

Bioeconomic Aspects of Legumes Using in Laying hen Diets

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Introduction

In the poultry industry, egg production is affected by a shortage of some feedstuffs (especially protein-rich ones) and possibilities to reduce feed costs. Various species of legumes such as beans, peas, lupine etc., which could be successfully grown in Latvia, are used as promising sources of protein in animal farming.

The present research on diets for laying hens was conducted to identify the most appropriate amount of protein-rich feedstuffs to be included in the laying hen diet and the effect on laying hen productivity.

Methodology

The experiment used two kinds of protein-rich crops: pea seeds (*pisum sativum*), var. 'Bruno', and dried green alfalfa (*medicago sativa* L.) pellets. The feeding experiment was conducted for 24 weeks on Lohmann brown laying hens (n=150) kept in a deep bedding housing facility. The basic feed (control group) represented a feed mixture (barley, oats, ground maize, lime, a premix) prepared according to layer age. For the experimental groups, the diets included 50 g kg⁻¹, 100 g kg⁻¹ peas 'Bruno' and 50 g kg⁻¹, 100 g kg⁻¹ dried green alfalfa pellets.

Feed mixture used in the feeding experiment to prepare 100 kg of feed

Ingredients	C	T1	T2	T3	T4
	Basic feed (BF)	BF+5% peas	BF+10% peas	BF+5% lucerne pellets	BF+10% lucerne pellets
Ground maize	25	19	27	16	20
Barley	50	50	39	50	45
Oats	13	14	12	17	13
Peas	-	5	10	-	-
Lucerne	-	-	-	5	10
Premix	8	8	8	8	8
Lime	4	4	4	4	4
Total, kg	100	100	100	100	100
Amount of feed per hen per day, g	125	115	115	115	115

