

## STUDY OF CERTAIN FACTORS INFLUENCING MEAT PRODUCTION IN ROSS-308 CHICKEN HYBRID

M.G. Usturoi<sup>1</sup>

<sup>1</sup>University of Agricultural Sciences and Veterinary Medicine from Iasi, Romania

### Abstract

Chickens gender and slaughtering age were studied as factors that could affect the slaughtering technical parameters (dressed yield and proportion of cut parts from whole carcass). There have been established 3 groups of Ross-308 chicken broilers, consisting each in 100 individuals (50 males and 50 females), slaughtered gradually when groups reached, consecutively the ages of 35, 42 and 49 days. Increase of this moment from 35 to 49 days resulted in better live weight, with 55.09% in males, with 46.90% in females. Dressed yield calculated on fresh carcasses was 0.54-1.17% better in females compared to males. On refrigerated carcasses there were found also 0.50-0.83% higher values in females, which suggest decreased drip loss in males. Calculation of cut parts proportion from whole carcass revealed more back percentage in the chickens slaughtered at 35 days, compared to the other slaughter ages (+ 1.48...2.32% in males and + 0.97 ... 1.70% in females). Compared to this first slaughter moment, the other chosen ages brought better breast proportion (0.85-1.52% higher in males and 0.82-1.20% higher in females), whole chicken legs proportion (+0.50...0.57% in males and + 0.06...0.36% in females) even that of the wings (0.13-0.23% improvements in males and 0.09-0.14% in females). The achieved results underline that slaughtering the Ross-308 chickens at ages of 42 and especially of 49 days is related to improved dressed yields and proportion of the high value cut parts. Also, the separate – genders rearing is recommended.

**Key words:** Ross-308, age, gender, slaughtering, poultry

### INTRODUCTION

Poultry production oriented to separate genders rearing, due to the increase demand of the consumers for deboned meat [4, 10].

Meat yield, especially breast muscles, increases as weight improves till slaughter [6, 7].

In order to cut production costs, the males could be reared till reach an appropriate weight and the deboned meat could be complexly processed (even as elaborated products), while females could be used to cover market demands for broilers carcasses [9].

Besides the deboned meat increased request, the consumers began to pay more attention to the nutritional aspects, knowing the fact that in the chemical composition profile, poultry males is lower in total lipids, compared to females [3, 10].

Also, the final live weight heterogeneity in a flock reared as hatched could be significantly reduced through separate

genders rearing, improving thus uniformity at slaughter, which is an advantage for the processing plants [6, 7].

Separate genders rearing allows differentiate feeding, in correlation with the effective nutritional requirements; males grow faster, have better feed conversion ratios and produce better response to feed supplementation with proteins [5, 8, 11].

The advantages of such separated rearing could be maximized when males and females are raised in separated houses, to provide very specific nutritional and microclimate factors control [1, 2, 5].

However, the uniformity of the products, even when they are separately reared, is strongly influenced by the management of all farming factors [1, 9].

### MATERIAL AND METHOD

The research comprised 300 Ross-308 chicken broiler, 150 males and 150 females. Slaughtering was carried on at three different ages (35; 42; 49 days), commonly used by the poultry industry, in accordance with the

\*Corresponding author: umg@uaiasi.ro

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market demand and with the technological and economical particularities of the farms.

One hundred individuals (50 males and 50 females) were slaughtered during every study moment.

The studied parameters were represented by live weight, weight of carcasses (fresh and 24 h refrigerated carcasses), dressed yields (fresh and cold meat).

Each carcass (without head, neck, fat and internal organs) was mechanically cut in 4 parts (breast, whole chicken leg, wings and back); each cut was weighed and reported to the originating carcass.

**RESULTS AND DISCUSSIONS**

Dressed yield represents a quality trait correlated with the live weight; this one depends, among others, on the slaughtering age and on the chicken gender.

**Live weight** at 35 days old was 2236.45g in males and 1958.65g in females; the theoretical potential of the Ross-308 hybrid at the same age is 2283g in males and 2006 g in females.

The chickens slaughtered at 42 days weighted 2836.40g in males (potential =3023g) and 2399.20g in females (potential=3023g), while those slaughtered at 49 days had 3468.48g in males and 2877.52g in females (compared with the potentials of 3750g and 3165g, respectively) (tab. 1).

Fresh carcasses weight reached in average 1621.21g in males and 1430.94g in females when slaughtering occurred at 35 days; 2092.13g and 1789.65g in the fowl slaughtered at 42 days old and 2591.99g, respectively 2164.81g in the chickens slaughtered when reached 49 days of age (tab. 1).

