



Consequences of Bill Trimming on Behavior, Welfare and Performance of Muscovy ducks

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ABSTRACT

Muscovy ducks reared commercially are often bill trimmed to prevent feather pecking and cannibalism. Bill trimming has been criticized because of its potential to cause acute and chronic pain, but little is known about the beneficial effects of bill trimming on welfare of ducks. The aim of this study is to realize the effects of three different methods of bill trimming (cutting by scissor, hot blade and hot searing) on bill related behavior, body weight and welfare of Muscovy ducks. A total of 48 (sixteen days of age) Muscovy ducks were allotted equally to four equal groups. The first was a control (C) group without bill trimming, the second; scissor (S) bill trimmed by scissor, the third; hot blade (HB) bill trimmed by hot blade and hot searing (HS) bill trimmed by touch cautery blade for few second. Bill related behavior of ducks was recorded by video camera for six weeks post-trim using scan sampling. Ducks were weighed weekly. At the end of experiment (9 week old) blood samples were collected for Heterophil /lymphocyte ratio and level of corticosterone hormone. The different methods of bill trimming had non-significant effects on ingestive behavior, while trimming by scissor and hot blade significantly reduce aggressive pecking than control group. Body weight of hot blade trimming group was significantly lower than the other three groups. Bill trimming by scissor, hot blade, or hot searing didn't influence neither blood corticosterone level nor heterophil lymphocyte ratio.

Key words:

Muscovy ducks,
Bill trimming,
Behavior, Welfare.

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1. INTRODUCTION

Cannibalism and feather pecking are serious behavioral problems that affect the welfare of duck. Muscovy duck (*Cairina moschata*) is prone to feather pecking and cannibalism. Outbreaks of cannibalism in Muscovy ducks have been reported to occur as early as thirteen days of age and seemed to be related to appearance of the first feathers (Knierim et al. 2005). Muscovy ducks have less affiliation to open waters and show cannibalistic behavior more often under commercial conditions (Rodenburg et al. 2005). Therefore, Muscovy duck producers usually

trimmed bills and claws of their birds within the first three weeks of age. Feather pecking and cannibalism are damaging behavior, painful and in sever case may cause death of birds leading to economic losses (Hester and Shea-Moore 2003). Bill trimming of ducks is the best method used to decrease the damage caused to plumage and skin by cannibalistic behavior. Ducks are trimmed using a variety of methods, including cold-cutting with scissors (Gustafson et al., 2007a), hot-blade cutting with cautery, or tip-searing which involves holding the end of bill against a cautery, blade for 2 to 3 seconds. The method of trim, amount of bill removed, and age at which trimming is conducted

vary throughout duck industry. Bill-trimming is controversial because of its potential to cause acute and chronic pain and show significant effect on bill-related behaviors lead to increase time performing passive behaviors, such as resting and standing, than untrimmed pullets (Cunningham et al., 1992). They also show more guarding behaviors, such as tucking bill under wing, which indicate possibility of pain (Gentle et al., 1997). Also, bill-trimming has persistent effect on feeding which affect body weight and Productive performance (Laganá et al. (2011).

The purpose of the present study was to evaluate the effects of three different methods which are trimming by scissor, hot blade and hot searing on behavior, body weight and welfare of Muscovy ducks.

2. MATERIALS AND METHODS

2.1. Birds

A total of forty eight Muscovy ducklings (sixteen days old) were randomly selected from Research center, Faculty of Agriculture Alexandria University. They were reared at poultry house of Animal Husbandry and Animal Wealth Development Department, Faculty of Veterinary Medicine, Alexandria University. Birds were allotted into four equal groups (n=12) of mixed sex. CONTROL (C) group without bill trimming, SCISSOR (S) bill trimmed by scissor, HOT BLADE (HB) bill trimmed by hot blade and HOT SEARING (HS) bill trimmed by touch cautery blade for few second.

1.2. Housing

Birds were allocated into four pens (each one 2.4×1.8 m). Stocking density was four birds / m². Bedding materials was a thick layer of sand and covered by a layer of chaffed wheat straw. The litter was uniformly distributed with depth of 5-7 cm and a new layer of straw added twice/ week to avoid wet litter. Under the waterer a thin layer of sand with a depth of 3 cm was sited. Birds were housed in a clean and well-ventilated house. Day to day management was carried out for keeping facilities clean. Commercial pelleted ration for broilers was used (21 % crude protein). Feed and water was offered to birds in round plastic feeder and two 8 litter waterer. All birds were apparently healthy and were vaccinated against Avian Influenza with a 0.5 ml subcutaneous at the 9th day of age.

