ABSTRACT

The Phd dissertation comprises two sections: THE LEVEL OF KNOWLEDGE and ORIGINAL CONTRIBUTIONS.

The **1st section** comprises four chapters:

1. Swine husbandry state of facts: actual trends and perspectives; 2. Data concerning Pig Improvement Company (PIC); 3. PIC hybrids used in Romania: synthesis schematics, performances and rearing perspectives; 4. Worldwide and national achievements concerning swine hybridisation

1. Chapter I revealed that the swine flocks and their dynamics followed for the last 15 years, worldwide and at national level and especially in certain European countries, and ascendant trend.

In Europe, swine flock gradually decreased, starting from 1992 till 2002, the main reason being the reducing of swine flocks in the ex-communists countries due to the market liberalisation;

In Romania, swine flocks significantly decreased between 1990 – 2000 and then progressively increased each year;

2. Chapter II comprises data concerning the establishment and development of the PIC Company, worldwide and in Romania.

3. Chapter III reveals the production and reproduction performances achieved by the boars and sows lines of the PIC Company, available on the Romanian market.

4. Chapter IV presents the main companies of swine genetics acting worldwide or at national level and the main hybrids realised by those companies, as well.

Six chapters have been included in **the 2nd section**: 5. General experimental design; 6. Presentation and characterisation of the unit hosting the researches; 7. Husbandry and exploitation technology applied in SC „SUINPROD" SA Roman; 8. Results achieved and their discussions; 9. Results concerning the quality of the meat issued from the PIC hybrids; 10. Conclusions and recommendations.

Through this paper, we proposed to establish the production performances of breeder lines belonging to one of the most important providers of genetic material in Romania,

respectively the Pig Improvement Company (P.I.C.), exploited within a top unit in Moldova in swine husbandry - S.C.SUINPROD S.A. ROMAN.

The researches goal was to study the reproduction performances (sperm volume, spermatozoids concentration in sperm, the amount of spermatozoids and of produced doses, fecundity, prolificacy etc.) and the production performances (average daily gain, feed conversion ratio, body indexes and meat quality) achieved by the PIC bloodlines intensively exploited in Romania, for meat production by slaughtering.

There have been analysed the reproduction performances achieved by three PIC boars lines (PIC 1075, PIC 402, PIC 408) and two sows lines (PIC 1050, Camborough) used within the previously specified company.

The insemination material, issued from the 1075 boars, is used to artificially inseminate the PIC 1050 sows from the hybridisation farm of the unit.

The insemination material, issued from the boars of PIC 408 and PIC 402 lines, is used to artificially inseminate the Camborough sows, resulting piglets exclusively designed for slaughtering.

The PIC 1050 females are used in the previously specified company, in order to produce Camborough sows, which are also used to be crossed with terminal boars, in order to obtain industrial hybrids, designed for slaughtering.

Both boars and sows used as biological material have been examined from the reproductive life onset toward their culling.

In order to assess the production performances, there have been studied individuals resulted from crossings between PIC 402 and PIC 408 boars with the Camborough sow, following the standard working protocol in the unit.

Achieved results and discussions

Reproduction performances of the studied PIC boars

Ejaculate volume at the three bloodlines of boars we studied, was comprised within the limits specified in the references. It reached values between 224 and 235 ml during 8-12 months old, between 310 and 366 ml during 13-24 months old, between 330 and 348 ml between 25-36 months old and between 304 and 404 ml during 37-42 months old. Significant and distinguished significant values occurred both between boars and age periods.

The level of sperm concentration, as influenced by boars age, was found high, in all lines, during the 25-36 months old period, the differences compared to the other periods being statistically significant. Comparing the values achieved in each boar line, we could find differences between PIC 1075 (372 x 10^6 spermatozoids / ml =100%) and PIC 402 (311.5 x 10^6 spermatozoids / ml), of 16.28%, or compared to PIC 408 (302.3 x 10^6 spermatozoids / ml), of 18.76%.

The average spermatozoids mobility within the crude semen had mean values comprised between 76.92 % and 79.4%, but not significantly influenced by boars age. Expressed in relative values, the differences between the average level observed in PIC 402 line (79.4%=100) and those found in the other lines, were comprised between 3.13% (comp. to the PIC 1075 line) and 0.57% (comp. to PIC 408 line).

The amount of doses per ejaculate subscribed to the trend presented in the last field researches. The maximum amount of doses/ejaculate has been achieved in both bloodlines during 25-36 months old period, while the poor amount during the reproduction activity onset (8-12 months old period). The highest doses amount (21.12) has been produced by the PIC 402 line. No significant differences occurred between groups. Expressed as relative values, the differences were of 3.17 % (compared to PIC 1075 line), respectively of 7.20 % (compared to PIC 408 line).

