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Effects of Beak Trimming on Behavior and Agonistic Activity of Thai Native Pullets Raised in Floor Pens

Pongchan Na-Lampang

***Abstract*—**The effect of beak trimming on behavior of two strains of Thai native pullets kept in floor pens was studied. Six general activities (standing, crouching, moving, comforting, roosting, and nesting), 6 beak related activities (preening, feeding, drinking, pecking at inedible object, feather pecking, and litter pecking), and 4 agonistic activities (head pecking, threatening, avoiding, and fighting) were measured twice a for 15 consecutive days, started when the pullets were 19 wk old. It was found that beak trimmed pullets drank more frequent (P<.01) but fed less frequent (P<.05) and show lower number of avoiding acts (P<.01) than intact pullets. Beak trimmed pullets showed all kind of agonistic activities less (P<.05). Genetic effect was found significant (P<.01) for drinking, nesting, and agonistic activities. Genetic by beak trimming interaction was found only for avoiding behavior (P<.01).

***Keywords*—**Agonistic Behavior, Beak Trimming, Behavior, Thai Native Pullet

I. Introduction

TRADITIONALLY, Thai native chickens are raised in the free-range system. The meat of Thai native chicken has become very popular among Thai consumers because of its unique taste and texture which regarded as a great delicacy. This leads to a growing domestic market for Thai native chicken [1] [2]. Due to this market trend, the raising system of Thai native chickens is moving toward intensive industry scale. In this production practice, beak trimming is used to reduce feather pecking, aggression and, cannibalism among chickens in the breeding flock which are raised in a non-cage system. Although beak trimming helps to control cannibalism, but the procedure gives rise to welfare concerns due to its potential to cause short and/or long term pain and loss of function. [3] [4]. An extensive review on effects of beak trimming on behavior and welfare of chicken has been published by [5]. Since Thai native chickens derived from those raised extensively and have higher aggressiveness than commercial breeds [6], it is suspected that when they are raised in intensive system their welfare would be compromised. However, there is no information on the effect of beak trimming on behavior of Thai native chicken available at the present. Thus, the objective of this study was to investigate the effect of beak trimming on general and beak related behavior, as well as aggressive behavior of Thai native pullets kept in floor pens.

P. Na-Lampang is with the School of Animal Production Technology, Suranaree University of Technolgy, Nakhon Ratchasima, 30000 Thailand (phone: +66 44 224370; fax: +66 44 22 4370; e-mail: pongchan@ sut.ac.th).

II. Materials and Methods

Two hundred and forty Thai native pullets were utilized in the study. The experimental design was Completely Randomized Design consisted of 2 treatments, i.e. intact and trimmed beak, and 2 genetic stocks, i.e.

Strains I and Stain II in a factorial arrangement of treatments. There were 4 replicates per treatment.

Beak trimming was done when the chicks were 4 wk old with an electric hot-bladed beak trimmer.

At 18 wk old, 20 pullets were housed in each of 12 floor pens (150 x 240 cm) designed for breeding flock. An automatic waterer and a tube-type feeder were placed in each pen. Feed and water were provided ad lib. The photoperiod was 15 hr (0600 – 2100).

Behavioral data were collected for 15 consecutive days starting from the second week of housing. A randomly chosen sample of 6 pullets per pen was colored-marked to aid identification. General and beak related activities of these pullets were directly observed by using scan sampling technique of sampling rule and recorded by instantaneous sampling technique [7]. Each pen was observed 2 5-min sessions per day. Each session was divided up into 5 1-min intervals. The general activities recorded were: 1) standing: standing in an erect position and not in the act of other activities; 2) crouching: sitting down with breast touching floor and not in the act of other activities; 3) moving: moving about but not engaged in any specific activities; 4) comforting: stretching wings or legs, ruffling feather, and other similar movements; 5) roosting: standing or crouching on perches; and 6) nesting: standing or crouching in a nest box. The beak related activities recorded were: 1) preening: rearrangement of the feathers or scratching of the skin by beak or foot; 2) feeding: eating or pecking at feed; 3) drinking: drinking movement at the waterer; 4) pecking inedible object except feather; 5) feather pecking: pecking or preening like acts directed to another's feathers; and 6) litter pecking: pecking at litter.

The percentage of each of the general and beak related activities were computed from the accumulative total of the 15-day observation. The percentage values were subjected to arcsine-square root transformation prior to analysis.

The agonistic activities recorded were: 1) head pecking; 2) threatening; 3) avoiding; and 4) fighting. Frequencies of these agonistic activities were measured on the basis of pen totals by using behavior sampling technique and recorded by continuous recording technique as described by [7]. Each pen was observed for 5 min right after the general and beak related activities observation described above, 2 sessions per day for 15 consecutive days.

The data were analyzed with the PROC GLM procedure of the Statistical Analysis System [8].