2.3. Behavioral observation

Scanning behavioral observations system was applied for behavioral pattern from 3rd week till 9th week of age with infrared digital cameras according to Mahrous (1993). Day / Night period (24hrs.) was divided into four periods (6hr/period). Number of birds performing a particular behavioral pattern was determined into a check sheet for each behavioral pattern then data were expressed as percentages (number of individual birds performing behavior). Behaviors observed are Bill related behaviors (Feeding, Drinking, Preening, Floor pecking, Wall pecking and Aggressive pecking)

2.4. Productive performance:

Live body weight

Ducks were identified by leg band and weighted individually every week from 3rd to 9th week of age.

2.5. Biochemical Parameters

At the end of experiment (9 week old) two blood samples were collected from 6 birds / group that were randomly selected via vein puncture. One blood sample was smeared on glass slide for heterophil and lymphocyte count after staining by Giemsa stain. Another blood sample was collected in non-heparinized tube and left for 30 minutes till blood clotting then centrifuged at 3000 rpm for 10 minute to separate serum and preserved under -20°C for analysis of corticosterone hormone based on the principle of photometric detection using a commercial Corticosterone Enzyme Immunoassay Kit

2.6. Statistical analysis

Data were analyzed using by SAS (2004) software package, Proc ANOVA one way analysis of variance.

3. RESULTS AND DISCUSSION

3.1. Bill related behaviors:

Presented results of Table I revealed absence of significant differences between non trimmed group feeding and drinking behavior (3.94 & 6.11 %) and trimmed group by S, (4.20 & 5.98%), HB (3.79 & 17.60%) and HS (3.33 & 5.6%). These results agreed with findings of Sandilands and Savory (2002) & Gentle and McKeegan (2007) who found non-significant effect of bill trimming on ingestive behavior immediately after bill trimming and even after 6 weeks. On the other hand Araújo (1997) reported that bill trimming significantly reduced feeding time and frequency and drinking frequency than non-trimmed bird. While Gustafson et al. (2007a), Gustafson et al. (2007b) concluded that bill trimming by hot blade, scissor and hot searing significantly reduced ingestive behavior at the first week post trim while this difference

disappeared one week post trim. Floor Peking behavior was non-significantly affected by different methods of bill trimming.

Meanwhile, wall pecking behavior was significantly reduced under HS (0.24%) compared to C and S groups (0.81 & 0.69 %). On the other hand, aggressive behavior was significantly decreased after trimming by S & HB methods (0.92 & 0.78 %) compared to the control group (1.44%). These results supported by those of Lambton et al. (2013), Nicol et al. (2013) who found significantly higher aggressive pecking and exploratory behavior of non-trimmed birds than trimmed ones. They showed less pecking, threatening, and avoiding activities than intact birds. Fighting activity was very low in both intact pullets and beak trimmed birds.

3.2. Body weight:

At the end of experiment (9 weeks old), final body weight of HB group had significant lower

body weight (3.37 ± 0.23 kg) than C, S & HS groups (4.36 ± 0.3 , 4.28 ± 0.28 & 4.10 ± 0.29 kg). These results agreed with Meneeh and Fouda (1992), Laganá et al. (2011) & Na-Lampang (2012) who found that beak trimmed bird by hot blade had significant decreased body weight. In contrast to Guesdon et al (2006) who found that hot blade method enhance body weight.

3.3. Biochemical Parameters:

Table (II) showed that serum corticosterone level was higher in HB & S (5.14 & 6.38 ng. / ml) than control group (4.26 ng/ ml), while HS group (3.90 ng/ ml) was lower than control birds, these results agreed with El-Kazaz (2015) who found that blood corticosterone level increased in hot blade trimming than non-trimmed group.

TABLE I: Effects of Different Methods of Bill Trimming (Scissor, Hot Blade & Hot Searing) on Bill Related Behaviors (%) of Muscovy Ducks.

