

ABSTRACT

Keywords: guinea fowl, yield, performances, cholesterol, quality

Of all the sources of meat used, the poultry occupies a special place, because it presents a series of characteristics that make it to be appreciated for its fine taste, the proteins with high nutritional values and the reduced intake of calories. Currently, the consumption of poultry is increasing in the vast majority of developed countries as well as in developing countries.

The guinea fowl is among the last species of domesticated birds. In our country, their rearing is done exclusively in the domestic system, in small herds and alongside other species of birds.

The exploitation of the guinea fowls in the intensive system has wide prospects for development, as a result of the increasing demand of the consumers for the meat and eggs obtained from this species, but also for a series of very valuable biological properties.

Through this thesis we intend to make an assessment of the productive performances achieved by the commercial hybrid of the guinea fowl "NIMBA" reared in intensive system.

Feeding of the studied birds was done with combined fodder purchased from a company specialized in the production of fodder for birds, including guinea fowls.

To achieve the proposed purpose, 3 breeding series were organized, differentiated by the age of slaughter of the birds: 77, 84 and 91 days respectively.

The research aimed at evaluating the following elements: the technological factors ensured during the rearing (temperature, humidity, air currents, light program and the quality of the administered fodder); productive performance (dynamics of body weight, weight gain, outflows from flock, combined fodder consumption); quantitative meat production (weight at slaughter, dressing yield percentage at slaughter, - proportion ratio of the cut parts in the carcasses formation, weight of edible organs, meat / bone ratio); quality of the meat obtained (sensory properties of the meat, pH value, chemical composition of the meat through the content of water content, dry matter, protein, lipids, total mineral substances, nitroge-free extract, fatty acids, macroelements, microelements, energy value, cholesterol concentration, histological features and meat microbiology).

The appreciation of the meat production was made on the age of slaughter of the birds (variable 1 of the researches), but also on the sexes (variable 2), while for the evaluation of the quality of the meat obtained it was used a third variable, namely, the anatomical part from which we took samples for analysis.

From the data obtained regarding the dynamics of body weight, this aspect was obviously strongly influenced by the age at which the guinea fowls were slaughtered. Body weight was 2173 g (male) and 2187 g (female) for the birds in the first growth series. Males in the 2nd breeding series had weight values before slaughter of 2326 g, and females 2387 g. The weight of guinea fowls in the 3rd series showed live weight values of 2511 g for males and 2489 g for females. From the calculation of weight gain, close values were obtained for the average daily gain of 27.98 g / head / day (series I), 27.91 g / head / day (series II) and 27.92 g / head / day (series III).

Regarding the average daily consumption of combined feeds, results were obtained for each batch, namely: 94.71 g / head / day (series I); 95.71 g / cap / day (series II); 100.60 g / head / day for series III.

Based on the individual feed consumption combined, there were recorded values of the feed conversion ratio of 3.25 kg cf / kg gain for poultry up to 77 days, a value of 3.43 kg cf / kg gain for that of the second series (slaughter at 84 days), and for series 3 (slaughter at 91 days), the feed conversion ratio had a value of 3.65 kg cf / kg gain.

Regarding the cash outflows, we can say that the situation was very good. Thus, in the first experimental series, the losses were 4% (week 9 and 11 of life), caused by mechanical accidents during weighing, 2% for the second experimental series, losses recorded in week 11 (wing fracture during the weighing operation); In the third experimental series the outflow from the herd was 2%, the only mortality being registered at the end of the 13th week of life, due to the installation of the hepatic steatosis phenomenon (the existence of fatty liver).

The quantitative meat production was evaluated from the point of view of slaughter yield, determined immediately after slaughter (hot yield) and after 24 hours of refrigeration (cold yield). Guinea fowls slaughtered at 77 days recorded warm yield values of 82.90% for males and 82.97% for females, those sacrificed at 84 days had 83.40% yield for males and 84.84% for females; those sacrificed at the age of 91 days recorded values for yield of 83.83% for males and 83.89% for females. As a result of the refrigeration, a lower value of the yield at slaughter was obtained for both sexes, respectively 79.52% (males) and 79.17% (females) for series I, 79.90% (males) and 81.71% (females) for series II and 80.40% (males) and 80.88% (females) respectively in series III.

After the slaughter of the guine fowls process, the carcasses obtained were cut onto anatomical portions, calculations were made regarding the share of each one in the composition of the carcass.

