Using bioinformatics and reproduction indicators for understanding the relationships that environmental influence cows' milk production

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Abstract: - Livestock production (milk, meat) depends heavily on reproductive activity, leading to scientific research and practice to find ways to optimize growth and livestock operation in order to achieve maximum economic efficiency. Research work in cattle reproduction, especially in family farms, are particularly important because understanding leads to increase capacity while the number of existing animals, meat and milk production, combating infertility, increased birth rates, increasing revenue and improving people's work throughout the year.

In the area of reproduction, these goals are of particular importance, both theoretical and practical, especially after the introduction and expansion of artificial insemination technique, a method that has transformed animal reproduction activity in a process managed and controlled entirely by man. It should be noted that the farm is the main basis of agricultural production, so it is necessary to highlight issues affecting the animal reproduction in the investigated area. Being holdings, taking into account recommendations made by the World Health Organization (WHO) and United Nations Food and Agriculture Organization (FAO) as well as those of romanian and foreign specialists in human nutrition.

In this regard, we calculated the main nonlinear regression of correlations analysis that exist between the LU and the most important factors that affecting increased production of milk cows in the South East and North East economic region of Romania

Keywords: eco-bio-economics, sustainable development, indicators of reproduction, biodiversity, bioinformatics

1 Introduction
In the area of reproduction, the results obtained in this field are very different, depending on growing conditions and exploitation of animals provided for directing and monitoring the reproduction activity, preventive and curative measures of reproductive disorders, etc. Note that the leading units in raising cattle, obtained good results in reproduction these species lime. In these units is done in the first calving age 30 months, the potential reproductive capacity of close to 100%, fecundity over 80%, rest of under 3 months of pregnancy, the birth rate exceeding 85% efficiency using cows as breeding range the calving of 450 days, 60-75% conception rate, gestation index of 90%, the percentage of “reimbursing” 80%, stemming tulle breeding frequency of 50% mortality rate below 1.5%, etc.

It is estimated that in perspective, the herd of cattle could increase con creasing in line with the experience gained, with biological and existing material and technical basis set. This requires the practice of enlarged reproductions, with an average annual growth rate double that worldwide. It provides improvement of all reproduction parameters (birth rate of 85%, less than 1.5% mortality rate based on the changeover to a flock of 85%, etc.).

2. Problem formulation
The working method used consisted of macroeconomic studies and sample-based study
using different sources of information. Raw data for the study overall, we have received from holdings records and official control of livestock performance practice (COP) and biotechnology in cattle reproduction.

The primary data that formed the basis of this study were taken from national and international specialized literature and Academy Romanian - INCE - Research Center for Biodiversity Studies - Acad David Davidescu Department for Agriculture and Rural Development, National Agency for Animal Breeding and Reproduction, Statistical Yearbooks 1995 - 2009, Ministry of Agriculture and Rural Development.

Centralized data processing were calculated and analyzed by light, merge and correlate with the many observations made directly on farms and official statistical data, reporting final results to the requirements of the transition to market economy conditions and current and future opportunities peasant household.

To identify these elements, study was focused on livestock development and production, size and weight of cattle farms, 100 ha of agricultural land cargo management and technological factors of production.

In all cases, the research results were statistically processed and interpreted in accordance with established methodology of calculation, is given in paper form of tables and charts. For correlation and regression relationships were used in calculating the Pearson correlation index and plotting the regression equations, and based on the coefficient of determination ($R^2$) to identify the percentage number of cases where the relationship is valid, it is passed in the respective graphs.

In terms of races, the major reproduction indices were studied breeds Brown Spotted Romanian, Romanian Black Spotted, Pinzgau Steppe Grey.

For the calculation we used computerized data used SPSS (Statistical Package for the Social Sciences), one of the most used in the statistical analysis.

In terms of economic management, in the published literature and known relationships between value and growth indices of the main reproduction, which makes the quantity and regularity of livestock production.

