Original Article

Testing the Association between Cattle Productions and Stocks from the County of Vâlcea Reared in Conventional ad Organic Systems, with those Reported in Romania and EU during 2001 – 2006. Note I. Cattle Reared in Conventional System

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Abstract

The aim of this study was to estimate the variability of cattle effectives and dairy production from the county of Vâlcea during a six year period, 2001 – 2006, and quantify possible association of this variability with the variability of the cattle effectives and dairy production in Romania and European Union, in conventional rearing system. A test of variable distribution was performed in order to establish the statistical approach needed for estimate correlation, and both parametric and not parametric solutions were found. The variability of the cattle effectives reared in conventional system in the county of Vâlcea during 2001 – 2006 is positive and moderate correlated with the evolution of Romanian cattle effective. The evolution of these effectives are negatively correlated with the evolution of the same variable reported in EU, in the same period. The cattle dairy production obtained during 2001 – 2006 in the county of Vâlcea was moderate correlated with productions from Romania and EU.

Keywords: pairs of variables, association, trend, cattle dairy production, cattle effectives

1.Introduction

The animal breeding and cattle breeding represent a very important activity in the economy of the livestock rearing, worldwide, and also in Romania. In our country, an important region for cattle rearing in both conventional and organic system is the county of Vâlcea. At national level, the cattle stocks recorded fluctuation in their number during 2001 – 2006, with a significant decrease in 2004 (2.808.061 heads, compared to 2.897.082 heads in previous year 2003, and 2.861.671 heads in 2005), while in the county of Vâlcea it had a linear trend during the above mentioned period.

Concerning cattle dairy production, during the same period 2001 – 2006, an average production by head with acceptable fluctuations was reported for the county of Vâlcea, and with small constant increasing trend at national level.

Testing the association between livestock effectives and their productions represent an interesting approach in order to study the trend of their evolution in wider context, and if the study is taken forward, even for elaborate scenarios on variable time intervals, which may take into consideration the prediction of this evolution.

In this study we aim to identify the way in which the variability of cattle effectives and dairy production from the county of Vâlcea may be reflected in the variability of the cattle effectives

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and dairy production from Romania and European Union, in conventional rearing system, during a six year period, 2001 - 2006.

2. Material and Method

All data were collected for the period framed within 2001 and 2006. All data concerning the cattle effectives in Romania were collected from the Romanian Statistical Annuary, and from effectives in the county of Vâlcea from the Report of the Council of the County of Vâlcea Concerning the Priorities of the County Development during 2007 – 2013. The data concerning cattle effectives and dairy production by entire EU were colected from FAO official site (raw data for cattle effective s evolution, and calculated data for cattle dairy production data).

The statisticall processing was performed with STATISTICA v.6.0 programme. Basic statistics was applied for calculation of the averages, standard deviation of average, standard deviation, skewness, and kurtosis. The type of variable distribution was tested in order to identify the dependence between them, and apply the suitable model for calculation the aimed associations.

3.Results and Discussions

The average value of the cattle effective in the county of Vâlcea during the analyzed experimental period of six years developed beginning with 2001 and ending in 2006, was of 86,645 heads, while in the entire country it was of 2,863,005 heads, and in EU during the same time period it was of 92,714,280 heads (table 1).

Table 1. The averages and dispersion parameters of cattle effectives in Vâlcea, Romania and EU, 2001 – 2006

Issue	n	Cattle effectives in Vâlcea	Cattle effectives in Romania	Cattle effectives in EU
$\overline{X}$	6	8,664.5	2,863,005	92,714,280
s	6	8,812	51,724	1,821,728
Skewness	6	-0.300	-0.051	0.534
Kurtosis	6	-1.808	1.234	1.012

The dairy production (table 2) was of 3,679 L/head in the county of Vâlcea, with about 80% bigger than the cattle dairy production at nationa llevel (2,042 L/head), but with 36% lower compared to EU average dairy production recorded during the same period (57,444 L/head).

The normal distribution for cattle effectives, is emphasized by the values of skewness between -0.004 – 1.649, and kurtosis between – 2.145 – 2.942 and for dairy productions skewness between - 0.300 – 0.532, and kurtosis between – 1.808 – 1.234 a (tables 1 and 2).

Table 2. The averages and dispersion parameters of dairy production in Vâlcea, Romania and EU, 2001 – 2006

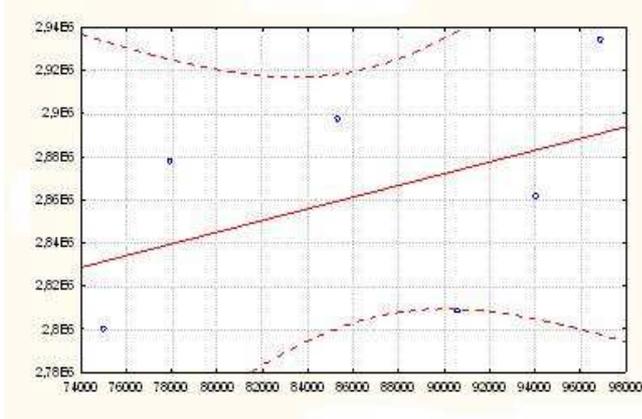| Issue	n	Cattle effectives in Vâlcea	Cattle effectives in Romania	Cattle effectives in EU
$\overline{X}$	6	3,679.167	2,042.833	57,444.00
s	6	235	125	2,068
Skewness	6	1,649	-0,004	0,071
Kurtosis	6	2.942	-2.145	-1.338

The dependence between cattle effectives, and also between the cattle dairy production in the county of Vâlcea, Romania, and EU, is not linear, and variables are not normally distributed (fig. 1).

