

## **ABSTRACT**

The decline of fertility in the last decades represent a major problem in the dairy cow farm, thus one being caused by a series of factors: genetic breeding, inadequate nutrition, poor reproduction management, applied rearing technology, increase of diseases incidence and poor welfare of animals.

Assuring the welfare of animals in husbandry exploitations represents a complex problem, very actually at world level, which is mandatory for progress.

In this context also in Romania, in the last time were settled up new farms with modern maintenance systems of dairy cows in according with demands and norms of European Union. Also many old farms were updated, and there were changed up between others the maintenance systems.

For this reason the current paper aimed to contribute to the study of influence of some technological factors on the welfare of dairy cows, welfare reflected through reproduction capacity, respectively by production.

Concretely the PhD thesis aimed to analyse and to compare the obtained results in four representative exploitations from Moldova area, with different maintenance systems, concerning: quantitative and qualitative performances of milk production (milk production being a direct consequence of reproduction activity); reproduction capacity and the incidence of the major reproduction diseases.

Dairy farms in which research were conducted were:

- CATTLE REARING RESEARCH DEVELOPMENT STATION DANCU – IAȘI, with 246 heads maintenance in a mixed system;
- S.C AGROCOMPLEX BÂRLAD – Bădeana Husbandry Farm, with 326 heads maintenance in a mixed system;
- S.C. COMCEREAL VASLUI- Tânzii Farm, with 339 heads maintenance in free range;

- S.C. AGROCOMPLEX PAŞCANI - Lunca Paşcani Farm, with 285 heads maintenance in free range.

Biological material was represented by 1196 dairy cows from Romanian Black and White breed (BNR).

To achieve our goal, first were analysed the rearing technologies in each farm, accentuating, especially, on rearing of breeding female youth, maintenance of heifers and dairy cows exploitations. Further were gathered, processed and analysed the data regarding milk production and reproduction activity.

From the realised evaluation for *production performances*, on successive lactations and on farms results the following:

*Length of total lactation* overpass at all farms the optimal value of 305 days as a consequence of failure of applied management measures in each farm. Between farms were found very significant differences.

*Milk quantity on total lactation* was good in general. For first lactation, the lowest milk quantity was recorded at Dancu Farm (7617.33 kg) and the highest one at Târzii Farm (10303.58 kg). Between farms, from this point of view, were recorded very significant differences.

*Fat content* varied from 3.50% up to 5.12% for the four lactations. Could be noticed a higher variability than the one for proteins content.

*Protein content* recorded values between 2.87% and 4.12%. In average could be observed a better value of protein content, with a low variability, for each farm.

*Fat and protein quantity* varies in very large limits as it is shown in the variation series. Could be observed that for this character were recorded distinct significant differences between the farms.

*Length of normal lactation* was between 299.78 days for Bădeana Farm and 303.05 for Târzii Farm. At all the farms the mean duration of normal lactation was shorter than the optimal value recommended in the literature (305 days).

*Mean milk quantity per normal lactation* varied between 6164.37 kg of milk for Lunca Paşcani Farm and 8276.75 kg of milk for Târzii Farm. Per total population was obtained a mean milk quantity of 7020.02 kg of milk (which represents 23.33 kg of milk per day).

*Fat content* was the lowest one at Dancu Farm (4.12%) and the highest one at Târzii Farm (4.23%). In average, for the whole population, was obtained a good percent for fat, 4.21%.

*Mean fat quantity* recorded the lowest value at Lunca Paşcani Farm (253.67 kg) and the highest one at Târzii Farm (349.23 kg).

*Content in proteins* had good values at all four farms. The lowest protein content was recorded

at Bădeana Farm (3.34%) and the best one was recorded at Târzii Farm (3.40%).

Reported to the whole cattle population was obtained a mean value of 3.37%.

*Average quantity of proteins* had values between 206.01 kg (Lunca Pașcani Farm) and 281.52 kg (Târzii Farm).

Clearly, as regarding milk production, under the qualitative and quantitative aspect, is detach cattle nucleus from Târzii Farm, as a fact of superior origin of the biological material and due to the implementation of an optimal management.

At the opposite side it is placed the nucleus from Lunca Pașcani Farm, which include half-bloods with Friesian type breeds, and naturally which have a lower genetic potential. Must be mention the fact that the studied cow herd suffered a transition period, respectively the passing from mixed maintenance system, applied till the end of 2008, to free range system, applied in the last period, and which was an additional stress for animals.

At the level of each nucleus was observed an accentuated variability due to the lack of a rigorous selection of the efficient geno-types.

Through the ***main reproduction indicators*** was realised an analysis of reproduction activity in all four farms, on successive lactations.

*Service period for heifers (SP')* varied between 551.17 days at Bădeana Farm and 611.44 days at Lunca Pașcani Farm. Statistical differences were recorded between Bădeana Farm (where heifers were introduced for the first insemination at the youngest age) and the rest of the farms.

*The age of first calving (VPF)* was the lowest one at Bădeana Farm (823.89 days) due to better fertility of those heifers. In the case of Dancu Farm, even if heifers were introduced at a younger age at reproduction, gestation was installed in a longer time. As regarding this parameter were, in general, distinct significant differences between farms.

*Service period for cows (SP)* was overpass at all farms, the optimal value being the one of 85 days. The lowest mean value was recorded at Dancu Farm (129.13 days) and the highest average value was recorded at Târzii Farm (181.91 days). In average, on the whole population, service period had the value of 154.35 days.

Through effectuation of significance tests for service-period at cows being at first parturition we observed that are distinct significant differences between farms.