III. Results and Discussion

A. General and Beak Related Activities

The study shows that the major of activities of the pullets were roosting, standing, feeding, litter pecking, and preening (Table 1). Intact pullets spent the highest time, almost one third of the time, in roosting activity, while beak trimmed pullets spent the highest time, about one fifth of the time, in standing activity.

Beak trimming did not significantly affect general activities, i.e. standing, crouching, moving, comforting, roosting, and nesting (Table 1). For beak related activities, beak trimming effect was found to be significant only for feeding and drinking activities only. Beak trimmed pullets fed less often ($P<0.05$) but drank more often ($P<0.01$) than intact pullets.

Many studies show that pain from beak trimming caused decrease in activities of chicken such as feeding, drinking, environmental pecking and preening [9][10][11][12] right after the operation. In addition, time spent inactive standing and crouching increase were increase. However, these differences disappeared by 1 week post-trim. The result found in this study is in agreement with the mentioned studies to some extent. However, the persistence beak trimming effect on feeding reduction found in this study may have adverse effects on performance of the chicken.

TABLE I
Effects Of Beak Trimming On Time Budgeting Of Behavior Of Thai Native Pullets

Behavior	Intact	Beak Trimmed	Difference
General Activity			
Standing	10.25	20.33	-10.08
Crouching	0.83	2.75	-1.92
Moving	4.67	6.92	-2.25
Comforting	0.25	0.58	-0.33
Roosting	30.67	17.91	12.76
Nesting	4.92	3.33	1.56
Beak Related Activity			
Preening	10.33	11.92	-1.59
Feeding	19.08	12.25	6.83*
Drinking	1.33	2.75	-1.42**
Pecking at inedible object	0.50	0.83	-0.33
Feather pecking	1.42	3.00	-1.58
Litter pecking	15.75	17.42	-1.67

* $P<0.05$
** $P<0.01$

Genetic stock did not significantly affect general activities, except nesting activity where strain I pullets spent much more time in the nest than strain II pullets ($P<0.01$) (Table 2). For beak related activities, genetic stock effect was found to be significant ($P<0.01$) only for drinking activity only. Strain I pullets drank less often than strain II pullets.

TABLE II
Effects Of Genetic Stock On Time Budgeting Of Behavior Of Thai Native Pullets

Behavior	Strain I	Strain	Difference
General Activity			
Standing	11.92	18.67	-6.75
Crouching	2.58	1.00	1.58
Moving	5.50	6.08	-0.58
Comforting	0.50	0.33	0.17
Roosting	26.08	22.50	3.58
Nesting	7.83	0.42	7.41**
Beak Related Activity			
Preening	10.00	12.25	-2.25
Feeding	14.92	16.42	-1.50
Drinking	1.33	2.75	-1.42**
Pecking at inedible object	0.67	0.67	0.00
Feather pecking	2.08	2.33	-0.25
Litter pecking	16.58	16.58	-0.00

** $P<0.01$

B. Agonistic Activities

Beak trimmed pullets had significantly lower agonistic behavior than intact pullets ($P<0.01$) (Table 3). They showed less pecking, threatening, and avoiding activities than intact pullets. Fighting activity was very low in both intact pullets and beak trimmed pullets and the difference between the two treatments was not significant.

TABLE III
Effects Of Beak Trimming On Frequency Of Agonistic Activity Of Thai Native Pullets

Behavior	Intact	Beak Trimmed	Difference
Pecking	14.00	7.50	6.50**
Threatening	17.75	9.00	8.75**
Avoiding	11.50	2.75	8.75**
Fighting	0.00	0.25	-0.25

** $P<0.01$

The 2 genetic stocks significantly differed in agonistic behavior ($P<0.01$) (Table 4). Strain I pullets showed more pecking, threatening, and avoiding activities than strain II pullets. The fighting activity within each strain was very low and there was non-significant between the 2 strains. The finding is agree with other research literature provides strong evidence of possible genetic differences among strains of laying chickens resulting in feather pecking, cannibalistic behavior [13].

TABLE IV
Effects Genetic Stock On Frequency Of Agonistic Activity Of Thai Native Pullets

Behavior	Strain I	Strain II	Difference
Pecking	13.75	7.75	6.00**
Threatening	18.00	8.75	9.25**
Avoiding	9.50	4.75	4.75**
Fighting	0.00	0.25	-0.25

** $P<0.01$

Genetic by beak trimming interaction was found for avoiding activity (P<0.01). Beak trimming effect was significant within Strain I stock but not within Strain II stock (Table 5). Intact strain I pullets showed more avoiding activity than beak trimmed pullets (P<0.01).

TABLE V
GENETIC BY BEAK TRIMMING INTERACTION FOR AVOIDING ACTIVITY OF THAI NATIVE CHICKENS

Behavior	Intact	Beak Trimmed	Difference
Strain I	17.00	2.00	5.00**
Strain II	6.00	3.50	2.50

** P<0.01

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