The carcasses resulted in the first experimental series obtained cut-off values of 25.48% (males) and 26.16% (females) for chest with bone, 12.08% (males) and 11.19% (females).) for the shanks, 13.61% (males) and 15.24% (females) for the thighs, 11.44% (males) and 11.27% (females) for wings and 37.39% (males), 36.14% (females) for the proportion of the back.

The guinea fowls slaughtered at 84 days presented the following values: 24.77% (males) and 25.41% (females) in the case of the chest with bone; the shanks made up the male body in a proportion of 11.83%, and that of the female one, 12.30%; for the thighs the values were 14.03% in male and 15.91% in female. The participation rate of the wings was 13.04% in the male and 12.91% in the females, and the back had a proportion of 36.33% (males) and 33.47% (females).

The last experimental series (guinea fowls slaughtered at 91 days) showed values of the participation quotas in the composition of the carcasses of 25.44% for the chest from males and 24.60% for the chest of females; the shanks had a participation rate of 11.60% in males and 11.92% in females, and the thighs had values of 12.74% in males and 12.87% in females. The wings had a participation rate of 13.29% for males and 13.01% for females, and the back occupied 36.93% of the males and 37.60% of the females.

Regarding the weight of the internal edible organs, the highest weights of the hearts were obtained at the third series (14.23 g in males and 14.18 g in females), followed by the values obtained from a 2nd series (12.67 g in males and 11.95 g in females); and in the first series the heart had weights of 10.49 g in males and 9.56 g in females. The highest values of the weight of the gizzards were observed in the birds slaughtered at 77 days, 40.11 g in males and 41.99 g in females, followed by birds in the third slaughter (35.13 g in males and 40.87 g in females) and finally the guinea fowls slaughtered at 84 days had gizzards weights of 32.35 g in males and 40.87 g in females.

The weight of the liver recorded large differences between the 3 experimental series; more precisely the lowest values were obtained after the first slaughter (28.34 g in males and 31.00 g in females); the second sacrifice showed liver weights of 43.77 g in males and 57.48 g in females. The maximum weights

were obtained in the females of the third experimental series 74.89 g, and in the males the average value was 59.96 g.

The meat / bone ratio calculated for carcasses obtained at 77 days was 5.90 / 1 in males and 5.85 / 1 in females; slaughter at 84 days showed values for this parameter of 6.33 / 1 in males and 6.25 / 1 in females; and at 91 days, the meat / bone ratio was 6.91 / 1 in males and 6.32 / 1 in females.

Analyzes of meat from guinea fowls slaughtered at 77 days revealed water content values of approximately 72% for the thighs, 73% for the shanks and chest and 75% for the wings. The protein content had the best values in the pectoral musculature (24%), followed by the shanks and thighs (23%) and the wing musculature (20%).

The lipid content had values of about 2% for the shanks and thighs, 1.30% for the chest muscles and over 2.3% for the wing muscles. Regarding the concentration in cholesterol, the highest levels were observed in the musculature of the wings (0.20%), and the lowest values in the muscles in the chest area (0.12%).

The chemical composition of the musculature from the guinea fowls slaughtered at 84 days showed water content values of 73% for the shanks, thighs and chest muscles and 75% for the wing muscles. The determination of the protein content revealed values of 22% for the thighs, 23% for the shanks and chest and about 20% for the muscles from the wings of the guinea fowls. Lipid levels ranged from 1.24% as identified in the chest to 2.41% (wings) Cholesterol identified in the muscles had values between 0.23% (wings) and 0.11% (chest).

Data on water content for meat provided by the third slaughter (91 days) shows that in the shanks, thighs and chest the values were in the range 72-73%, and in the wings the value was close to 76%. In the case of proteins, their level reached the maximum threshold in the pectoral musculature, more precisely 24%, and at the opposite pole is the musculature of the wings with a protein level of 20%. The lowest lipid level was 1.14%, a value obtained from the analyzes performed on the pectoral musculature; and the highest level of 2.72% was identified in the wing muscles. Obviously, the concentration in cholesterol was higher in the wings (0.25%), compared to 0.12%, a value obtained in the pectoral muscles.