It could be stated, basing on the researches we carried on, that, due to the high sperm concentration, meaning high spermatozoids amounts per ejaculate during the whole exploitation period, the reproduction usage intensity of studied PIC boars could be improved. Thus, the period between two ejaculates could be shortened to 3 or 4 days, compared to the actual used interval, of 5 days.

In the studied PIC boars, the sperm production level allows the exploitation of a reduced amount of males, generating thus favourable financial and zootechnic consequences.

Reproduction performances of the PIC1050 and Camborough studied sows

At the studied sows, the fecundity has been poorly influenced by the parturition number, the differences between the 5 observed parturitions, concerning piglets amounts being reduced.

Comparing the fecundity values, in both analysed sow lines, the average values were found as well, passing over 81 % in both groups (PIC 1050 – 81.72 %; Camborough – 81.90 %), suggesting thus that both groups present special maternal features.

Average prolificacy of the sows, expressed as the amount of farrowed pigs, was higher in Camborough sows (12.11 piglets / parturition) as compared to PIC 1050 sows (11.33 piglets / parturition), meaning + 6.8%. Both achieved values are in accordance with the data specified by the scientific references.

Piglets losses, in both groups, were less than 10%, compared to the references, which indicate 15 % losses till weaning. The reduced losses percentage could be explained by both better sows quality and provided technological conditions during gestation, parturition and weaning.

Production performances achieved by the studied PIC hybrids

The body weight values, achieved by both piglets groups issued from crossings, indicated a better performance in the PIC 402 x Camborough descendants, compared with the PIC 408 x Camborough ones, meaning + 2 % overall the analysed period, being in accordance with the data presented by the PIC company and by the scientific references as well.

The values concerning the average daily weight gains indicated better results in PIC 402 x Camborough piglets (611 g), compared to those achieved by PIC 408 x Camborough descendants (600g), meaning a difference of 1,8%.

Feed conversion ratio (kg feed / kg weight gain) reached, during the entire experimental period, 2.61 kg in PIC 402 x Camborough group and 2.7 kg in PIC 402 x Camborough groups, the values being comprised within the limits specified by the PIC and other literature specifications.

Body dimensional features measured at the studied PIC hybrids

Comparing the data concerning the body dimensional features of the PIC hybrids in both groups (L1 and L2), specific to the 25, 85, 120 and 160 days ages, with the data corresponding to the Large White and Landrace individuals, it resulted that the values achieved by the PIC groups are higher than those Large White breed and inferior to those of

the Landrace bread. Thus, the PIC hybrids could be considered to belong to the meat morpho-productive type.

Quality of the meat issued from the PIC hybrids

Chemical meat features have been assessed on samples issued from *Longissimus dorsi* muscles of 20 carcasses, 10 for each group.

The samples have been chemically analysed within the Animal Science Faculty - Laboratory of Analytic Chemistry, according to the laboratory methodology requirements and to all in state standards.

Concerning the slaughtering efficiency, this parameter was calculated at 72.43% in L1 group, at 73.41 % in L2 group, existing a 1.35% difference between groups. No statistically significant differences occurred. The variability coefficient was calculated under the 10 % limit, indicating poor variability.

Protein content varied between 22.36 % in L1 group (PIC 402 x Camborough) and 22.43 % in L2 group (PIC 408 x Camborough). No statistical differences occurred between groups. Fat level varied from 1.66 % in L1 group, till 1.83 % in L2 group. No significant statistic differences occurred. Average variability was established, knowing that variability coefficient passed over 10 %.

pH meat value, during the three assessment moments (30 minutes, 12 hours, 24 hours), in both PIC groups, indicated normal values, specified by the scientific literature.

Concerning carcass quality, it could be stated that meat participation in whole carcass was 2 % higher in PIC 408 x Camborough descendants (56 %), as compared to the PIC 402 x Camborough descendants (54 %), the values being closely situated to the meat percentage in carcass achieved by other foreign hybrids and higher to those obtained by the pure breeds used in Romania.

The results achieved during the experiments allowed us to state some conclusions which underline the importance of the genetic material within a swine intensive husbandry unit, and its incidence upon production, through the improvements of those characters presenting economic relevance.

A series of recommendations will be advised, basing on the achieved results and issued conclusions, mainly to the swine breeders owning small and middle size exploitations,

in order to convince them to use high productivity hybrids, leading to the achievement of better economical efficiency.