The Effect of Beak Trimming on Two Strains of Commercial Tom Turkeys. 2. Behavior Traits

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ABSTRACT The influence of beak trimming of two strains of commercial male turkeys (Strains A and B) on behavior during the growing period was investigated. Poults were either left with beaks intact or arc beak trimmed at hatching. Strain by beak treatment interactions were generally lacking, indicating that these two strains responded similarly. Beak trimming did not influence tameness (as measured by response to a novel object at 16 wk), fearfulness (as measured by tonic immobility response at 18 wk), or resting behavior from 3 to 15 wk of age. When compared to birds with intact beaks, birds with trimmed beaks spent more time standing during the week of hatching and were observed eating more often at 2 wk of age. Strain B birds were more tame, less fearful, and rested more at 8 and 11 wk of age than Strain A birds. Results of the current study indicate that the influence of arc beak trimming at hatching on behavior of male turkeys is transitory. Arc beak trimming of male turkeys at hatching did not appear to have a lasting negative impact on their well-being.

(Key words: beak trimming, behavior, male turkey, genetic strains, well-being)

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INTRODUCTION

The practice of beak trimming chickens has received considerable attention (see reviews by Gentle, 1986 and Cunningham, 1992). Beak trimming of turkeys has not been as intensively studied and there has been little attention paid to the effect of beak trimming on behavior.

Beak trimming of male turkeys increased "nonagonistic feather pecks", but otherwise did not affect agonistic behavior (Denbow et al., 1984). Feed intake was greater for beak-trimmed male turkeys than for male turkeys with intact beaks from 12 to 18 wk. Beak trimming of female turkeys increased the frequency of feather pecking and reduced feed intake from 8 to 16 wk of age (Leighton et al., 1985).

Cunningham et al. (1992) found that beak trimming of female turkeys reduced eating behavior through 2 wk of age and drinking behavior through 1 wk of age. Ingestive behaviors of males during the same period were not affected. Sleeping, huddling, and resting were generally increased during brooding by beak trimming. Beak trimming reduced agonistic acts in males from 3 to 18 wk, but did not influence agonistic acts in females.

The aforementioned studies used a single strain of turkeys. Studies with laying chickens (Craig and Lee, 1989, 1990) indicate that strains may respond differently to beak trimming. Information on potential strain differences in response to beak trimming of turkeys, however, is generally lacking.

In a previous study (Noble et al., 1994), the effect of beak trimming of two strains of toms turkeys on growth, feed intake, feed conversion, livability, and beak-induced injuries was examined. The present study examined the effect of arc beak trimming on behavior and well-being of the turkeys utilized by Noble et al. (1994).

MATERIALS AND METHODS

Animals and Husbandry

Male poults from Strains A and B were obtained from a commercial hatchery. Poults from the two strains were either arc trimmed 1.5 mm from the nostril (Renner et al., 1989) at the hatchery by the same individual or left with beaks intact. Poults were wing-banded upon arrival and assigned to pens. Sixteen pens containing 35 poults per pen were utilized; thus, there were four replicates of each strain and beak treatment combination. A declining-protein, five-ration feeding program (Naber and Touchburn, 1970) was provided for ad libitum consumption. Feed was provided in crumble form from hatching to 8 wk of age and in pellet form thereafter. Birds were restricted

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to half of the pen from hatching to 8 wk of age. This allowed for stable social hierarchies to be formed within pens and still allowed for increasing space requirements. Floor space allowances were 1,340 cm² per bird from hatching to 8 wk of age and 2,690 cm² per bird from 8 to 18 wk of age. Additional details of husbandry and management were provided by Noble et al. (1994).

To habituate the birds to the presence and appearance of an observer, caretakers wore a uniform consisting of a white laboratory coat and black rubber boots each time the room was entered. Care of the birds during the week was performed by the principal investigator. Weekend care was performed by employees wearing the same uniform as the principal investigator.

