TRADITIONAL CHICKEN BREEDS ACTIVELY AVOID HYBRIDIZATION

I. Tiemann[1,2] G. Rehkämper[1]

[1] Research Group of Behaviour and Brain, C. and O. Vogt Institute of Brain Research, Heinrich-Heine University of Duesseldorf, [2] Bruno-Duerigen Institute, Scientific Poultry Yard, Neuss, Germany

The topic of genetic diversity is widely discussed at present. Politicians argue how endangered species can be preserved, and biologists focus their research on phylogenetic relations between species. Despite the public awareness and interest spent on biological diversity the definition of what is diverse and whether diversification is worth preserving is in dispute. In this study, we assess diversity and related behaviours in an animal model, the domestic chicken. At present domestic chickens hold the biological status of a species that consists of morphologically distinguishable varieties, called breeds. This status is justified by the expectation that breeds still cross freely and the resulting offspring are fertile.

We have addressed this question by taking the White Crested Polish as a traditional breed with a long breeding history that can be traced back for more than 1600 years. In the present study White Crested Polish chickens were observed in different ethological experiments to demonstrate whether they are on the way to speciation. Sexually mature White Crested Polish (WCP) females were compared with Red Leghorn (RL) females in the first year of the experiments, and they were compared with Lohmann Selected Leghorn Classic (LSL) females in the second year.

Cocks of the same or of a comparative breed were presented to sexually mature hens in a multiple choice situation. Hens were observed to see if they display a sexual preference. While RL and LSL hens showed no evidence of preference, WCP hens preferred cocks of their own breed when presented together with RL cocks. After behavioural testing, mixed breeding groups were established and fertilization and hatching rates were analyzed. LSL showed a higher fertilization rate after breed-internal copulations as did also WCP. The preference found in the prior behavioural experiment was confirmed by the superior breed-internal fertilization and hatching rate of WCP in comparison to RL.

Our experiments demonstrate breed-specific mate choice among domesticated chickens. Evolution as an adaptive process results in the formation of a species defined as an isolated reproductive unit. Whether such a process takes place under the constraints of domestication is as yet unknown. Our data suggest that speciation as an evolutionary branch occurs even under the constraints of domestication. It could be shown that the process of speciation can be adapted to domestication. This does not require assigning species status to White Crested Polish chickens in the sense of the biological species concept. Domestication as seen here is an evolutionary process that integrates the human interests of animal breeding with innate mate choice preferences of the same animals. Therefore, genetic diversity, especially among domesticated animals, should be promoted as part of biological history and future.

Keywords: biologic diversity, artificial selection, evolution, sexual preference, reproduction

TIEMANN, I. and REHKÄMPER, G. (2009). Impact of Artificial Selection on Female Choice among Domesticated Chickens *Gallus gallus* f.d.. *Poultry Science* 88: 1948-1954.