory tract diseases
- 9 - Reproduction tract diseases
- 10 - Locomotion apparatus diseases

- 11 - Metabolic derangement
- 12 - Cannibalism
- 13 - Diverticulus inflammation
- 14 - Culling and other causes
- 15 - Sampling (excluded of calculation)

**Second quality eggs – in 3 periods**

**Tab. No. 5**

Treatment No.	Treatment	Eggs layed	Cracked		Broken eggs		Double-yolked		Membranes		Nonstandard together	
		number	number	%	number	%	number	%	number	%	number	%
1	<b>T1</b>	28101	836	2.97	508	1.81	0	0.00	81	0.29	1425	5.07
2	<b>T2</b>	28238	977	3.46	605	2.14	0	0.00	147	0.52	1729	6.12
3	<b>T3</b>	28054	894	3.19	583	2.08	0	0.00	90	0.32	1567	5.59
4	<b>T4</b>	28432	889	3.13	518	1.82	0	0.00	106	0.37	1513	5.32

**Second quality eggs – the whole test**

Treatment No.	Treatment	Eggs layed	Cracked		Broken eggs		Double-yolked		Membranes		Nonstandard together	
		number	number	%	number	%	number	%	number	%	number	%
1	<b>T1</b>	32708	962	2.94	592	1.81	0	0.00	101	0.31	1655	5.06
2	<b>T2</b>	32829	1086	3.31	710	2.16	0	0.00	163	0.50	1959	5.97
3	<b>T3</b>	32639	1028	3.15	690	2.11	0	0.00	104	0.32	1822	5.58
4	<b>T4</b>	33001	1034	3.13	616	1.87	0	0.00	127	0.38	1777	5.38

**Weight classes of eggs – in 3 periods**

**Tab. No. 6**

Treatment No.	Treatment	Egg weight	XL	L	M	S
			(= > 73 g)	(63 - 73 g)	(53 - 63 g)	(= < 53 g)
		g	%	%	%	%
1	<b>T1</b>	62.35	2.56	39.92	56.35	1.17
2	<b>T2</b>	62.70	2.93	42.27	53.64	1.15
3	<b>T3</b>	62.81	2.00	44.29	53.20	0.52
4	<b>T4</b>	62.91	3.09	43.73	52.06	1.12

**Weight classes of eggs – the whole test**

Treatment No.	Treatment	Egg weight	XL	L	M	S
			(= > 73 g)	(63 - 73 g)	(53 - 63 g)	(= < 53 g)
		g	%	%	%	%
1	<b>T1</b>	62.39	2.73	39.85	56.33	1.09
2	<b>T2</b>	62.78	3.21	43.96	51.84	0.99
3	<b>T3</b>	62.90	2.67	44.98	51.92	0.44
4	<b>T4</b>	62.85	3.07	42.79	53.05	1.08

**Egg quality – 39<sup>th</sup> week of age  
(21<sup>th</sup> week of lay)**

**Tab. No. 7a**

Treatment No.	Treatment	Egg weight g	Yolk weight g	Shell strength N	Index of egg shape	Shell thickness mm	Haugh's units	Yolk colour				Egg shell colour			Blood spot	Albumin height mm
								L	a	b	Roche	L	a	b		
1	<b>T1</b>	61.74	16.78	41.97	1.27	0.37	99.57	-8.03	3.7	7.1	12.73	56.40	21.9	29.4	0	10,14
2	<b>T2</b>	64.18	16.50	44.47	1.27	0.37	98.63	-8.57	4.3	6.7	13.50	55.37	22.5	29.3	0	10,16
3	<b>T3</b>	61.97	16.45	42.36	1.27	0.37	97.27	-9.23	4.2	6.0	13.67	58.10	21.0	30.4	1	9,65
4	<b>T4</b>	63.44	16.78	41.32	1.26	0.36	99.70	-8.93	4.2	6.3	13.67	56.20	22.1	30.3	0	10,24

In 39<sup>th</sup> week of age there were only 30 eggs per treatment for the quality.

**Egg quality – 42<sup>nd</sup> week of age  
(24<sup>th</sup> week of lay)**

**Tab. No. 7b**

Treatment No.	Treatment	Egg weight g	Yolk weight g	Shell strength N	Index of egg shape	Shell thickness mm	Haugh's units	Yolk colour				Egg shell colour			Blood spot	Albumin height mm
								L	a	b	Roche	L	a	b		
1	<b>T1</b>	62.77	17.82	44.48	1.28	0.36	92.26	-9.18	7.1	6.6	15.53	57.84	22.7	30.7	0	8,70
2	<b>T2</b>	62.91	18.25	46.10	1.27	0.37	89.72	-8.88	7.4	6.8	15.43	58.03	22.6	29.9	0	8,25
3	<b>T3</b>	62.92	18.14	44.74	1.28	0.36	91.02	-9.20	7.1	6.6	15.48	57.46	22.9	30.6	1	8,49
4	<b>T4</b>	62.58	18.33	46.32	1.28	0.37	91.42	-8.33	7.5	7.3	15.29	57.35	23.2	30.2	0	8,55

