

The potential impact of slow growth broilers on the resources and
infra structure of the poultry industry

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Americans consume more chicken than anyone else does in the world. Consumption is at ninety pounds per person. To meet demand U.S. production is approaching 9 billion chickens producing approximately 50 billion pounds of broiler meat. The broiler market is 55 percent through retail outlets and 45 percent through food service. Any change in the production system will have direct impact on the sustainability and economic viability of the poultry industry.

Over a fifty-year period, the broiler chicken has changed in conformation and growth rate. This change is due to genetic improvement and better nutrition. The continual change in growth performance has not been without consequences. Muscle myopathies and skeletal abnormalities have become present in certain segments of broiler production. There has been a movement towards a slower growing genotype of chicken in some sectors of the poultry industry. Slow growth has been defined as less than 50 grams of growth per day. Many restaurants and grocery stores including Whole Foods, Panera Bread, Chipotle, Noodles and Co. and Quiznos have all indicated a movement to slower growing birds raised under the Global Animal Production (GAP) certified process. Bell and Evans has begun the transition to slow growth genotypes with the importation of their own proprietary breed the Das Klassenbester. The movement to slow growing birds and the GAP standards will have implications for all of the poultry meat industry.

Studies have been conducted at the University of Kentucky comparing fast growing and slow growing meat type chickens. Cornish Cross Broiler males (Fast growing) and Red Ranger males (Slow growing) were raised on self-selection diets. The traditional broilers reached 5 pounds live weight in 40 days while the Red Ranger required 57 days to reach the 5-pound live weight. The average daily gain for the broilers was 58.3 grams/bird/day and 39.6 grams/bird/day for the Red Ranger. The growth rate of the Red Ranger was less than 50 grams per day thus qualifying as a slow growth bird. Average daily feed intake was significantly less for the Red Ranger (89 grams/bird/day) than the broilers (111 grams/bird /day). The feed to gain ratio was 1.91 and 2.24 for the broilers and Red Rangers, respectively.

When allowed to self-select their nutrient intake the slower growing birds' intake, as a percent of diet was higher in energy, lower in protein, methionine, calcium and phosphorus compared to the broilers (Table1). Total intake adjusted to 5 pound live body weight is presented in Table 2. Total feed intake as well as energy, protein and methionine intake was higher for the Red

Ranger than the broilers. This was due to the extra days required to reach the targeted weight. The total intake for calcium and phosphorus however, was lower for the Red Ranger.

There are other slow growing genotypes for meat production commercially available. These genotypes display similar growth patterns and feed intake patterns as the Red Ranger. A comparison of the genetic potential of a conventional broiler and a slow growing broiler from the same poultry genetic company indicates that the slow growth birds required 24 and 29 extra days to reach 5 and 6 pounds respectively. At equal weights the slow growing birds had reduce average daily gain, increase feed intake and poorer feed efficiency.

The impact of slow growth genotypes is not only felt at the farm level. Carcass composition is also impacted. Carcass weight without giblets (WOG) is significantly less for the Red Ranger than broilers. WOG yield for broilers was 74 percent compared to a 68 percent yield for the slow growth genotype. Breast meat yield (percent of WOG) was significantly higher for broilers (31.2 percent) than the Red Ranger (20.3 percent). The opposite was true for whole legs with the Red Ranger having higher yield (34.1 percent) compared to the broilers (30.3 percent).

The impacts that slow growth broilers will have on the sustainability and infrastructure of the broiler industry are presented in Table 3 and Table 4. Producing one million pounds of whole carcasses with slow growth genotypes will require 28 percent more feed, as well as 27 percent more feed trucks to deliver feed. At the processing plant water usage will increase by 9 percent and offal disposal will be increased by 36 percent. Producing one million pounds of breast meat is far more challenging than producing whole carcasses. To produce one million pounds of breast meat with slow growth genotypes will require 68 percent more birds and 128 percent more poultry houses due to the extra birds and scheduling. The amount of feed needed will be 97 percent more and will require a similar increase in truck deliveries. Trucks to the processing plant will increase by 68 Percent as will water usage. Offal disposal will increase by 95 percent.

Restaurants and high-end grocery stores are already requesting the use of slow growth genotypes for meat production. Some companies are transitioning to the slow growth broiler. The changing to a slow growing meat type chicken will directly impact the resources needed by the poultry industry and will ultimately have a negative impact on the environment and sustainability.

Table 1: Self-selected Nutrient Intake

	Cornish Cross	Red Ranger	
Avg. Energy Intake (kcal/kg)	2887 ^b	2982 ^a	P<0.0001
Avg. Protein Intake (% of diet)	20.8 ^a	18.3 ^b	P<0.0001
Avg. Methionine Intake (% of diet)	0.32 ^a	0.31 ^b	P<0.0001
Avg. Calcium Intake (% of diet)	0.92 ^a	0.66 ^b	P<0.0001
Avg. Phosphorus Intake (% of diet)	0.47 ^a	0.38 ^b	P<0.0001

Table 2: Total Self-Selected Intake (adjusted to 5 lb live weight)

	Cornish Cross	Red Ranger
Total Feed Intake (kg)	4.34	5.09
Total Energy Intake (kcal)	12,532	12,945
Total Protein Intake (kg)	0.90	0.93
Total Methionine Intake (kg)	0.014	0.016
Total Calcium Intake (kg)	0.040	0.034
Total Phosphorus Intake (kg)	0.020	0.019

Table 3. Resources required to produce one million pounds of whole carcass	Cornish Cross	Red Ranger	
# of birds	271,003	296,296	9% more
Days housed	40	57	45% longer
# of houses (for extra birds)	14	15	7% more
# of houses (for extra birds + scheduling)	14	21	50% more
Amount of feed (lbs.)	2,588,076	3,318,519	28% more
Trucks to deliver feed	62	79	27% more
Trucks to processing plant	33	36	9% more
Water for processing (gallons)	1,355,014	1,481,481	9% more
Offal produced (lbs.)	355,014	481,481	36% more

Table 4. Resources required to produce one million pounds of breast meat	Cornish Cross	Red Ranger	
# of birds	868,598	1,459,588	68% more
Days housed	40	57	45% longer
# of houses (for extra birds)	44	73	66% more
# of houses (for extra birds + scheduling)	44	100	128% more
Amount of feed (lbs.)	8,295,115	16,347,382	97% more
Trucks to deliver feed	198	390	97% more
Trucks to processing plant	104	174	68% more
Water for processing (gallons)	4,342,992	7,297,983	68% more
Legs produced (lbs.)	971,154	1,679,803	73% more
Wings produced (lbs.)	330,128	640,394	94% more
Offal produced (lbs.)	2,041,710	3,977,741	95% more