Table 1 Slaughter yield calculated on fresh carcasses

| Notice             |   | Slaughtering age (days) |         |         |
|--------------------|---|-------------------------|---------|---------|
|                    |   | 35                      | 42      | 49      |
| Live weight (g)    | ♂ | 2236.45                 | 2836.40 | 3468.48 |
|                    | ♀ | 1958.65                 | 2399.20 | 2877.52 |
| Carcass weight (g) | ♂ | 1621.21                 | 2092.13 | 2591.99 |
|                    | ♀ | 1432.94                 | 1790.65 | 2165.81 |
| Dressed weight (%) | ♂ | 72.49                   | 73.76   | 74.73   |
|                    | ♀ | 73.66                   | 74.64   | 75.27   |

**Dressed weight on fresh carcasses** was calculated immediately post-slaughtering. The values in 35 days old chickens were of 72.49% in males and 73.06% in females, while for those in 42 days old of 73.76% and of 74.59%. The most increased values were achieved when chickens were slaughtered at 49 days old: 74.73% in males and 75.23% in females (tab. 1).

The cold carcasses were weighed again after 24 hours of refrigeration. The carcasses from the 35 days old broilers reached 1596.6g in males and 1410.42g in females; those from 42 days old slaughtered birds reached 2067.45g-males and 1768.69g-females, while the carcasses from the individuals slaughtered at 49 days weighed 2567.72g-males and 2144.62g-females (tab. 2).

**Dressed weight on refrigerated carcasses** was calculated at lower values than that on fresh ones, with values varying from 71.39% (35 days chicks) till 74.03% (49 days chicks) in males and between 72.01% (slaughter at 35 days) and 74.53% (slaughter in 49 days) in females (tab. 2).

Table 2 Slaughter yield calculated on refrigerated carcasses

| Notice             |   | Slaughtering age (days) |         |         |
|--------------------|---|-------------------------|---------|---------|
|                    |   | 35                      | 42      | 49      |
| Live weight (g)    | ♂ | 2236.45                 | 2836.40 | 3468.48 |
|                    | ♀ | 1958.65                 | 2399.20 | 2877.52 |
| Carcass weight (g) | ♂ | 1596.60                 | 2067.45 | 2567.72 |
|                    | ♀ | 1410.42                 | 1768.69 | 2144.62 |
| Dressed yield (%)  | ♂ | 71.39                   | 72.89   | 74.03   |
|                    | ♀ | 72.01                   | 73.72   | 74.53   |

**Proportion of cut parts (%)** was calculated by reporting them at the weight of the refrigerated carcasses.

In the males slaughtered at 35 days, breast reached 21.32% (340.40g) in carcass, whole chicken leg 22.61% (360.99g), wings 10.04% (160.30g) while back was calculated at 46.03% (734.91g).

In the females slaughtered at the same age, cut parts proportion reached 21.83% (307.89g) - breast, 22.01% (310.43g) whole chicken legs, 9.92% (139.92g) -wings and 46.24% (652.18g) - back (tab. 3).



Proportion of cut parts in the chickens slaughtered when turned 42 days old revealed 22.17% breast, 23.11% whole chicken leg, 10.17% wings and 44.55% back in males carcasses, while those issued from females reached 22.65% breast, 22.07% whole chicken legs, 10.01% wings and 45.27% back (tab. 3).

Table 3 Proportion of cut parts from the carcasses

| Notice               |   |   | Carcass yield (g) | Cut parts |                    |        |         |
|----------------------|---|---|-------------------|-----------|--------------------|--------|---------|
|                      |   |   |                   | Wings     | Whole chicken legs | Breast | Back    |
| Slaughter at 35 days | ♂ | g | 1596.50           | 160.30    | 360.99             | 340.40 | 734.91  |
|                      |   | % | 100               | 10.04     | 22.61              | 21.32  | 46.03   |
|                      | ♀ | g | 1410.42           | 139.92    | 310.43             | 307.89 | 652.18  |
|                      |   | % | 100               | 9.92      | 22.01              | 21.83  | 46.24   |
| Slaughter at 42 days | ♂ | g | 2067.45           | 210.26    | 477.79             | 458.35 | 921.05  |
|                      |   | % | 100               | 10.17     | 23.11              | 22.17  | 44.55   |
|                      | ♀ | g | 1768.69           | 177.05    | 390.35             | 400.61 | 800.68  |
|                      |   | % | 100               | 10.01     | 22.07              | 22.65  | 45.27   |
| Slaughter at 49 days | ♂ | g | 2567.72           | 263.70    | 595.20             | 586.47 | 1122.35 |
|                      |   | % | 100               | 10.27     | 23.18              | 22.84  | 42.71   |
|                      | ♀ | g | 2144.62           | 215.75    | 479.75             | 493.91 | 955.21  |
|                      |   | % | 100               | 10.06     | 22.37              | 23.03  | 44.54   |

Weighing of cut parts at the age of 49 days revealed values of 586.47g (22.84%) for the breast, of 595.20g (23.18%) for the whole chicken legs, of 263.70g (10.27%) for the wings and of 1122.35g (43.71%) for backs of the males, respectively of 493.91g (23.03%), of 479.75g (22.37%), of 215.75g (10.06%), of 955.21g (44.54%) in the female carcasses (tab. 3).