Behavior Observations

The number of poults in a pen eating (manipulating feed with their beaks), drinking, standing, or resting (body in contact with the litter) was recorded twice per pen at 0900, 1200, 1500, and 1800 h when the birds were 0, 1, 2, and 3 wk of age. A set of four video cameras were used to record activity of birds at 3, 4, 5, 6, 7, 8, 11, and 15 wk of age. A camera was placed in front of each pen of a replicate prior to beginning recording. A switch was utilized that allowed the different pens to be recorded without moving the cameras. Entry into the poultry house was only that required to switch the recorder from camera to camera. Even so, a 5-min period was allowed after switching cameras and beginning of observations. Each pen was recorded for two 30-min periods each week between 0900 and 1300 h. The quality of the recorded images was relatively poor (e.g., it was difficult to determine whether birds standing at the feeder were manipulating feed or not) due to the low level of lighting utilized. Thus, birds were classified as either resting or active (eating, drinking, walking, or standing) at 5-min intervals.

Tameness was assessed by use of a brightly-colored novel object (Jones, 1987) at 16 wk of age. A 20-cm rod with alternating stripes of orange, white, blue, and yellow, which stood from a 20 × 20 cm base, served as the novel object. The rod was not visible to the birds for 3 min. After 3 min, the novel object was presented. Scoring was a modification of the method described by Komai and Guhl (1960) in which the numbers of birds in a pen pecking, approaching, or fleeing the object at 1, 2, 3, and 4 min after presentation were recorded. For the aforementioned behaviors, the order of replicates observed and the order of pens observed within each replicate was assigned at random.

Tonic immobility (TI) was used to assess fearfulness of the birds at 18 wk of age. Four birds per pen were randomly selected. The procedure used was a modification of the method of Benoff and Siegel (1976). Each sampled bird was placed on its left side on a bag of wood shavings and restrained for 15 s by holding its feet in one hand while restraining the right wing with the other hand. The number of inductions required to achieve TI (up to three) and duration of TI (up to 60 s) were recorded. Birds that failed to achieve TI after three attempts were recorded as having three inductions with a duration of 0 s.

Statistical Analyses

Percentages were transformed to arcsine square roots prior to analysis and converted to the original scale for presentation. Durations (seconds plus one) were transformed to common logarithms prior to analysis and transformed to the original scale for presentation. Data were analyzed within each age (where appropriate) by analysis of variance with strain, beak treatment, and the interaction between them as sources of variation. When the interaction was significant, the four strain-beak treatment means were separated as described by Snedecor (1956). The proportion of birds that achieved TI was analyzed by chi square. Unless otherwise stated, significance was accepted at P ≤ 0.05.

RESULTS

Hatching to Three Weeks

The percentage of poults eating, drinking, standing, or resting are presented in Table 1. Resting tended to decrease from hatching to 3 wk of age, whereas standing increased during the same period. Eating and drinking percentages remained fairly constant from hatching to 3 wk of age. Strain by beak treatment interactions were not significant for any observed behavior at any age. A greater percentage of birds with trimmed beaks than birds with intact beaks were observed eating at 2 wk of age. This is the age at which the tip of the upper beak falls off of most birds following arc trimming, although some tips may drop off at a younger age. The percentage of birds standing was increased in beak-trimmed birds during the week of hatching. Strains did not differ in behavior from hatching to 3 wk of age.

Three to Fifteen Weeks

The percentage of birds active from 3 to 15 wk of age is presented in Table 2. The strain by beak treatment interaction influenced activity at 4 wk of age. Strain B birds with intact beaks rested less (46.8%) than Strain B birds with trimmed beaks (70.1%) or than Strain A birds with intact (72.7%) or trimmed (65.9%) beaks. Strain B birds were less active than Strain A birds at 8 and 11 wk of age. Beak treatment did not affect activity at 3, 5, 6, 7, 8, 11, or 15 wk of age.

