



Deutscher Tropentag, October 11-13, 2005, Hohenheim

“The Global Food & Product Chain—
Dynamics, Innovations, Conflicts, Strategies”

Genetic Reduction in Feather Coverage Minimizes Performance Losses of Broilers Reared under Hot Temperature

MARIANNA SIEGMUND-SCHULTZE¹, JOEL AGWETANG AJUH¹, ANNE VALLE ZÁRATE¹, Yael AZOULAY², SHELLY DRUYAN², AVIGDOR CAHANER²

¹University of Hohenheim, Animal Breeding and Husbandry in the Tropics and Subtropics, Germany

²The Hebrew University of Jerusalem, Faculty of Agricultural, Food and Environmental Quality Sciences, Israel

Abstract

Broiler production under hot temperatures suffers from the inadequacy of contemporary fast-growing stocks which are bred for high rate of feed intake and metabolism under temperate conditions. Brought to hot temperature regions, they exhibit decreased livability and do not reach their genetic potential for broiler performance. This happens because under high ambient temperatures, dissipation of excessive internal heat — outcome of high metabolic rate — is hindered by the feathers. Therefore it was hypothesised that heat stress can be alleviated by the use of the major genes Naked Neck (Na) and Scaleless (sc) that, respectively, reduce or eliminate feather coverage.

A controlled trial at Rehovot (Israel) included four genetic groups (normally feathered, heterozygous naked-neck, homozygous naked-neck, scaleless), progeny of the same double-heterozygous parents (Na/na Sc+/sc), and a commercial line as industry reference. The 331 birds from all groups were brooded together, and on day 21 each group was separated to two sub-groups. Birds from one sub-group from each group were reared together under normal ambient temperature (constant 25°C), and all the remaining birds were reared together under high ambient temperature (constant 35°C). Live weight and body temperature were recorded repeatedly from hatch to slaughter, at about 50 days, when carcass yields were recorded.

Mortalities throughout the experiment were higher in the commercial and normally-feathered groups than in the reduced-feathered groups. The featherless (scaleless) birds exclusively showed similar live weights at slaughter under the two temperatures, while the commercial line had the highest and earliest depression in weight gains under hot temperature as compared to normal temperature. Breast meat yields of the featherless birds were the highest of all groups under both temperatures. The heterozygous and homozygous naked neck birds had also higher relative meat yields compared to the commercial and the normally-feathered broilers in both temperatures.

The experimental birds carrying the major genes have not been selected yet up to the level of contemporary commercial broiler lines. Further selection for rapid growth within these experimental lines, or the introduction of the major genes into already selected commercial lines, are promising approaches to improve production of broiler meat in hot conditions.

Keywords: Breast meat yield, broiler, featherless, genetically-reduced feathering, hot climates, livability, Na gene, naked-neck, sc gene