The determinations made on the pectoral musculature from the first slaughter regarding the quantity of fatty acids revealed the sum of saturated fatty acids (SFA) of 40.58 g FA / 100g, of monounsaturated fatty acids (MUFA) of 36.28 g FA / 100g and of polyunsaturated fatty acids (PUFA) of 22.67 g FA / 100g, resulting in a SFA / UFA ratio of 0.68; PUFA / MUFA 0.62. The dosage of acids $\Omega 3$ showed that their total was 32.34 g FA / 100g, and the sum of acids $\Omega 6$ was 20.32 g FA / 100g, resulting in the ratio $\Omega 6 / \Omega 3$ of 9.04.

Analyzes regarding the amount of fatty acids in the pectoral muscle obtained from the guinea fowls slaughtered at the age of 84 days, showed that the total saturated fatty acids (SFA) was 39.34 g FA / 100g, of monounsaturated fatty acids (MUFA) of 36.13 g FA / 100g and polyunsaturated fatty acids (PUFA) of 22.70 g FA / 100g, resulting in a SFA / UFA ratio of 0.69 and a PUFA / MUFA ratio of 0.72. The sum of type $\Omega 3$ acids was 2.23 g FA / 100g, and that of $\Omega 6$ acids of 20.36 g FA / 100g, resulting in a $\Omega 6 / \Omega 3$ ratio of 9.13.

The chemical analyzes were also performed on the pectoral musculature from the guinea fowls slaughtered at 91 days, obtaining a total saturated fatty acids (SFA) of 40.57 g FA / 100g, monounsaturated fatty acids of 36.27 g FA / 100g, polyunsaturated fatty acids 22.63 g FA / 100g. The value of the SFA / UFA ratio was 0.67 and that of the PUFA / MUFA ratio was 0.61. The dosage of acids $\Omega 3$ showed an amount of 2.21 g FA / 100g, and the sum of acids $\Omega 6$ was 10.31 g FA / 100g, resulting in the ratio $\Omega 6 / \Omega 3$ of 9.19.

The histological particularities of the musculature resulting from the first slaughter revealed values for the thickness of the muscle fibers of 46.74-48.55 μm for the musculature of the chest, of 36.13- 41.62 μm for the musculature of the thighs, of 39.71- 42.24 μm for the muscles of the shanks and 31.27-33.42 μm for the muscles of the wings. At this age the connective tissue had 25.76-25.17% values in the chest, 26.89-27.51% in the thighs musculature, 29.46-30.25% in the shanks musculature and 28.26-28.67% in the musculature of the wings.

The muscle fibers taken from the guinea fowls from the second experimental series had thickness values of 49.94-51.18 μm (chest), 38.29-44.12 μm (thighs), 42.56- 45.09 μm (shanks) and 35.10-37.06 μm (wings). The proportion of connective tissue had 25.60-25.76% values in the pectoral musculature, 27.32-27.80% - thighs musculature, 29.69-30.48% - shanks musculature and 28.55-28.89% - wing musculature.

In the third series of histological analyzes on the musculature (guinea fowls slaughtered at 91 days) the thickness of the muscle fibers had values of 51.84-53.88 μm in the chest muscles, 44.30-46.39 μm in the muscles from the thighs, 44.37-47.31 μm for the shanks musculature and 36.62-38.81 μm for the wing muscles. The connective tissue had a chest value of 25.94-26.18%, in the thighs 27.76-28.01%, for the shanks musculature 29.83- 30.68% and for the musculature wings of 28.66-29.20%.

Laboratory analyzes for the detection of bacteria of the genus *Salmonella* and *Escherichia* showed that they were absent for samples of both sexes; the same was true for *Staphylococcus aureus* analyzes.

Based on the results obtained in the rearing of the guinea fowls hybrid for meat "NIMBA", we make the following recommendations for the practice of breeding this species:

- the growth technology elaborated by us has proven its efficiency, in terms of the productive parameters realized and as such it is recommended to be applied by breeders;
- raising broiler broilers up to the age of 84 days, only ensures the best breeding performance, a higher production of meat, of very good quality compared to slaughter at a younger age;
- guinea fowl meat has superior nutritional properties, such as: a high protein level (24% compared to 22% in the chicken broiler) and a low fat content (2.5%); in addition, the cholesterol level is more than 4 times lower than in the chicken broiler (0.16% versus 0.68%);
- the continuation of the research regarding the morpho-productive parameters of the guinea fowl hybrid "NIMBA" because the bird has a good genetic potential.