Tameness

Strain B birds appeared to be more tame, as more Strain B birds approached the novel object (10.1%) than did Strain A birds (6.1%). Beak treatment effects and the strain by beak treatment interaction were not significant for approach to the novel object. No birds were observed pecking the novel object, and so few birds were observed fleeing the object that statistical analyses were precluded for these responses.
behavior. The effect of beak trimming on eating behavior was generally lacking. The observed increase in eating behavior of beak-trimmed poults at 2 wk of age may have been in response to an inability to grasp feed crumbles, as this is the age at which most beak tips fall off. Craig et al. (1992) found that layer pullets that were beak trimmed at either 9 d or at 9 d and at 9 wk could consume mash at least as quickly as pullets with intact beaks. The feed intake of birds in the current study (as reported by Noble et al., 1992) generally did not differ between intact and beak-trimmed male turkeys. Exceptions to this trend were at 13 wk, when birds with intact beaks consumed more feed and at 17 wk, when the reverse was true.

Cunningham et al. (1992) observed that male turkeys with trimmed beaks rested more than males with intact beaks from 1 to 6 wk of age, but did not differ at other ages. In their study, Cunningham et al. (1992) hypothesized that the increase in sleeping, resting, and huddling

### Fearfulness
Neither strains, beak treatments, nor the strain by beak treatment interaction affected the number of inductions required to achieve TI. Neither beak treatment nor the strain by beak treatment interaction affected duration of TI. Strain A birds had a longer duration of TI (16.3 s) than did Strain B birds (3.7 s), indicating that Strain A was more fearful than Strain B. This result was confirmed by the fact that a greater proportion of Strain A birds were susceptible to TI than were Strain B (78.1 vs 41.9%).

### DISCUSSION
The results of the current study generally confirm those of Cunningham et al. (1992) with male turkeys, who found no influence of beak trimming on ingestive behavior. The effect of beak trimming on eating behavior was generally lacking. The observed increase in eating behavior of beak-trimmed poults at 2 wk of age may have been in response to an inability to grasp feed crumbles, as this is the age at which most beak tips fall off. Craig et al. (1992) found that layer pullets that were beak trimmed at either 9 d or at 9 d and at 9 wk could consume mash at least as quickly as pullets with intact beaks. The feed intake of birds in the current study (as reported by Noble et al., 1994) generally did not differ between intact and beak-trimmed male turkeys. Exceptions to this trend were at 13 wk, when birds with intact beaks consumed more feed and at 17 wk, when the reverse was true.

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### TABLE 1. Percentage\(^1\) of turkeys observed eating, drinking, standing, or resting from 0 to 3 wk of age by strain (S) and beak treatment (BT)

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Age (wk)</th>
<th>S</th>
<th>A</th>
<th>B</th>
<th>Intact</th>
<th>Trimmerd</th>
<th>Analysis of variance</th>
<th>Probability</th>
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<tbody>
<tr>
<td>Eating</td>
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<td>13.4</td>
<td>12.0</td>
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<td>NS</td>
<td>NS</td>
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<td></td>
<td>1</td>
<td>9.1</td>
<td>8.9</td>
<td>10.0</td>
<td>8.0</td>
<td>NS</td>
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<td>NS</td>
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<tr>
<td></td>
<td>2</td>
<td>6.7</td>
<td>6.1</td>
<td>2.7</td>
<td>10.6</td>
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<td>NS</td>
<td>NS</td>
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<td></td>
<td>3</td>
<td>5.9</td>
<td>6.6</td>
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<td>4.8</td>
<td>5.9</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
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<tr>
<td></td>
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<td>4.3</td>
<td>4.7</td>
<td>5.0</td>
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<td>NS</td>
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<td></td>
<td>2</td>
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<td>1.3</td>
<td>1.3</td>
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<td>3</td>
<td>1.1</td>
<td>2.4</td>
<td>1.8</td>
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<td>Standing</td>
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<td>14.3</td>
<td>11.4</td>
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<td>Resting</td>
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<td>65.2</td>
<td>70.4</td>
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<td>60.0</td>
<td>52.1</td>
<td>68.2</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
</tbody>
</table>

\(^1\)Percentages were transformed to arc sine square roots prior to analysis and converted to the original scale for presentation.

