

Conclusion

The hypothesis that: a mutation in the TSHR gene will affect different traits, central for domestication in chickens could not be accepted nor rejected. For the hypothesis to be accepted the TSHR mutant would have mirrored the White leghorns behavioural response and the TSHR wild type would possibly have followed the behaviour of Red Junglefowl. This was however not confirmed in this study. Not all genotypes were represented (no female TSHR mutants) which made it difficult to give an acceptable analysis of all genotypes on the TSHR locus for both sexes.

This study would benefit from more individuals to be tested to achieve stronger statistical results and further to have all genotypes represented to investigate the affect the TSHR mutation have on the domestication process in chickens and potentially a range of other species.



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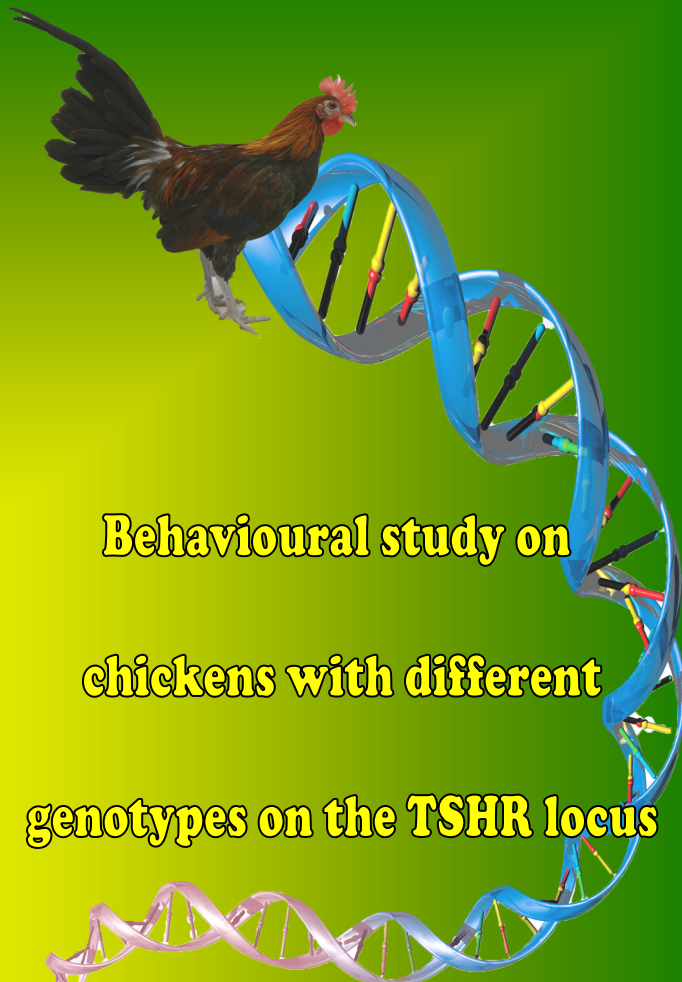
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**Behavioural study on
chickens with different
genotypes on the TSHR locus**



Johanna Axling's Master thesis
International Masters Programme
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Linköpings universitet

The Domestication gene ?



Background. The thyroid stimulating hormone receptor (TSHR) mutation could potentially be involved in regulating the photoperiodic cycle affecting development, growth and behaviour in the domestic chicken, all traits with selective advantages during domestication. Resequencing of the genome in several lines of domestic chicken has revealed a selective sweep over the thyroid stimulating hormone receptor gene (TSHR). A missense mutation in TSHR causing a glycine to arginine change is the most obvious candidate causal mutation for the sweep, since glycine is conserved in all known vertebrate TSHR sequences at this position. Therefore TSHR are suggested to be a domestication locus in chickens, where all individuals of domesticated species carry a mutant allele.

Hypothesis

A mutation in the TSHR gene will affect different behavioural traits which are considered central for domestication in chickens. Four tests will be carried out to measure different aspects of social and fear related behaviours.

Material & Methods

The control group was represented of both White leghorn (WL), a domesticated breed and Red Junglefowl (Rjf), the wild ancestor. The TSHR individuals originated from an advanced intercross line between WL and Rjf, the parental birds were genotyped for their alleles on the TSHR locus and the heterozygotes were chosen for breeding. The TSHR individuals consisted of both homozygotes for both of the alternative alleles (Wildtyp and Mutant) and heterozygotes. All chickens were tested at the age of 10 – 14 weeks in four different tests.

Aerial Predator

Aerial predator tests the chicken's response to a potential predator by recording behaviours expressed before and after exposure to the predator as well as their reaction when the predator was released.

Fear of Human

Fear of human investigates the birds fear response to a human by measuring; the latency until the chicken leaves the startbox, enter human zone and start feeding combined with behaviours expressed during the test.

Tonic Immobility

Tonic Immobility measures the birds passive fear response, the longer the birds stays down the higher level of fear is expressed. The measured variables were latency until first head movement and latency until the bird got up on its feet and rightened itself

Social Hierarchy

Social Hierarchy estimates the dominance between the two individuals. Two birds of the same sex were put together and the first who got access to a limited resource (water) was determined to be the most dominant, combined with observation of antagonistic behaviours.

Results

White Leghorn (WL) expressed more active fear response and dominance compared to Red Junglefowl (Rjf), which was shown in the aerial predator, fear of human and social hierarchy tests. Red Junglefowl expressed more passive fear response which was shown in the tonic immobility test. The TSHR heterozygote females feed significantly more in feed from hand in Fear of Human than the TSHR wildtype female.