## CONCLUSIONS

The achieved data on the correlation between broiler gender, biological age, slaughter age and the values of the slaughtering technical parameters (dressing yield percentage, proportion of cut parts from whole carcass) generated a few interesting conclusions:

- broilers live weight at slaughter was 2.04-7.51% lower in males and 2.36-9.08% in females, compared with the theoretical performance of the hybrid, hence the farm provided all optimal rearing conditions;
- weight loss during refrigeration were 0.95-1.54% in males carcasses and 0.98-1.57% in the females ones. The better results in males comes from the anatomical structure of the muscular fibers, which are reinforced in this gender, therefore allows better constitution water retention;
- the fresh dressing yield was higher females (73.66-75.27%) than in males (72.49-74.73%). Closer results occurred as slaughter age increased (females were in advantage vs. male with 1.57% in those birds slaughtered at 35 days, with 0.88% at 42 days and just with 0.54% at 49 days);
- although the dressed yield after refrigeration was also better in females (72.01-74.53%) than in males (71.39-74.035), the difference between genders was of just 0.62% for 35 days slaughter, increased at 0.83 for 42 days and it was reduced to 0.5% for 49 days slaughtered chickens. These data suggest that the differences related to dressed yield would decrease between genders if the slaughter age would increase.

The main conclusion states that the increase of the broiler rearing period till age of 42 days and especially till 49 days allows the acquiring of better live weight when dispatched to the slaughterhouse, accompanied by the improvement of the dressed yield and by the proportion of high value cut parts (breast, thighs and drumsticks), especially in males.

Within these circumstances, it could be a viable solution to raise apart per genders the chicken hybrids and even the postponement of the slaughter age, with all implied advantages that may occur in processing, especially when the market demand is for bigger size and quantity cut parts.

To successfully fulfill this need it is necessary to provide differential and specific microclimate and nutritional conditions to each gender, in accordance with hybrid producer's technical recommendations.

Also, it must be recalled the fact that rearing males apart results in aggressive behavior (frequent fights, casualties), hence the necessity to implement technical measures to decrease such phenomenon.

## REFERENCES

- [1] Brewer V.B., Kuttappan V.A., Emmert J.L., Meullwnwt J.F. and Owens C.M., 2012-*Big bird programs: effect of strain, sex and debone time on meat quality of broilers*. Poultry Science, no. 91, pg. 248-254.
- [2] De Jong I.C., Wolthuis-Fillerup M. and Van emous R.A., 2009-*Development of sexual behavior in commercially-housed broiler breeders after mixing*. British Poultry Science, vol. 50, pg. 151-160. ISSN: 0007-1668
- [3] Fletcher D.L., 2002-*Poultry meat quality*. World's Poultry Science Journal, vol 58, pg. 131-145. ISSN: 0043-9339
- [4] Hamon J.F., 2010-*The alternative broiler market: history, evolution and future*. Book of abstracts XIII<sup>th</sup> European Poultry Conference, Tours, France, pg. 579.
- [5] Kornasio R., Uni Z. and Halevy O., 2010-*Broilers skeletal muscle growth and developments is improved duet o early feeding strategies*. Book of abstracts XIII<sup>th</sup> European Poultry Conference, Tours, France, pg. 233.
- [6] Maertens L. and Delezie E., 2010-*The impact of slaughter age and sex-segregated housing on the performances, slaughter and carcass characteristics and footpath lesions in broiler chickens*. Book of abstracts XIII<sup>th</sup> European Poultry Conference, Tours, France, pg. 591.
- [7] Radu-Rusu, R.M., Vacaru-Opriș, I. and Usturoi M.G., 2009-*Researches concerning the slaughtering efficiency and the cut parts proportion in the carcasses of the chicken broilers reared within intensive system*. Lucrări Științifice, Seria Zootehnie, vol. 52 (14), pg. 411-415. Editura „Ion Ionescu de la Brad” Iași. ISSN: 1454-7368.
- [8] Taherkhani R, Shivazad M, Zaghari A, Zareshahne A and Zaefarian F, 2008-*Comparison of different ideal amino acid rations in male and female broiler chickens of 21 to 42 days of age*. 1st Mediterranean summit of WPSA „Advances and challenges in poultry science”, ISSN 2065-3484.
- [9] Usturoi M.G., Vacaru-Opriș I, Radu-Rusu R.M., Simeanu D., Usturoi A., 2008-*Study of certain factors influencing poultry meat quality*. The 37<sup>th</sup> international session of scientific communications of the faculty of animal science, Seria D, vol LI, ISSN 1224-4295, pg. 279-282. Bucharest, 2008.
- [10] Vukasovic T., 2014-*European meat market trends and consumer preference for poultry meat in buying decision making proces*. World's Poultry Science Journal, vol 70, no 2, pg. 289-302. . ISSN: 0043-9339
- [11] Zaefarian F., Zaghari M., Shivazad M. and Abdollahi M.R., 2008-*Threonine requirement and its effects on growht performance of broiler chicks fed different levels of protein*. World's Poultry Science, vol. 64, supplement 1, pg. 108, . ISSN: 0043-9339