Summary

Of doctorate thesis, entitled ,''Contribution to the reproductive capacity and the breeding management in some holdings of dairy cows, developed by engineer Carmen-Ana Bălăiță,scientific coordinated by Professor Ph.d. Vasile UJICA, from Faculty of Zootechnics at University of Agricultural Sciences and Veterinary Medicine ,''Ion Ionescu de la Brad'' Iasi.

Doctorate thesis has 292 page, with 91 tables and annexes, figures and index bibliographic contains 164 titles with speciality projects from country and foreign countries .

This project contain two parts: first parts: first part contain a documentary study based on reproductive capacity and the breeding management on dairy farms, with an extension on pages 68 in 4 chapters and more subchapter.

Part two, with an extension on 224 pages and 6 chapters contain the results obtained, general conclusions and recommendations for farm production.

Working hypothesis and intent to researchs

Growth of cattle was and will be an activity of great importance in ensuring food for peoples everyware in the world, so in our country thigh milk production appear from the relationship between genotype and environment, individuals knowledge and knowledge of population whichare knowledg of exploitation and knowledge of fair management in the farm.

The intent wich is the subject of these doctorate thessis is knowledge and study of factors wich contribute at improvement of reproductive capacity and the breeding management in the three private holdings of dairy cows from district Bacau.

Biological material studied

The research was made by 856 dairy cows from three private holdings at Bacau, with demisystem increasing.

In the Serbesti farm was studied 334 cows from queen effective, therein the 289 cows was BNR-Friza, and 45 cows was BR-Fleckvieh.

In the Radomiresti farm was studied 275 cows from BNR-Friza race, and in the Ghe. Doja farm was studied 247 cows from BNR – Friza race.

In genetic structure of herd from BNR-Friza race at Serbesti farm was identified 21 bulls. The bull who are 51459 code has 28,4 % from herd ; the bull which 51458 code has 17,3 % from descendants; and the bull which are 51315 code has 13,9 % from descendants.

The herd from BR – Fleckvieh from these farm belongs the bull with 51467 code (42,2 %) and the bull 51262 has 33,3 %.

In the genetic structure of herd of BNR – Friza race from farm Radomiresti, prevail three bulls used to reproduction : the bull 51470 with 26,5 % descendants, the bull 51114 with 13,8 % descendants and the bull 51111 eith 13,1 % descendants.

The herd of cows from Gh. Doja farm belongs to the bull 51111 with 33,6 % descendants; the bull 51121 with 15,8 % descendants and the bull 51114 with 12,9 % descendants.

Country of origin, the race and the value improvement from the bulls exist in the genetic structure at queen herd who is prersented in table 5.1 in these thessis.

According with the experimental protocol, the objectives of research was follows:

- the study of landscape from zone and the specific technologies from the investigated farms;
- the study of productive performance on total lactations and normal lactations, on farms, on chronological lactations and on whole herds.
- the study of reproduction indices : VPF; RM; CI; SP;DG on whole herds, on farms and on chronological lactations.

The study of quantitative genetic indices: heritability (h^2), repeatability (R), phenotypics correlations (r_P) and genetics correlations (r_G) regression (b) to acguire the production and reproduction, on whole herds.

The analysis of herd structure and the analysis of improvement values for breeders, on genetics grups, for production traits and reproduction traits, on whole herd at first lactation .

The analysis of reproductive capacity in dinamics for years 2006-2008, to whole herd, on farms, on years, on month and on seasons. Was studies the fallows issues:

- the influence of VPF to production and reproduction indices;

- seed index;
- conception rate ;
- percentage to ''non – retourne'';
- fertility index;
- potential reproductive capacity;
- calving index;
- frequency of difficult calvings
- frequency of reproductive disorders

The analysis of economic efficiency to control infecundity and sterility in the investigated farms. Was studied:

- the days to infecundity – sterility
- total loss caused by infecundity-sterility (by unfulfilment the calves, the milk, by unproductive costs with the infecundes cows.

All primary dates results from researches are statistical processing, using the specific modern methods from zootechnics, synthesized in tables and graphics in these thesis.