\(*P < 0.05.\)

\(**P < 0.01.\)

### TABLE 2. Percentage\(^1\) of turkeys observed active from 3 to 15 wk of age by strain (S) and beak treatment (BT)

<table>
<thead>
<tr>
<th>Treatment group</th>
<th>3 wk</th>
<th>4 wk</th>
<th>5 wk</th>
<th>6 wk</th>
<th>7 wk</th>
<th>8 wk</th>
<th>11 wk</th>
<th>15 wk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strain A</td>
<td>40.13</td>
<td>69.37</td>
<td>74.93</td>
<td>54.59</td>
<td>65.21</td>
<td>46.63</td>
<td>46.06</td>
<td>43.32</td>
</tr>
<tr>
<td>Strain B</td>
<td>56.68</td>
<td>58.67</td>
<td>66.00</td>
<td>63.00</td>
<td>63.90</td>
<td>30.67</td>
<td>31.18</td>
<td>55.45</td>
</tr>
<tr>
<td>Beak treatment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intact</td>
<td>41.90</td>
<td>60.13</td>
<td>69.04</td>
<td>55.02</td>
<td>61.67</td>
<td>36.68</td>
<td>37.52</td>
<td>44.87</td>
</tr>
<tr>
<td>Trimmered</td>
<td>54.89</td>
<td>67.99</td>
<td>72.07</td>
<td>62.58</td>
<td>67.39</td>
<td>40.52</td>
<td>39.46</td>
<td>53.89</td>
</tr>
<tr>
<td>Analysis of variance</td>
<td>Probability</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Source of variation</td>
<td>S</td>
<td>BT</td>
<td>S × BT</td>
<td></td>
<td></td>
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<td>S</td>
<td>NS</td>
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<tr>
<td>BT</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td></td>
</tr>
<tr>
<td>S × BT</td>
<td>NS</td>
<td>*</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td></td>
</tr>
</tbody>
</table>

\(^1\)Percentages were transformed to arc sine square roots prior to analysis and converted to the original scale for presentation.

\(*P < 0.05.\)
behavior may have been caused by the pain inflicted by beak trimming. In the current study, birds with trimmed beaks stood more than those with intact beaks only at 0 wk of age. Such effects, however, were not present at 1 wk of age or later.

In the current study, beak trimming did not affect tameness or fearfulness, but the strains differed. The methods used to assess tameness were modified from behavior studies with chickens. The fact that pecking and fleeing the novel object were not observed in this study may indicate species differences between chickens and turkeys. The apparent strain, but not beak trimming, differences in tameness and fearfulness supports the results obtained by Mielnik et al. (1992) with layer pullets. In their study, pullets that were beak trimmed at 9 d or at 16 wk had durations of recovery from TI similar to those with intact beaks, although the three strains utilized differed. Measurement of TI is generally accepted as a way to quantify fearlessness (Gallup, 1979), although its use has been questioned (Murphy, 1978).

In the previous report on production traits, livability was similar for intact and beak-trimmed birds, feed conversion of both strains was improved by beak trimming, and body weights at market age were similar (Noble et al., 1994). In the current study, Strain B was less active than Strain A after 3 wk of age. These differences in activity may have contributed to improved feed conversion of Strain B. In studies with turkeys selected for increased 16-wk body weight, the large-bodied strain had poorer walking ability, longer bouts of eating, shorter bouts of walking, and took fewer steps when walking than did its medium-bodied randombred control (Noble et al., 1996a,b).

In the report of Noble et al. (1994), beak-inflicted injuries were reduced in Strain B; thus, beak trimming improved the well-being of Strain B. Strain A males with intact beaks showed a low level of beak-inflicted injuries, indicating that beak trimming to reduce cannibalism may not be necessary in Strain A males. In the current study, changes in behavior that may be attributed to arc beak trimming appeared to be transient, with effects on standing present only the week of hatching and effects on eating present only at 2 wk of age. No abnormal or stereotyped behaviors were noted in either the intact or beak-trimmed groups. The current report indicates that arc beak trimming of male turkeys at hatching does not appear to have a lasting negative impact on their well-being.

REFERENCES