In this regard, A.T. Bogdan, Dorina Bogdan et col. established a mathematical relationship that expresses the level of milk production in cows, according to the index birth and the different coefficients of reproduction biology and pathology. Given the influence that they have evidence of breeding on milk production in cattle, the legislature has developed an original formula, which, based on additional birth index, enables the establishment of additional milk production, as follows:

$$PL (hl) = EMV \cdot IN(10^6 \cdot PM + PM_1 \cdot IN_1 \cdot K_1) \cdot 10^6$$

where:
- $PL = \text{total additional production (hl)}$;
- $EMV = \text{average actual cows and heifers (head)}$;
- $IN = \text{additional average index birth to cows ( %)}$;
- $PM = \text{average milk production per cow in milk (HL)}$;
- $PM_1 = \text{PM for heifers}$
- $IN_1 = \text{IN in primiparous}$;
- $K_1 = \text{heifers suitable for breeding of all calves born in the VPM (head)}$.

Given that the profitability of cattle reproduction zooeconomics in our country is expressed by the term "year, cow and calf", improving birth index by veterinary and health activities supported by technical measures - economic and management, can achieve an increase in this the main reproduction index by about 15%.

Thus we can calculate a possible additional milk production on three successive levels of improvement in birth index staged in the country at least 5%, and for some areas of economic development of Romania by 10% and in some counties even 15%. Also, it may be a possible approach to increase production quality and quantity of milk and meat, respectively, based on overall improvements veterinary care (with special reference to prevention and control rational and reduce pregnancy loss infecundity postpartum), especially in the new market economy conditions. In this regard, the guide, the following factors illustrate the variable nature Sanitary - Veterinary:

- $K_1 = \text{coefficient of loss of calves during lactation (eg 3%)}$;
- $K_2 = \text{coefficient of loss of youth during breeding (eg 4%)}$;
- $K_3 = \text{coefficient of loss to the optimal age for breeding (eg 2%)}$;
- $K_4 = \text{coefficient of losses by reproductive disorders (eg 4%)}$;
- $K_5 = \text{coefficient of pregnancy loss including abortion (eg 3%)}$;
- $f_m = \text{multiplication factor of 0.34 in value}$.

Note the potential coefficients $K_1$ to $K_5$ totaling about 16% and are called "health factors - veterinarians ($K_{SV}$) of influencing the value and growth index birth."
3. Problem Solution
The research focused mainly on economic regions, North East and South East of Romania, in which we identified for each component county: LU, the total area under pasture and hay, total agricultural land and the number of cattle. Knowing that milk production is directly dependent on the weight of milk cows in these two regions LU exitent economic development, we tried to establish links between their size and number of existing cattle and farmland, both cultivated and pasture and hay.

In the South East region correlations are different in each of the counties considered, between LU, the area planted with pastures and agricultural land, as seen in table and graph below. The same correlation is observed in the case of LU, the area planted with pasture and arable land, which shows a direct correlation between agricultural land and arable land in this region.

Table 1
Results LU value obtained in the study in correlation with pasture and agricultural land in the South East region (orig.)

<table>
<thead>
<tr>
<th>Counties</th>
<th>LU X</th>
<th>Pasture and hay Y</th>
<th>Agricultural land Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Braila</td>
<td>229047</td>
<td>33996</td>
<td>386262</td>
</tr>
<tr>
<td>Buzau</td>
<td>251526</td>
<td>118227</td>
<td>401174</td>
</tr>
<tr>
<td>Constanta</td>
<td>160968</td>
<td>57845</td>
<td>521136</td>
</tr>
<tr>
<td>Galati</td>
<td>251915</td>
<td>41789</td>
<td>352356</td>
</tr>
<tr>
<td>Tulcea</td>
<td>144828</td>
<td>62097</td>
<td>352124</td>
</tr>
<tr>
<td>Vrancea</td>
<td>169807</td>
<td>73668</td>
<td>231526</td>
</tr>
</tbody>
</table>

Fig. 1 Nonlinear correlation between LU, pasture and agricultural land in the South East region (orig.)

Linear correlation between the amount of LU, the number of cattle and agricultural land in the South East region, highlights the very high agricultural land accounts for a maximum allocation of LU, regardless of the number of cattle. This trend is also reflected in the correlation between LU, the number

Table 2
Results LU value obtained in the study in correlation with the number of cattle and agricultural land in the South East region (orig.)

