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INFLUENCE OF INCANDESCENT & FLUORESCENT LIGHT SOURCES ON THE BEHAVIORAL PATTERNS OF COMMERCIAL BROILERS AT DIFFERENT AGES

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ABSTRACT

The present study was conducted on 420 commercial day old broiler chicks of 'Caribro Dhanraja' starin to investigate the behaviour performance under two light sources upto 35 days of age. The broiler chickens spent the majority of time in sitting, feeding, foraging, standing, drinking, pecking and walking. During day and night under fluorescent and incandescent light sources all the bahvioral activities have difered significantly. Broiler chickens spent a large proportion of their rime (44-55%) sitting on the litter. This was significantly more under incandescenet than fluorescent light. Time devoted in stand, lie, feed, drink and forage activity was significantly more under fluorescent whereas walk activity was more under incandescent light source. Wingshake, stretch, dustbath and manipulate activity was significantly more under incandescent than fluorescent light where as peck and preen activity was comparatively more in fluorescent light source. Aggression was significantly more in fluorescent light during day time. The birds spent more time in other activities under fluorescent than incandescent light.

Key Words : Broiler, behaviour, light, Wingshake, dustbath.

MATETRIALS AND METHODS

The present study was conducted to investigate the effect of light sources on behaviour and growth performance of broiler chickens. The study was arrief out at Teaching Livestock and Poultry Farm of College of Veterinary Science and Animal Husbandry, Kumarganj, Faziabad. U.P.(India). Two different high sources were used in this experiment. One was chosen to reflect commercially relevant light source (pearl incandescent light bulb) and another was the biologially relevant light (warm white fluorescent tube). A total of 420 commercial day old chicks were reared and two trails containing 210 chicks each were conducted. In each trial two groups of 105 broiler chicks were collected from a hatchery and they were housed in separate house in a well ventilated room, each pen measuring 16ft x 8ft with white wall to acheieve maximum refelection of the light. The light sources were suspended from cieling. 2m above the floor of each pen. The undisturbed behaviour of the chick in each rearing room were recorded one day per week using instantaneous scan sampling for six periods of 4 hours each (so period 1 describes the behaviour between 6:00 and 10:00 hour, period 2 between 10:1 and 14:00 hour etc.) The numbers of birds performing each of 14 predefined behavioral categories were recorded as proportions of number of birds observed during each hour. The observations of all the behaviours was done by Scan sampling method. In this method the events which have occured during predetermined time period are recorded. Several animals can be observed simultaneously because the data do not be recorded continuously. The fourteen beahvioral activities in the broiler chickens were recorded in the present study. For recording the activity of behaviors the observer situated outside the pen with a clear view. All the fourteen activity of behaviors were recorded as a series of instantaneous scan. Similar scans were recorded for another group of brids in the bulb. Each activity of bird was scanned at five minute intervals for a period of one hour, thus giving 12 records in each hour. The data collected on the various behavioral activities of broiler chickens reared under

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two different light sources up to five weeks of age have been analyzed as per suitable standard statistical procedures.

RESULTS AND DISCUSSION

Least square means of percent time spent weekly in different behavioral activities of broiler chickens under fluorescent & incandescent light sources have been shown in Table 1. The broiler chickens spent majority of their sitting, feeding, drinking, standing, walking & pecking activities in this experiment. While rest behavioral activities under study contributed less than 5% of total time budget.

The percent time spent on sitting under incandescent light source was significantly higher than that of fluorescent light source during all the weeks under study. The time spent on feed and drink activities was significantly ($p<0.01$) higher under fluorescent light source than the incandescent light source over most of the weeks under study. The broiler chickens spent 2 to 8% of time budget in stand activity at 1st & 5th week of age respectively. The percent time spent in this activity under fluorescent light source was significantly ($P<0.01$) higher than that of incandescent light source during all the weeks except 4th week under study. Walk activity showed significantly higher % of time under incandescent light source at 3rd, 4th & 5th weeks. However during 2nd week the walk activity was higher unhder fluorescent light source and it was significant. The time spent on peck activity was sitgnificantly ($P<0.05$) higher under fluorescent light source than incandescent light source during all the weeks except 4th week during the study period. The percent time spent forage activity was significantly higher (P)<0.05) under fluorescent light source than incandescent light source during all the weeks under study.

Wingshake activity was significantly higher during 1st three weeks under incandescent light source than fluorescent light source. The percent time spent in aggression activity was significantly higher under incandescent light source than fluorescent light source at week 1 and same trend nonsignificantly followed at week 2 and 3 howevr during last week the trend was reversed and it was significant at 5th week. However the total time spent on this activity was less than 1% under both the light source. The time devoted on 'other' activities was significantly higher under fluroscent light source then incandescent light source at week 2nd, 3rd & 5th only.