*Calving interval (CI)*, due to a prolonged uterine repose, recorded values over the optimal limit of 12-13 months. The best value for calving-interval was recorded at Bădeana Farm (425 days). Statistical differences for calving interval between first and second calving were recorded in connection with Bădeana Farm.

*Mammary repose (RM)* is the only parameter of which the mean value was closed to the optimal one, of 60 days, but even in this case was enlightened a great variability.

In the case of Târzii Farm it is an obvious tendency in decreasing of this parameter due to the difficulties at weaning. So, mammary repose has the value of 52.85 days, prolonged in an unusual way the duration of lactation.

For a better enlightening of *fertility state* in these farms, were analysed also other reproduction indicators, to have a more precise image on farm management.

*Interval between calving and first artificial insemination* overpass the optimal limits of 60 days. In average were recorded 120.74 days, fact that show that in majority of farms problems appear regarding the resumption of ovary postpartum activity.

The longest delay was recorded at Târzii Farm and was of 133.73 days.

*Conception rate* is an important indicator because express the measure in which cows will remain pregnant after first insemination. This index is influenced by the health state of genital apparatus and by the moment of artificial insemination. The most reduced rate of conception was obtained at Dancu Farm and the best one at Târzii Farm.

*Mean duration of gestations* was of 278.86 days, more reduced than the mean value specified in literature, of 283 days.

*Fertility index* had an average of 84.25% for the whole population. The lowest fertility was obtained at Târzii Farm, due to the longer service period. Reduced fertility is a consequence of incidence of reproduction diseases in a high percent.

*Mortality percent at calves*, generally, had normal limits, less in the case of Lunca Pașcani Farm, at which is recorded the highest mean of 11.88%. This aspect is a consequence of a poor assistance given to the females in their last part of gestation.

*Twin gestations* influenced in a minor way the birth index. Those ones were more often at Lunca Pașcani Farm (2.69%).

*Birth rate index* in average was very good, 91.96%.

*Insemination index* was satisfactory and were effectuated, in average, a number of 1.80 artificial inseminations for one gestation.

As a consequence of recorded deviations from the optimal limits of reproduction parameters we consider that it is necessary to make an ample analysis also on reproduction diseases. Gynaecologic diseases through their frequency and severity are responsible for non-fecundity of animals.

The studied diseases were: retention of fetal annexes, uterine infections and ovariopathy (persistent yellow body, ovary cysts and ovarian hypotrophy).

Their tracking was made function of lactation range, season and the level of milk production.

***Incidence of reproduction diseases*** presents variations function of: lactation range, season and milk quantity.

***Incidence of reproduction diseases function of lactation range.*** At first parturition was recorded the highest *incidence of placenta retention*, as a fact of the cases of fetal-maternal dystocia.

In direct relation with this aspect had leads the *incidence of uterine infections*. In dynamics, incidence of fetal annexes decrease direct proportionally with lactation number.

As regarding the incidence of *persistent luteal body* this disease had a higher incidence at first parturition and at cows at fourth calving.

Regarding the *incidence of ovarian hypotrophy* this disease were more often met at first parturition and second parturition. Must be mention the fact that ovarian hypotrophy was of 1<sup>st</sup> degree, with a reduced severity and was caused by the temporary lack of vitamin-mineral premixed.

*Ovary cysts* and especially the luteal ones were diagnosed in the great proportion. Their main manifestation was the anestrus one.

***Incidence of reproduction diseases function of season.*** Seasonal variation of reproduction diseases are not so accentuated, because the shelter conditions didn't differ much from one season to another. The majority of diseases had an increased incidence in cold season (winter-spring) and minimal during autumn.

***Incidence of reproduction diseases function of milk quantity.*** Related with milk production the incidence of reproduction diseases increased in a direct proportionality recording high values starting with a production of 7,000 kg of milk.

By comparing the averages in those four farms, the lowest *incidence of placenta retention* was at Târzii Farm (6.13%) and the highest one at Dancu Farm (9.64%). On the whole population the incidence of placenta retention was of 8.18%. Between farms weren't recorded statistical differences.

*Incidence of uterine infections* varied between 13.82% at Târzii Farm and 22.34% at Bădeana Farm. In average the uterine infections affected 20.00% from animals. Between farms weren't recorded statistical differences.

*Incidence of ovariopathy* varied between 34.48% for Târzii Farm and 42.29% for Bădeana Farm. In mean the incidence of this disease represented 38.60%.

*Persistent luteal body* had an incidence between 8.79% at Bădeana Farm and 10.38% at Lunca Pașcani Farm. Also we did not record statistical differences.

As regarding the *incidence of ovarian hypotrophy*, the lowest value was recorded at Târzii Farm (6.77%) and the highest one at Bădeana Farm (18.57%). Between those farms were recorded distinct significant differences. Also at the other two farms the incidence of this disease was higher.

In the case of *incidence of ovary cysts*, the obtained values were higher because these diseases are more frequent at the same time with increasing of milk production, because the endocrine disequilibrium from ovaries are favoured by the high levels of milk production. Mean values were between 14.92% at Bădeana Farm and 17.77% at Târzii Farm. In this case were not recorded statistical differences between farms.

Synthesising the obtained results of the current paper on cattle population from the four studied farms could draw the general conclusion that dairy cows Friesian – BNR type are well adapted to the specific environmental conditions from each farm, and productive and reproductive performances are different and express the influence of exploitation technologies and the genetic value of biological material.

The paper have a practical utility, the obtained results and the drawn conclusions could serve as a knowledge element for reproduction capacity and the influence of exploitation technology on productive and reproductive performances.