Interpretative notes:

L - colour of egg ( 0=black. 100=white )

a - red colouring and it's fullness

b - yellow colouring and it's fullness

**Egg quality – 46<sup>th</sup> week of age  
(28<sup>th</sup> week of lay)**

**Tab. No. 7c**

Treatment No.	Treatment	Egg weight g	Yolk weight g	Shell strength N	Index of egg shape	Shell thickness mm	Haugh's units	Yolk colour				Egg shell colour			Blood spot	Albumin height mm
								L	a	b	Roche mm	L	a	b		
1	<b>T1</b>	61.86	17.16	43.69	1.28	0.38	93.68	-9.88	6.6	6.0	15.57	58.15	22.6	30.8	0	8,95
2	<b>T2</b>	62.48	17.54	45.07	1.28	0.37	94.07	-9.82	6.6	6.0	15.54	58.43	22.3	30.4	0	9,04
3	<b>T3</b>	62.68	18.21	44.15	1.28	0.37	92.56	-8.49	7.1	7.1	15.22	57.88	22.6	30.4	0	8,77
4	<b>T4</b>	62.15	18.06	42.79	1.28	0.37	91.33	-8.68	7.3	7.0	15.43	58.18	22.5	30.6	0	8,52

**Egg quality – 50<sup>th</sup> week of age  
(32<sup>nd</sup> week of lay)**

**Tab. No. 7d**

Treatment No.	Treatment	Egg weight g	Yolk weight g	Shell strength N	Index of egg shape	Shell thickness mm	Haugh's units	Yolk colour				Egg shell colour			Blood spot	Albumin height mm
								L	a	b	Roche mm	L	a	b		
1	<b>T1</b>	61.90	17.01	40.77	1.28	0.35	95.17	-9.73	6.4	6.1	15.36	57.75	21.2	30.1	0	9,28
2	<b>T2</b>	63.62	18.24	43.02	1.28	0.37	90.60	-8.89	6.7	6.8	15.20	58.43	21.2	30.0	0	8,50
3	<b>T3</b>	62.52	18.12	42.00	1.28	0.36	91.04	-8.14	6.7	7.4	14.83	58.23	21.4	30.4	0	8,47
4	<b>T4</b>	62.33	18.30	41.60	1.28	0.37	93.13	-7.96	6.7	7.5	14.81	57.94	21.8	30.5	0	8,91

Interpretative notes:

L - colour of egg ( 0=black. 100=white )

a - red colouring and it's fullness

b - yellow colouring and it's fullness

Egg quality – 52<sup>nd</sup> week of age  
(34<sup>th</sup> week of lay)

Tab. No. 7e

Treatment No.	Treatment	Egg weight g	Yolk weight g	Shell strength N	Index of egg shape	Shell thickness mm	Haugh's units	Yolk colour				Egg shell colour			Blood spot	Albumin height mm
								L	a	b	Roche mm	L	a	b		
1	<b>T1</b>	62.60	18.58	42.63	1.29	0.36	92.94	-7.16	6.7	8.1	14.48	58.51	21.9	30.4	0	8,84
2	<b>T2</b>	62.73	18.59	42.39	1.28	0.36	89.52	-7.36	6.7	8.0	14.58	59.00	21.6	30.5	0	8,23
3	<b>T3</b>	63.30	19.06	43.86	1.29	0.37	87.94	-7.17	6.7	8.2	14.53	58.59	21.9	30.5	0	7,99
4	<b>T4</b>	62.45	18.86	39.63	1.29	0.36	89.12	-6.58	6.0	8.4	13.78	59.36	21.1	29.9	1	8,14

Interpretative notes:

L - colour of egg ( 0=black. 100=white )

a - red colouring and it's fullness

b - yellow colouring and it's fullness

**Laying intensity****Tab. No. 8**

in four weeks long periods (%)

Treatment No.	Treatment	Period			
		6	7	8	9
1	<b>T1</b>	93.28	92.51	92.43	91.41
2	<b>T2</b>	94.43	92.93	92.78	91.64
3	<b>T3</b>	93.62	92.48	92.77	90.97
4	<b>T4</b>	94.42	93.77	93.87	90.12

In the 9<sup>th</sup> period there was only 2 weeks of lay including.

**Average weight of eggs****Tab. No. 9**

in four weeks long periods (g)

Treatment No.	Treatment	Period			
		6	7	8	9
1	<b>T1</b>	62.21	62.46	62.37	62.65
2	<b>T2</b>	62.81	62.35	62.93	63.29
3	<b>T3</b>	62.63	62.79	63.01	63.45
4	<b>T4</b>	62.78	62.88	63.07	62.47

In the 9<sup>th</sup> period there was only 2 weeks of lay including.



**Graph no. 1: Intenzity of laying**

