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Conference paper

CORRELATION OF FEED CONVERSION BETWEEN KILOS OF WEIGHT GAIN AND CHICKENS MORTALITY

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Summary

Feed costs participate with over 50% in a price per kilogram of fattened chicken. Each impact affecting increase, i.e. feed consumption decrease is very important regarding economic aspect. Mortality as one of the factors affecting feed conversion indicated varying largely in shifts of the same sector whereas varying from 5.62% (sector I) to 7.40% (sector III) was at the whole farm in our investigation. Calculated coefficient of simple correlation proved that there is correlation between feed conversion and mortality percentage at the end of fattening period in all sectors and for the farm averagely. Each kilogram of fattened chickens live weight is more expensive by higher feed amount. It makes every kilogram of fattened chickens more expensive by 0.048 kg at 5.61 % mortality whereas it increases 0.065 kg at 7.40% mortality which causes higher feed consumption and economically more expensive fattening.

Key words: mortality, cickens, feed conversion,

Introduction

Poultry production at a farm can be carried out only with breeds of high productive properties. An individual should be healthy and resistant to various diseases in order to endure effort till the end of the production process required by high productivity and maximum feed consumption utilization for a kilo of weight gain. Different reasons may cause occurence of diseases and various health disorders. Depending on the cause of the disease some birds eat less, feed consumption increases per gain unit and gain decreases. Certain percentage of diseased birds die.

Permetted mortality level in fattened chickens production is to 5% although the lower one is desirable. Many home and foreign centers give data

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on considerable varying of mortality percentage. (Puhar, Kralik Gordana, Fuhrken etc.).

Also numerous authors claimed that feed costs participate with 45% and more in total production costs of live weight kilo and even 70% in a price of kilogram of weight gain (Antić, Burkholder et. al., Kmecl).

Correlation of feed conversion between a kilogram of weight gain and chickens mortality can be seen from these surveys. (Fuhrken, Kralik Gordana, Milošević et al. Burgermeister).

Material and methods

Numerous factors different by their nature of which diseases and deaths (mortality) are considerably important affect feed consumption for a kilogram of weight gain in fattening chickens of the same origin and genetic structure at the same feed quality.

The investigated farm has four sectors with total capacity of 469.000 broilers in a shift. Health protection is carried out by preventive and curative measures in buildings adapted for floor way of raising broilers. Protection vaccination, diagnostic principles of medicament preventive and sanitary measures are carried out together with ensuring of qualitative genetic potential and feeding as well as optimization of accomodation conditions .

Mortality percentage (x) in four farm sectors in the period of four years was observed in relation to its influence on feed consumption for a kilogram of weight gain (y). The aim of the paper is to determine mortality percentage influence (X) on feed consumption for a kilogram of weight gain (y). Thus the following methods were applied in this investigation:

a) absolute and relative measures of variation

b) single and multiple linear correlation and determination

Results and discussion

The following varying measures were showed by mortality for the farm averagely during the four investigated years in 23 shifts and four sectors.

Average mortality 2 amounted to 6.66% varying from 5.61% (sector I) to 7.40% (sector III) in the observed period. Chickens mortality varied largely in shifts of the same sector. This varying is higher in sector III and IV since percentage in individual shifts of these two sectors was extraordinary high (19.30% i.e. 19.26%). Calculated standard deviation and variation coefficient

indicate considerable absolute and relative variability of chickens mortality percentage.

Table 1. - MORTALITY OF CHICKENS FOR EACH INDIVIDUAL SECTOR AND AVERAGE PARAMETERS FOR THE ENTIER FARM (%)

	X ± Sx	σ	Cv	Iv
Sector I	5.62 ± 0,.414	1.99	35.63	3.35 – 12.08
Sector II	6.27 ± 0.486	2.28	36.41	3.87 – 12.06
Sector III	7.40 ± 0.760	3.65	49.30	3.96 – 19.30
Sector IV	7.16 – 0.793	3.72	51.97	2.95 – 19.26
Average for the farms	6.66 ± 0.423	2.03	30.42	4.24 – 12.15

Taking into account that chickens mortality at fattening period may amount up to 5.00% we may found out that chickens mortality was averabely higher than the above given.

Table 2. - THE INFLUENCE OF PERCENTAGE OF MORTALITY ON FEED USAGE PER KILO OF WEIGHT GAIN FORM EACH SECTOR AND FOR ENTIRE FARM

		Sector				Average
		I	II	III	IV	
Coefficient of correlation (rxy)		0.66 ++	0.56 ++	0.60 ++	0.73 ++	0.70 ++
Coefficient of regression –	a	1.88	2.32	2.32	2.15	2.142
	b	0.170	0.043	0.037	0.065	0.080
	c	-0.009	-0.001	-0.0007	-0.002	-0.003
Coefficient of determination (dxy)		0.4356	0.3136	0.3600	0.5329	0.4900
Coefficient of non-determination (oxy)		0.5644	0.6864	0.6400	0.4671	0.5100

There is certain correlation between feed consumption and mortality percentage. Calculated coefficient of simple correlation indicates that there is positive and median correlation between feed consumption for a kilogram of weight gain and mortality at the end of fattening period in all sectors and for the farm averagely.