The average values and the variability of production and reproduction index, for all herd, on farms and on chronological lactation is containts in table 8.3 – 8.20 and figure 8.4. – 8.40.

Analyzing the average values from quantity of milk production, results that is varies widely, the lowest productions are realized in Gh. Doja farm and the largest productions are realized in Radomiresti farm with average values between 5733,6 kg milk (lactation I) and 6051, 51 kg (lactation III) . For entire population the average values is 4831,6 kg milk with limits between 917 kg and 9662 kg milk. In the studied population, was 4 plus variants with average values over 9000 kg milk; 24 cows with over 8000 kg milk and 103 primiparous cows with over 7000 kg milk.

The fat containt of milk present the same big variability, with limits between 2,94 % and 5,18 % and 77,7 % from primiparous cows have the fat containt between 3,85 % and 4.40 %.

The protein containt varies between the limits 2,26 % and 4,09 %, with a average values at 3,29 % from first lactation and 3,05% at lactation II.

The fat and protein containt, the quantity of fat and proteins varies between large limits as seen the grafic for these traits.

The duration of total lactation for BNR cows populations at Radomiresti farm and Gh. Doja farm was contained between 437,59 days (lactation I) and 354 days (lactation VI), exceeding duration of normales lactation . The cows at first lactation had a total lactation over 400 days, because the pregnacy over first calving it's made too late.

Following the evolution of milk on chronological lactations, it see the precocity of milk production who is very good, at first lactation realised 91,81 % from maximum lactation.

The cows herd Fleckvieh imported from Germany at Serbesti farm had a good productive precocity (84,6 % at first lactation), the maximum values is 5628, 01 kg milk on lactation II . In these population exists cows with over 8000 kg milk and realy 9131 kg milk at normal lactation (lactation II) , this proves the high genetic potential for milk production at Fleckvieh cows knot to Serbesti farm and this proves the possible genetics improvement using the genotypic and phenotypic selection .

Comparing the performances of milk production depending by farms, we observed the Fleckvieh cows from Serbesti farm have achieved lower production than those obtained in Radomiresti farm and Gh . Doja farm with cows BNR – Friza . The cow knot BNR from Radomiresti farm had a average performance at 6062,94 kg and 20,30 kg milk / day in the normal lactation III.

The average values of calving age are situated between 939,07 days at first calving and 1829,28 days at calving II . The amplitude of estimate values is even higher , being concludent the variability limits, standard eror and the coefficient of variation.

For Serbesti farm, the analysis of calving age was 835,49 days this indicates a good precocity, but the variability of this indicator is very pronounced.

Pregnancy during at the first 4 calving was contained between 278,1 days (calving II) and 281, 18 days (calving IV) 10 with 3-4 days shorter than average duration indicated by speciality literatures .

Calving interval (CI) exceeded much as optimal values, the limits of variation is containt between 270 days and 1071 days, and over 55 % females exceeded 400 days. Breast rest is the only index of reproduction who had the same average values that optimal values (x = 57,82 days),but the variability was accentuated with limit between 6 days and 237 days.

For the service period is a special situation because the average values was 187, 51 days, with limits between 130days and 802 days.

Extreme variability for this index of breeding (v % = 64,22) entail importants economic loss caused by adverse management in breeding activity .

The phenotypic variability expressed by total variances was established for each knot and for all herd , the values are different depending at character analysed, depending by farms, lactation and genethic group. We have used for calculating coefficients of heritability and repeatability by variance analysis .

Heritability coefficient for quantity milk production (h2 = 0,29) shows a low level of hereditary transmission, the values obtained are framed between the know limits. Limits between farms are h^2 by 0,24 for Radomiresti farm and 0,30 for Serbesti farm.

The high values of h^2 for fat containt (h^2 =0,63) and proteins containt (h^2 =0,60) show the phenotypic selection for this threats ensure the genetic progress.

Overall analysis of heritability coefficient values for the main reproductive traits lead to the conclusion that in the herds of the three farm investigated, the traits with the highest hereditary transmission is the age at first calving.

Generally, the reproductive traits (CI, RM, SP, DG) have a low genetic settled, they are strongly influenced by environmental factors and by management of farms.