This demonstrates that, in majority of cases (4 of 6) a non parametric test must be used in order to determine the aimed associations, and only in two cases, the classical parametric test is suitable, and Pearson correlations were calculated for emphasizing the aimed relationships.

Because we have a small dataset (n = 6), scaled on a fixed interval, in this study we use the

Spearman correlation coefficient (the order correlation coefficient) in order to emphasize the dependence of the variability of tested data sets, in all four cares where parametric test was not appropriate.

Even all data sets are made of 6 components, because of the high linearity and strong correlation coefficient, for the association cattle effective in the county of Vâlcea – cattle effective in EU, and cattle dairy production in Romania – cattle dairy production in EU, we use the Person correlation coefficient, for emphasizing the dependece between variables.
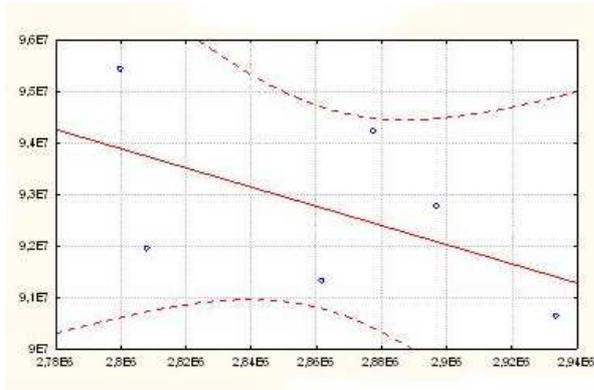
Effective valcea

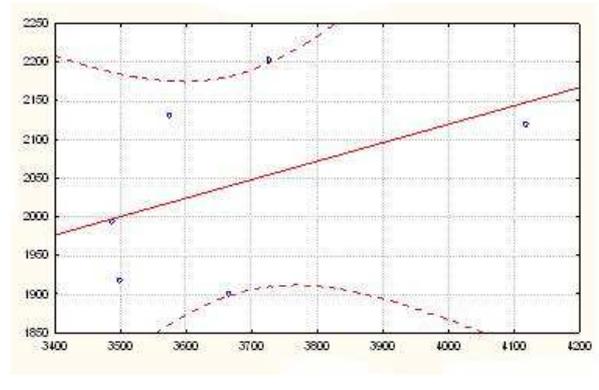a. Dependence between cattle effectives from the county of Vâlcea and Romania
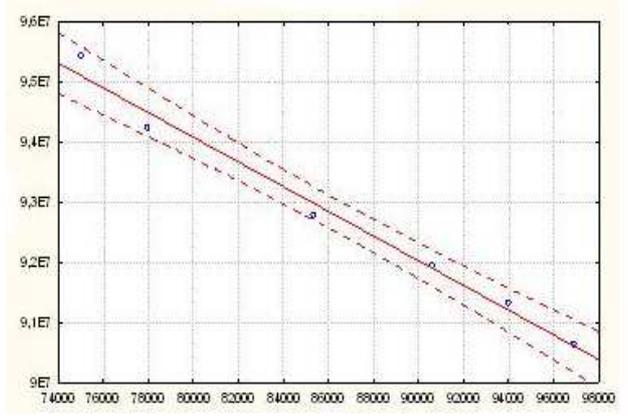
Effective valcea

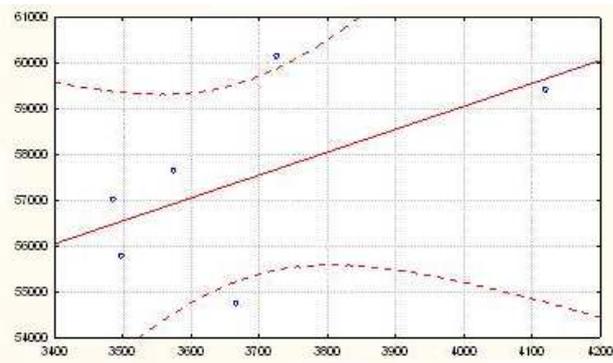b. Dependence between cattle effectives from the county of Vâlcea and UE

Effective Romania

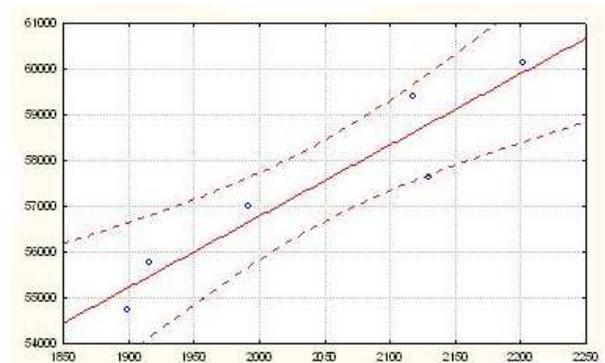c. Dependence between cattle effectives from Romania and UE