The following percentage of total feed consumption varying for a kilogram of weight gain occure in the sectors due to mortality varying:

Sector I	-43.56%
Sector II	-31.36%
Sector III	-36.00%
Sector 1V	-53.29%
For the farm averagely	-49.00%

Factors which were not comprised by this investigation affect feed consumption varying for a kilogram of weight gain:

Sector I	-56.44%
Sector II	-68.84%
Sector III	-64.00%
Sector IV	-46.71%
For the farm averagely	-51.00%

Functional relation between mortality percentage (x) and feed consumption for a kilogram of weight gain (y) for the sectors I, II, III, IV and for the farm averagely is expressed by the function:

Sector I	$-y = 1.879 + 0.170x - 0.0009x^2$
Sector II	$-y = 2.319 + 0.043x - 0.0011x^2$
Sector III	$-y = 2.322 + 0.011x - 0.0007x^2$
Sector IV	$-y = 2.161 + 0.065x - 0.0015x^2$
For the farm averagely	$-y = 2.142 + 0.080x - 0.00312x^2$

Feed consumption for a kilogram of weight gain increased with decreasing growth rate.

It can be seen that feed consumption for a kilogram of weight gain depends considerably on mortality percentage. Certain mortality percentage varying causes total varying of this occurrence.

The highest mortality appear in the first fattening days[4] when chickens are very sensitive to various mistakes and irregularities in technology.

However, mortality of chickens is also considerable in later fattening stages. According to our researches chicken deaths percentage varied considerably per weeks during the fattening. Average weight of dead chickens was 0.591 kilogram at fattening period.

Table 3. - THE FEED USAGE PER KILO OF WEIGHT GAIN WITH DIFFERENT MORTALITY RATES OF CHICKEN

Begining number	Mortality percentage	Mass		Feed usage for weight gain of dead birds (2.5 kg)	Total weight gain		Increase in feed usage per kilo of weight caused by deaths
		Per bird at time of death	Total		Birds	Mass	
100	3	0.591	1.773	4.432	97	174.6	0.025
100	4	0.591	2.364	5.910	96	172.8	0.034
100	5	0.591	2.955	7.387	95	171.0	0.043
100	6	0.591	3.546	8.865	94	169.2	0.052
100	7	0.591	4.137	10.342	93	167.4	0.061
100	8	0.591	4.728	11.820	92	165.6	0.071
100	9	0.591	5.319	13.297	91	163.8	0.081
100	10	0.591	5.910	14.775	90	162.0	0.091

Every kilogram of chickens live weight fattened to a certain weight is more expensive by higher feed amount[1] together with mortality percentage increase and calculation of weight which is lost at their death. It is so supposing that a kilogram of weight gain requires 2.5 kg of feed. Each kilogram of fattened chickens live weight is more expensive by 0.025 kg of feed with 3% mortality whereas it is more expensive by 0.091 kg with 10% mortality.

Table 4. - THE RELATIONSHIPS OF FEED USAGE PER KILO OF WEIGHT GAIN AND THE PERCENTAGE OF MORTALITY WITH FIXED VALUES OF CHICKEN MASS AND LENGTH OF FEEDING

	Chicken mass (x1) = 1.80 Length of the feeding period (x2) = 50 day Mortality of chicks in % (kg)					
	3	4	5	6	7	8
Feed usage per kilo of weight (y)	2.381	2.403	2.425	2.447	2.469	2.491

Calculation at chickens mortality ranging from 3% to 8%, at chickens weghing 1.8 kg and 50 day fattening period on the basis of elements from multiple regression for sector I (y =1, 16-0, 0.25 x1 +0.024x2 +0.022x3) indicate that feed consumption reduces by a kilogram together with mortality percentage at conditions being on the investigated farm. Feed consumption at 8% mortality is 2.491 kg whereas at 3% mortality it is -2.381 kg, i.e. difference between the lowest and highest mortality percentage is 0.110 kg with the above given rates.

Conclusion

Mortality as one of the factors affecting feed consumption for a kilogram of weight gain in this investigation varied significantly in the shifts of the same sector. It was averagely higher than desirable one.

Calculated coefficient of simple correlation show that there is dependence between feed consumption for a kilogram of weight gain and mortality at the end of fattening in all sectors and for the farm averagely.

Functional relation indicates that feed consumption per chicken kilogram also increased together with growth rate decreasing. In our investigation it meant that each kilogram of live weight of fattened chickens is more expensive by 0.025 kg of feed at 3% mortality whereas it is more expensive by 0.091 at 10% mortality. In that way we calculated that ratio of feed consumption is 2.491 kg at 8% mortality whereas at 3% mortality it is 2.381, i. e. difference between feed consumption with the lowest and highest mortality percentage is 0.110 kg at permanent chickens weight, fattening period length and different mortality percentage. This indicates that each reduction of mortality percentage would positively affect feed consumption for a kilogram of weight gain.

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KORELACIJA KONVERZIJE HRANE IZMEĐU KILOGRAMA PRIRASTA TEŽINE I SMRTNOSTI PILIĆA

Sažetak

Troškovi hrane sudjeluju s više od 50% u cijeni po kilogramu tovljenih pilića. Svako djelovanje na povećanje, odnosno smanjenje utroška hrane vrlo je važno s ekonomskog gledišta. U našim istraživanjima smrtnost kao jedan od čimbenika što djeluje na konverziju hrane pokazala je variranje uglavnom u pilića istog sektora, dok je variranje od 5,62% (sektor I) do 7,40% (sektor III) vrijedilo za čitavu farmu. Izračunati koeficijent jednostavne korelacije dokazao je da postoji korelacija između konverzije hrane i postotka smrtnosti na kraju tova u svim sektorima i prosječno na čitavoj farmi. Svaki kilogram žive vage tovljenih pilića skuplji je za veću količinu hrane. Tako je svaki kilogram tovljenih pilića skuplji za 0,048 kg uz 5,61% smrtnosti, dok raste za 0.065 kg uz 40% smrtnosti, što prouzrokuje veću potrošnju hrane i ekonomski skuplji tov.

Ključne riječi: smrtnost, pilići, konverzija hrane

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