Analysis of repeatability coefficient shows similar values as heritability, but slightly higher due by genetic variance and influenced by genetics factors from herds studied.

Analyzing the phenotypic correlations, genetics correlationd and by environment between the milk production and fat contain, respectively proteins, for all herds, we find some negative and weak correlation; as for correlation with pregnancy duration.The strongest correlations it's between milk production and fat quantity, respectively proteins quantity; this is determinated by same set of genes. For reproductive traits, the values of correlation are strong at age of first calving (r_p = 0,54; r_G =0,52; r_M =0,63) and the values are medium to low for the breast rest service period and calving interval.

Between the fat containt and fat guantity,proteins containt and proteins quantity – the correlations is very intense and positive, the selection is efficiency. The same positive and intense correlation is bettween fat containt and the age of first calving. The correlations with calving interval, show a medium degree (r_p =0,35; r_G =0,34). The correlation between fat containt and breast rest, respectively service – period is negatives and low-intensity to medium intensity.

The analisys of correlations between proteins containt and other traits show similar issues to those reported in the case of fat content.

Fat quantity are corelated very highly and positive with age at first calving (r_p = 0,62; r_G = 0,59; r_M = 0,66),but with proteins containt and proteins quantity.

While the values of correlation coefficients is positive and middle for calving interval, and for breast rest and service – period, the correlations is negatives and with low intensity.

Calving interval is positive correlated and with low to medium intensity with breast rest and service-period, instead between breast rest and service-period exist a medium degree of correlations, wich proves the existence of a phiotropic genetic settled for the two traits.

Analysis of correlation coefficients established for selecting characters of three studied farms and of all population show that between quantitative production and fat containt, respectively proteins, but and pregnancy duration, the phenotypic and genetic relationship are negative and weak, confirmed by most researchers (*Ujica V. si col., Velea si col., Georgescu si col., Negrutiu, Petre si col., Muresan, Vlaic si col., Grosu H. si col*.)

The quantity production of milk is strong and positively correlated with fat quantity (r_G = 0,98), with proteins quantity (r_G = 0,89); with age at first calving (r_G = 0,52). Weaker correlations but positive between milk production and the main reproduction indices (CI, RM, SP) was recorded at all population and in each farm.

Genetic correlations between milk production and main reproductive traits show that they remain at weak and insignificant degree for all farms analysed, the same situation is determined by other authors on other breeds of cattle from the country and abroad (*Velea si col.,Muresan si col., Grosu H., Negrutiu si Petre, Ujica si col., Marginean si col., J.K.Wilk, Johansson and Roache, Miller and McGillard*).

There is a closer correlation between milk production and age at first calving on all farms examined.

On this study, results that the relationship nonantagonistic between milk production and fat quantity, protein quantity, age at first calving can be certainly considered and informally for calving interval, breast rest and service – period about simultaneaus selection.

The population genetic progress achieved through breeding males with high improvement value, especially to acquire of production, reproduction and conformation-body development.Knowledge and determination of hereditary potentialy for each male reproductive male is the most important actions to improve a herd cattle.

Analyzing the quantitative value of improving milk production, result that 13 bulls (26, 0 %) are breeders, 20 bulls are worsening, and 17 (34, 0 %) are indifferent.

Among the top 10 bulls breeders is added the bull indigenous with 19185 code who are used in Radomiresti farm and Gh . Doja farm, he has + 453,89 kg milk value of improvement .

After value of improvement at fat percentage for this 50 bulls studdied, 17 bulls (34,0%) are breeders; 18 bulls (36,0%) are worsening and 15 bulls (30,0 %) are neutral. Notices the presence among the top 10 bulls breeders of four indigenous bulls, this shows the high genetic value from reproducers for fat milk content.

About age at first calving and other reproductive traits who reprepusent the reproduction cappacity, the value of improvement of bulls studied is as different as quantitative and qualitative milk production.

From the analysis of reproductive indices based on farm management resulted following:

For herds of farms Serbesti and Radomiresti the imported heifers was mounted at an early age so the calving is produced at 24-26 months.