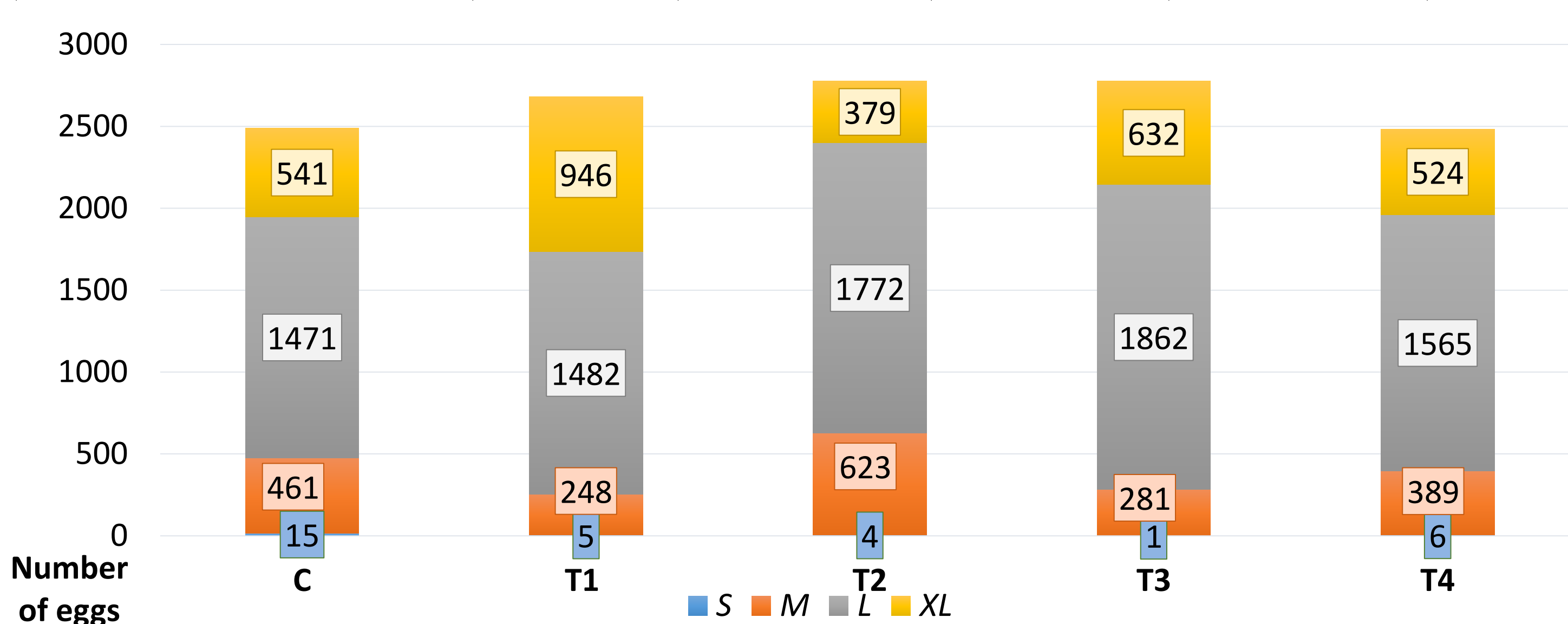
Results

Productivity of laying hens in the experimental groups

Indicators	C	T1	T2	T3	T4
Number of eggs laid, pcs.	2488	2681	2778	2776	2484
% against group C	x	7.76	11.66	11.58	-0.16
Egg-laying intensity, %	54.09	58.28	60.39	60.35	54.00
Egg weight, g	68.58	73.37	67.22	69.65	68.57
% against group C	x	6.98	-1.98	1.56	-0.02

Revenue from egg sales by egg weight grade

Indicators	Egg weight grades				Total
	S	M	L	XL	
	>53, g	53.0-62.9, g	63.0-72.9, g	73.0< g	
Average price, EUR per piece*	0.10	0.20	0.22	0.25	x
C control, number of eggs	15	461	1471	541	2488
% of total eggs	0.60	18.53	59.12	21.74	100
Revenue, EUR	1.5	92.2	323.62	135.25	552.57
T1, number of eggs	5	248	1482	946	2681
% of total eggs	0.19	9.25	55.28	35.29	100
Revenue, EUR	0.50	49.60	326.04	236.50	612.64
T2, number of eggs	4	623	1772	379	2778
% of total eggs	0.14	22.43	63.79	13.64	100
Revenue, EUR	0.40	124.60	389.84	94.75	609.59
T3, number of eggs	1	281	1862	632	2776
% of total eggs	0.04	10.12	67.07	22.77	100
Revenue, EUR	0.10	56.20	409.64	158.00	623.94
T4, number of eggs	6	389	1565	524	2484
% of total eggs	0.24	15.66	63.00	21.10	100



Ingredients of a layer diet and the costs, Eur 100 kg-1

Feedstuffs included in diet	Price, Eur kg ⁻¹ (VAT excluded)	C	T1	T2	T3	T4
		Ground maize	0.19	4.75	3.61	5.13
Barley	0.13	6.50	6.50	5.07	6.50	5.85
Oats	0.12	1.56	1.68	1.44	2.04	1.56
Peas	0.12	0	0.60	1.20	0	0
Lucerne pellets	0.37	0	0	0	1.85	3.70
Premix	0.75	6.00	6.00	6.00	6.00	6.00
Lime	0.16	0.64	0.64	0.64	0.64	0.64
Total:	x	19.45	19.03	19.48	20.07	21.55
% against group C	x	x	-2.16	0.15	3.19	10.80
± against group C, EUR	x	x	-0.42	0.03	0.62	2.10

Amounts of feed consumed by laying hens

Indicators	C	T1	T2	T3	T4
Per hen per day, kg	0.125	0.115	0.115	0.115	0.115
Per 1 000 egg, kg	231.11	197.31	190.42	190.56	212.96
Per kg of eggs laid, kg	3.37	2.88	2.78	2.78	3.11
% against group C	x	-14.62	-17.60	-17.54	-7.85
± against group C, kg	x	-0.49	-0.59	-0.59	-0.26

Main conclusion

The research results showed that the recommended amount to be included in the layer diet was 50-100 g kg⁻¹ peas or 50 g kg⁻¹ dried green alfalfa pellets, which increased the laying intensity and reduced the amount of feed per hen per day. Feeding layers a diet with peas or dried green alfalfa pellets enables farmers to produce higher weight eggs, which allows increasing revenues from egg sales at the same feed consumption level.