Production Vâlcea

d. Dependence between dairy cattle production from the county of Vâlcea and Romania

Production Vâlcea

e. Dependence between dairy cattle production from the county of Vâlcea and UE

Production Romania

f. Dependence between dairy cattle production from Romania and UE

Figure 1. The normal distribution analysis by two pairs

When Spearman correlation coeficient (r_S) was used, positive and negative moderate correlations were identified between Cattle effective in the county of Vâlcea - Cattle effective in Romania (r_S = 0.546),Cattle effective in Romania - Cattle effective in EU (r_S = – 0.543), and Cattle dairy production in the county of Vâlcea - Cattle dairy production in EU (r_S = 0.542), while weak correlation is reported for the pair of variables Cattle dairy production in the county of Vâlcea - Cattle dairy production in Romania (r_S = 0.371).

This demosntrates the same direction of evolution between the cattle effective in the county of Vâlcea and cattle effective in Romania, and cattle dairy production in the county of Vâlcea, Romania and EU. Different evolution was reported for Cattle effective in Romania and UE (- 0.543), demonstrating the lack of synchronization between our country and UE trend (table 3). Small determination coefficients (R^2 = 0.138 – 0.298) confirm the small representativeness of these associations.

Table 3. Speraman correlation coefficients for the pairs of variables within cattle effective and cattle dairy production from Vâlcea, Romania and EU, 2001 – 2006

Compared variables		n	R_s	R^2
Cattle effective in the county of Vâlcea	Cattle effective in Romania	6	0.546	0.298
Cattle effective in Romania	Cattle effective in EU	6	-0.543	0.294
Cattle dairy production in the county of Vâlcea	Cattle dairy production in Romania	6	0.371	0.138
Cattle dairy production in the county of Vâlcea	Cattle dairy production in EU	6	0.542	0.293

The correlation between the EU trend in cattle effective and the same variable in the county of Vâlcea is very strong (R = - 0.993) and negative. Thus, results the divergent trend in the evolution of this variable at these levels (table 4). Between Cattle dairy production in Romania and Cattle dairy production in EU strong positive correlation resulted, and this indicates the ascendent evolution trend of these variables (table 4). The strong determination coefficients (0.986, and 0.885, respectively) confirm the representativeness of this relationships.

Table 4. Pearson correlation coefficients for the pairs of variables within cattle effective and cattle dairy production from Vâlcea, Romania and EU, 2001 – 2006

Compared variables		n	R	R^2
Cattle effective in the county of Vâlcea	Cattle effective in EU	6	- 0.993[***]	0.986
Cattle dairy production in Romania	Cattle dairy production in EU	6	0.941[**]	0.885

Further studies must be developed in order to identify the evolution of cattle effective in both county of Vâlcea and Romania during 2007 – 2011 in both conventinal and organic systems. If results will confirm this tendency serious measures must be inplemented with the aim of enhance the cattle effectives by entire country.

4.Conclusions

Function of distribution analysis, two modalities of calculating the associations between pairs of variables within cattle effective and cattle dairy production from Vâlcea, Romania and EU, 2001 – 2006 were adopted.

One uses the nonparametric approach and association was estimated with Spearman correlation coefficient, and the other adopted a parametric approach with calculation of Pearson correlation coefficient.

The variability of the cattle effectives reared in conventional system in the county of Vâlcea during 2001 – 2006 had the same trend as the Romanian cattle effective., during the same period., even the value of the Speraman correlation coefficient demonstrates only a moderate association between these variables, also confirmed by the weak determination coefficients.

Concerning the association between the cattle effectives evolution in both Romania and county of Vâlcea during 2001 – 2006 and EU trends, negative moderate and very strong, respectively, correlation coefficients were calculated in cattle

The analyze of the association between cattle dairy production obtained during 2001 – 2006 in the county of Vâlcea emphasizes moderate correlation

coefficients between productions from all three variables, the county of Vâlcea, Romania and EU, respectively, but strong and negative correlation between cattle dairy production in conventional system was recorded only between two compared entities, Romania and EU, respectively.

References

[1] Marian Margareta, E. Merce, 1994, Introducere in managementul exploatațiilor agricole, Ed. IntelCredo, Deva

[2] Merce E., 1999, Strategii de dimensionare a factorilor de producție în agricultură, Ed. Aletheia, Bistrița

[3] Merce E., C. Merce, Ch. Hakizimana, 2008, Existential correlations, Buletin USAMV CN, Horticulture 65/2, Ed. Academicpres Cluj – Napoca

[4] ***, 2008, Efectivele de animale şi producția animală obținută în anul 2007, Anuar Statistic

[5] ***, 2006, Consiliul Județean Vâlcea, priorităţile dezvoltării județului 2007 – 2013

[6] ***, http://faostat.fao.org/site/569/DesktopDefault. aspx?PageID=569#ancor