The analysis of conception rate after first insemination is found that it was beetween 44,8% at Serbesti farm in 2006 and 74,3 % at Gh. Doja farm in 2008; except those two years who have minimum and maximum limits, in the remaining years for the three farms analyzed after first insemination, conception rate was over 60 %, which shows a favorable situation .

Analysis of this indicator shows significant differences at farms studied in this three year and between farms based on biological material (different races) but especially the management of reproductive function.

The percentage of cows and heifers after first insemination (%NR) in 60-90NR period in 2007 and 1,59% NR in 2008. This index may higher by 3-6 % (on average) compared to cows who are really pregnant, after Bogdan A. T. and col., because the patological anafrodizic caused by example by persistant corpus luteum , by other diseases.

Considering the number of cows and heifers seeded annual, was calculated the birth index (N%), based by bearing between the number of product obtained (alive and viable) and the number of cows and heifers seded in each farm.

Results obtained show that the best birth rate was recorded in 2007, the value of this index was 80,41% in farm Radomiresti and 85,08% in Gh. Doja farm, and 83,9% in Serbesti farm.

Achieving for this syntetic index of reproductive function at a suboptimal level is in closely related with the frequency of reproductive disorders and loss of cattle by abortion and in the first days after calving, the situation was analyzed for each farm .

In all herds of the three farms, the frequent of reproductive discorders at cows in analyzed period (2006-2008) was between 13% (January) and 22% (June-July). These dates show that the management of reproductive function was poor, due to reproductive disorders, it's recorded losses at calves and at milk production.

The most frequent reproductive disorder was: anoestrus, loss of heat cycles and heat removed undetected at the time, insemination at cows with vaginales discharge caused by metritis and other diseases , poor nutrition and poor hygiene of shelters, etc.

Dates from speciality literature shows the influence of age at first calving on milk production in first lactation and for his all milk productive career.

The results of the study at cattle on three farms, confirm the influence of age at first calving on index of age at first calving, on index of milk production and other reproductive index.

The analysis of these dates revealed that heifers calved at an age of 620 days (20 month and 20 days) achieved 3286 kg milk at first lactation, with a high conteint of fat (4,52%) and protein (3,4 %). The cows that have calved around 34 month and 19 days (1039 days) made 6220,15 kg milk and fat content of 0,6%, respectively 3,07% protein.

Regression line and value of regression coefficient (b = 0, 451) for the quantity of milk in first lactation reveals influence of age at first calving on milk production indices. Study results in the three farms evidence on BNR and BR-Fleckvieh races, evidence the high performance are obtained when the age at first calving is situated between 24 – 29 month.

The influence at age at first calving on other reproductive indices (CI, RM, SP) the dates obtained indicate different aspects depending from the index examined .

In calving interval case, (CI) is found that calving at an age too young cause on increase in calving interval, the optimal value is between 800 days and 1000 days .

On breast rest and service-period, the dates obtained do not give a clear conclusion this indices are strongly influenced by the moment of reproduction function.

Between milk quantity and calving interval (CI) is a closer connection show by value of regression coefficient (b=0,513) and the appearance of regression live.

Between milk quantity at first lactation and the breast rest, respectively service – period, the values of regression coefficient and line of regression prove a weak link, influenced by external environmental factors and farm management.

The economic calculation of losses due to infecundity and sterility status in dairy farm shows that losses are important and different from on farm to another depending by the biological material, technological factors and the management of reproductive function.

The primiparous cows recorded the biggest losses caused by physiological status, infertility, sterility, compared with adult animals where reproductive disorders are lower.

The grup of cows with over 91 infecundity days was 87,47%, the grup with 1-30 infecundity days was only 1,76%, and the grups with 31-60 days and 61-90 days infecundity was 4,36%, respectively 6,40of all population analyzed.

The total losses caused by infertility-sterility reached at 400581,7 RON or 109.230 euro, respectively 169.364 $ at exchange value of 11.06.2008.

The results of the study in three dairy farms shows the huge economic losses caused by sterility-infecundity. From these appear increase the efficiency and a profits by reducing or eliminating these losses, acting mainly on improving technologycs factors and a management of reproductive function.