Items	Feeding	Drinking	Floor pecking	Wall pecking	Aggressive pecking
C	3.94 ± 0.53	6.11 ± 0.66	3.29 ± 0.51	$0.81^a \pm 0.20$	$1.44^a \pm 0.20$
S	4.20 ± 0.49	5.98 ± 0.56	3.29 ± 0.51	$0.69^a \pm 0.18$	$0.92^b \pm 0.20$
HB	3.79 ± 0.51	7.60 ± 0.92	2.47 ± 0.45	$0.42^{ab} \pm 0.11$	$0.78^b \pm 0.12$
HS	3.33 ± 0.44	5.6 ± 0.73	3.29 ± 0.53	$0.24^b \pm 0.10$	$1.14^{ab} \pm 0.19$
C= Control S=Scissor HB=Hot Blade HS=Hot Searing					

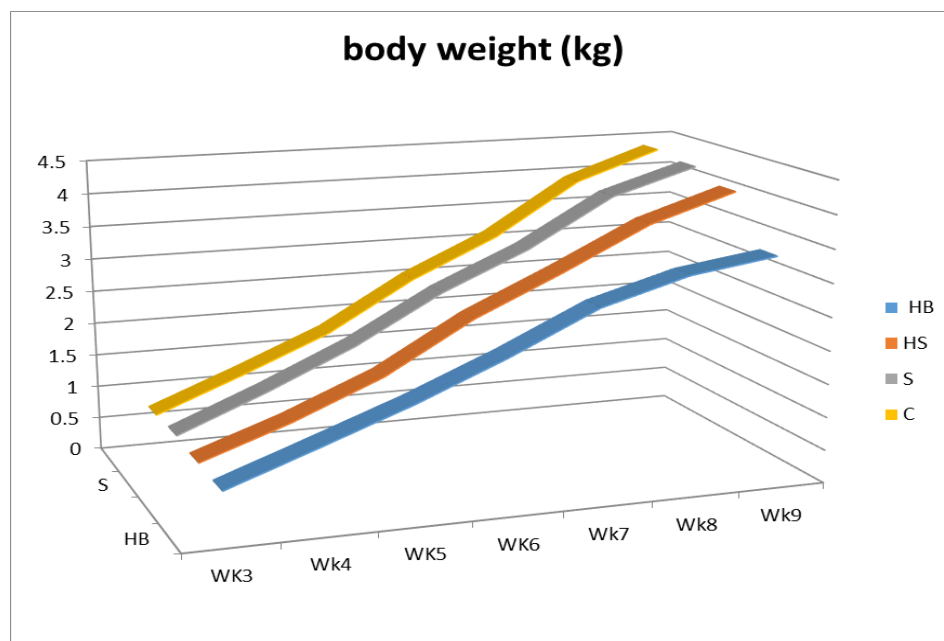


Figure I : Effects of different methods of Bill trimming (Control (C), Scissor (S), Hot Blade (HB) & Hot Searing (HS)) on body weight (Kg.) of Muscovy Ducks.

TABLE II. Effects of different methods of bill trimming (scissor, hot blade & hot searing) on serum corticosterone level of Muscovy ducks.

Treatments	Serum corticosterone level (ng./ml)
	$\bar{X} \pm SE$
Control	4.26 \pm 2.77
Scissor	6.38 \pm 1.87
Hot blade	5.14 \pm 2.50
Hot searing	3.90 \pm 1.16

TABLE III: Effects of different methods of bill trimming (scissor, hot blade & hot searing) on heterophil / lymphocyte ratio of Muscovy ducks.

Treatments	Heterophil	Lymphocytes	H/L
		$\bar{X} \pm SE$	
Control	47.83 \pm 7.12	40.50 \pm 6.64	1.51 \pm 0.43
Scissor	45.00 \pm 5.2	42.67 \pm 5.96	1.25 \pm 0.28
Hot blade	45.33 \pm 5.02	42.17 \pm 5.28	1.24 \pm 0.27
Hot searing	33.50 \pm 4.44	55.83 \pm 5.38	0.68 \pm 0.18

Table (III) revealed non significant differences among different methods of bill trimming S, HB and HS (1.25, 1.24 & 0.69) than control group (1.51), as control group birds were handled similar to birds exposed to beak trimming (Voslarova et al. 2013). These results agreed with Dennis et al. (2009) who found non-significant differences between hot blade trimming and control birds. Contrary, El-Kazaz (2015) mention that H/L ratio was significantly higher in beak trimmed bird than control.

CONCLUSION and RECOMMENDATIONS

Bill trimming by scissor efficiently reduced aggressive pecking behavior without affecting welfare and body weight. Meanwhile, trimming by hot blade efficiently reduced aggressive pecking without affecting welfare but significantly reduced body weight.

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