

Assessing body conformation of hens at the end of laying period using Computed Tomography scanning

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Abstract

The aim of the present study was to evaluate body composition of laying hens, in relation to flock uniformity, at the end of the laying period for hens in a commercial farm and from a laboratory experiment with three different body weight groups at point of lay (light, medium and heavy). A total of twelve birds was randomly selected for the on-farm study at a cage housing system at 80 weeks of age, and eighteen birds from the laboratory experiment with 6 birds per body weight group. Body weight (BW) was measured prior to scanning using an electronic weighing scale (VEIT electronics Poultry scale BAT 1), and the whole body of each hen was scanned using a GE HiSpeed QXi 4 slice CT scanner. The acquisition parameters of the CT scanner were performed with helical scanning 120 kV, 140 mA, 5 mm thickness, 5 mm spacing and 1 second scanning time. The abdominal fat depots were also weighed.

For the on farm birds, BW at 80 weeks of age ranged from 1.9 kg to 2.5 kg. There was a significant positive correlation between BW and abdominal fat pad ($R^2=0.8076$), a significant negative correlation between BW and lean composition ($R^2=0.6279$) and no significant correlation between BW and percentage bone in the body. For the laboratory experiment, BW ranged from 1.9 kg to 2.7 kg. There was no significant difference among the BW groups for body weight, abdominal fat pad, and variables measured by CT. However, there was a significant positive correlation between body weight and abdominal fat pad both measured and predicted by CT ($R^2=0.5125$ and $R^2=0.5875$, respectively). There was also a significant negative correlation between BW and lean composition ($R^2=0.3874$), and BW and bone percentage ($R^2=0.2678$) as measured by CT.

Body fat content increased linearly with body weight, while the composition of lean and bone decreased as body weight increased. CT is an accurate method for measuring body conformation of laying hens.

Keywords: Laying hens, computed tomography, body conformation