

Doctoral Thesis

Studies on the Regulation of Agonistic Behavior in
Chickens

(Summary)

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Summary

Agonistic behavior is a type of social behavior which is commonly observed in almost all animal species. Agonistic behavior is supposed to be an influential element in group communication, with the intention of self-protection or access to resources that are in limited supply like feed, mates, and territory. However, excessive aggression results in injury and stress which ultimately decrease production and increase mortality in the poultry farms. Agonistic behavior of chickens is not only economic concern, but is also very important issue for animal welfare. Successful management for better production and welfare requires knowledge of chicken agonistic behavior. It is of great importance to understand the mechanisms of chicken agonistic behavior and find a way to control excessive aggression of chickens in the poultry industry. This doctor dissertation, therefore, is about the research of the regulation of agonistic behavior of chickens.

1. Screening of the behavioral test for monitoring agonistic behavior of layer chicks

Chicken agonistic behavior is one of the serious problems in the poultry industry. No effective measures, however, have been taken because there are no effective behavioral models for investigating the mechanisms of chicken agonistic behavior. The purpose of the present study was, therefore, to select the behavioral tests available for monitoring chicken agonistic behavior. Two behavioral tests, resident-intruder (R-I) and social interaction (SI) test, were performed for 10 minutes to 10 pairs of male layer chicks at 8, 12, 18, 20, and 24 days of age, and total agonistic frequencies (TAF) and latency were measured. The significant differences of TAF and latency between aggressors and opponents in both behavioral tests. In the R-I test, the TAF of aggressors significantly increased from 8 to 20 days of age, and latency of those significantly decreased from 8 to 24 days of age. In the SI test, however, the TAF of aggressors significantly increased and latency of those significantly decreased only from 16 to 20 days of age. When the criterion of aggressive behavior was

defined as the TAF, where aggressors showed more than 30 times and the opponents did less than one-third TAF of aggressors, the aggression rate was higher in the R-I test than in the SI test. These results suggest that the R-I test, rather than the SI test, is an effective tool for monitoring agonistic behavior of layer chicks

2. Agonistic behavior of male and female Japanese large game (Oh-Shamo) chicks monitored by the R-I test

In this chapter, the purpose of the study was to compare agonistic behavior of male and female Oh-Shamo chicks by the R-I test. The R-I test was performed for 10 minutes to 15 pairs of male and 9 pairs of female Oh-Shamo chicks at 8, 12, 16, 20, and 24 days of age, and the TAF and latency were measured. These results suggest that the R-I test is also an effective tool for monitoring agonistic behavior of Oh-Shamo chicks, and initiation of agonistic behavior was different between males and females.

3. Localization of aggression-induced c-Fos immunoreactivities in the brain of male layer chicks

In this chapter, the aim of the research was to examine the localization of aggression-induced c-Fos immunoreactivity in the brain of male aggressor chicks following the R-I test. The TAF was significantly higher and latency was significantly lower in the aggressors compared to the opponents. Aggression-induced c-Fos immunoreactivities were mainly observed in the hypothalamus and limbic system of the chick brain. These results suggest that the localization of aggression-induced c-Fos immunoreactivities in chick brain corresponded approximately to the brain area in which the immunoreactivities had been previously reported on rodents.

CONCLUSION

These findings suggest that the R-I test, as compared to the SI test, is more effective tool for monitoring agonistic behavior of male chicks. It also suggests that the R-I test can be used to monitor female chickens' agonistic behavior. Moreover, it suggests that the localization of aggression-induced c-Fos immunoreactivities in chick brain, except in the VMH and ARC, corresponded approximately to the brain area in which the immunoreactivities had been previously reported on rodents.