

Effect of genotype and rearing system on chicken behavior and muscle fiber characteristics

R. Branciarì*, C. Mugnai**, R. Mammolì*, D. Miraglia*, D. Ranucci*, A. Dal Bosco**,2 and C. Castellini**

* Department of Biopathological Science and Hygiene of Animal and Food Production, University of Perugia, Via S. Costanzo, 4, 06126 Perugia, Italy; and ** Department of Applied Biology, University of Perugia, Borgo 20 Giugno, 74, 06100 Perugia, Italy

Abstract :

The effect of the organic production system and genotype on chicken behavior and muscle fiber characteristics was assessed. Three hundred day-old male chicks from slow-growing (Leghorn), medium-growing (Kabir), and fast-growing (Ross 208) genotypes were assigned to 2 different production systems: conventional, housing in an indoor pen (0.12 m²/bird); and organic, housing in an indoor pen (0.12 m²/bird) with access to a grass paddock (4 m²/bird). Behavioral observations were recorded from 73 to 80 d of age in the morning and afternoon. At 81 d of age, blood samples were collected to measure lactate dehydrogenase and creatine kinase, and 20 birds per strain and rearing system were slaughtered. Samples of pectoralis major, ileotibialis lateralis, and semimembranosus muscles were obtained for histological evaluations. Behavioral observations showed that genetic selection of animals for a better growth rate modified their behavior, reducing kinetic activity. Indeed, Leghorn birds were characterized by moving activities, whereas Kabir and Ross strains were discriminated on the basis of their lying, standing, and eating activities, and these activities were strongly associated with energy conservation, growth, and muscle fiber characteristics. Fiber characteristics and muscle enzyme functions were affected by rearing system only in animals adapted to the organic system. Interesting results relative to Leghorn chickens are the presence of red fiber in breast muscle and the increased cross-sectional area of the ileotibialis lateralis muscle, which together with behavioral data could affirm that this genotype is the most adapted to the organic rearing system.

Key Word :

behavior, chicken genotype, muscle fiber, organic rearing system

Volume 87, Number 12, December 2009