<table>
<thead>
<tr>
<th>Counties</th>
<th>LU X</th>
<th>Number of cattle Y</th>
<th>Agricultural land Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Braila</td>
<td>229047</td>
<td>111217</td>
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<td>Buzau</td>
<td>251526</td>
<td>128720</td>
<td>401174</td>
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<td>521136</td>
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<td>Galati</td>
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<td>87366</td>
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<td>352124</td>
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<tr>
<td>Vrancea</td>
<td>169807</td>
<td>66937</td>
<td>231526</td>
</tr>
</tbody>
</table>

Fig. 2 Nonlinear correlation between LU, the number of cattle and agricultural land in the South East region (orig.)

The NE region is noted that there are counties that have a small number of area under pasture at a large agricultural area and a large number of LU.

Table 3
The results obtained in the study in correlation with LU value pasture and agricultural land in the North East (orig.)

<table>
<thead>
<tr>
<th>Counties</th>
<th>LU X</th>
<th>Pasture and hay Y</th>
<th>Agricultural land Z</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacau</td>
<td>247230</td>
<td>126204</td>
<td>325120</td>
</tr>
<tr>
<td>Botosani</td>
<td>284837</td>
<td>89336</td>
<td>389747</td>
</tr>
<tr>
<td>Iasi</td>
<td>378125</td>
<td>107821</td>
<td>380919</td>
</tr>
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<td>Neamt</td>
<td>236207</td>
<td>109428</td>
<td>282670</td>
</tr>
<tr>
<td>Suceava</td>
<td>368054</td>
<td>165354</td>
<td>344918</td>
</tr>
<tr>
<td>Vaslui</td>
<td>236578</td>
<td>97182</td>
<td>398783</td>
</tr>
</tbody>
</table>
In the Northeast region, the correlation between UVM, the area planted with pasture and arable land, we see that a large agricultural area, we have a large number of area under pasture and a great value at LU to medium.

There is a clear difference between the number of cattle counties in North Eastern region, is below average or above in both cases increases with increasing grazing LU. Correlation is identical for the correlation between LU, the number of cattle, agricultural land and the correlation between LU, the number of cattle, the arable land.

Table 4
Results LU value obtained in the study in correlation with the number of cattle and agricultural area in North Eastern Region (orig.)

<table>
<thead>
<tr>
<th>Counties</th>
<th>LU</th>
<th>Number of cattle</th>
<th>Agricultural land</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacau</td>
<td>247230</td>
<td>109847</td>
<td>325120</td>
</tr>
<tr>
<td>Botosani</td>
<td>284837</td>
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<td>Suceava</td>
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<tr>
<td>Vaslui</td>
<td>236578</td>
<td>114219</td>
<td>398783</td>
</tr>
</tbody>
</table>

4. Conclusion
Achieve superior results on line breeding to improve the activity will be possible if it will still take me a series of measures, such as: improving the growth and exploitation of cattle, herd structure optimization; directing reproduction activity (re-scheduling maintenance and judicious the reproduction of cattle, development plan matings, daily screening of females in heat, but the age-Seed and the optimal time of females, following "return" them), pregnancy diagnosis, tracking of uterus involution after calving, 7 - 14 days practicing gynecological exam monthly at cows with reproductive disorders, conduct diagnostic and therapeutic accurate and timely recording of all reproduction phenomenon analysis etc. Also necessary: reduce losses to a minimum by appropriate technical and material facilities for veterinary use, general preventive measures, screening measures infectious and contagious and parasitic diseases, specific preventive measures (vaccinations), measures of prevention and fight against other diseases and disorders, reproductive disorders in particular occurred during the parturition and post-partum and pregnancy.

These studies will be developed and appropfundated in the Romanian Academy, Bucharest, Centre of Studies and Researches for Agrosilvicultural Biodiversity “Acad. David Davidescu” in the Postdoctoral School.

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Acknowledgement

This work was cofinanced from the European Social Fund through Sectoral Operational Programme Human Resources Development 2007-2013, project number POSDRU/89/1.5/S/63258 “Postdoctoral school for zootechnical biodiversity and food biotechnlogy based on the eco-economy and the bio-economy required by eco-san-genesy”