The results of the study described here showed that broilers have a preference for certain light source at different weeks of age. When reared commercially in light environment the broilers spent 50% of the time budget sitting in the litter. This is in accordance of previous studies[2,8]. Resting behavior varied considerably between the two light sources where broilers spent significantly ($P<0.01$) more time in incandescent light source than fluorescent light source throughout the study period. This difference may be explained by the difference in feed consumption between the two light sources. The feather directed behaviors appear more frequently in incandescent light than fluorescent light, since incandescent light increased in preening, pecking as well as object manipulation.

Particularly pecking and preening occured more often in fluorescent than in oncandescent light. Incandescent produces some UV_A light which may change the reflectance of both feathers and appearance of the experimental room. This may well make feathers and objects within th environment more attrated for the birds to peck at explore. The absence of an illuminance effect on pecking behavior was in contrast to several previous studies[4], which found higher feathjer pecking at higher light intensity. The gigher contribution of longer wavelengths in fluorescent light than incandescent light may have reduced pecking behavior although this needs confirmation.

Walking behavior took up a larger proportion of time budget in incandescent light source than in fluorescent light during last three weeks of study. This is contrary to previous study, where higher stocking density, faster grwoth and loower environmental complexity had decreased locomotion[3,7]. However it is possible that the higher stocking density and larger flock size complicated the behavioral distinction between walking and foraging behavior. Broilers walk more in incandescent light than in fluorescent light source at most of the week of study. The broiler birds have been more affected in brighter light environment[9], which may be due to increased visual abilities, facilitating active behaviors such as

exploring[6]. Broilers preferred to forage in fluorescent light source rather than incandescent light during the experimental period. The domestic chicks in UV deficient light environment tend to explore less[5], which support the present findings. The chicks perform more drinking, feeding, locomotion and litter directed behavior in brighter environments at 5 week of age. The frequency of dustbath was very low (<1% of the time budget). Dustbathing was performed more often in the bright light during first three weeks but in the dim light during last two weeks. The wing shaking behavior was followed the same pattern like dustbating during the intial three weeks of age. Higher frequency of standing behavior in broiler reared freqency of standing behavior in broiler reared in dim light is due to improved visual perception in higher illuminance or type 1 error. Bring took up very similar proportion of time budget in two light sources.

Table 1 Least sqaure means ± S.E. of % time spent weekly in different behavioural activities of broilers chicken under two light sources.

Activites	Weeks					Light Effects
	WK1	WK2	WK3	WK4	WK5	
Aggression t	0.06 ± 0.04b	0.17 ± 0.05	0.19 ± 0.06	0.48 ± 0.07	0.41± 0.06a	P<0.01**
b	0.24 ± 0.04a	0.27 ± 0.05	0.27 ± 0.06	0.29 ± 0.07	0.13 ± 0.06b	
Drink	7.77 ± 0.25a	7.39 ± 0.21	6.94 ± 0.21	7.56 ± 0.21a	6.35 ± 0.21	P<0.01**
	5.86 ± 0.25b	6.63 ± 0.21b	6.59 ± 0.21	6.00 ± 0.21b	6.45 ± 0.21	
Dustbath	0.00 ± 0.04b	0.06 ± 0.58b	0.31 ± 0.07b	0.65 ± 0.11	0.86 ± 0.12a	P<0.01**
	0.27 ± 0.04a	0.45 ± 0.58a	0.52 ± 0.07a	0.27 ± 0.11b	0.34 ± 0.12b	
Feed	8.61 ± 0.24a	7.63 ± 0.22a	7.81 ± 0.19a	8.26 ± 0.16a	6.18 ± 0.17	P<0.01**
	6.49 ± 0.24b	6.35 ± 0.22b	6.35 ± 0.19b	6.80 ± 0.16b	6.21 ± 0.17	
Forage	4.58 ± 0.20a	5.31 ± 0.14a	4.88 ± 0.22a	5.59 ± 0.15a	3.92 ± 0.15a	P<0.05*
	3.12 ± 0.20b	3.22 ± 0.14b	3.43 ± 0.22b	3.43 ± 0.15b	3.12 ± 0.15b	
Lie	3.54 ± 0.17b	4.72 ± 0.17a	4.27 ± 0.22	5.17 ± 0.21	5.03 ± 0.23a	P<0.01**
	4.93 ± 0.17a	3.78 ± 0.17b	4.20 ± 0.22	4.68 ± 0.21	3.88 ± 0.23b	
Manipulate	1.90 ± 0.12b	1.38 ± 0.09b	2.46 ± 0.14	2.95 ± 0.10b	2.18 ± 0.98b	P<0.01
	4.44 ± 0.12a	2.39 ± 0.09a	2.60 ± 0.14	3.85 ± 0.10a	3.12 ± 0.98a	
Peck	7.84 ± 0.38a	6.24 ± 0.22a	6.70 ± 0.25a	5.55 ± 0.20	6.06 ± 0.25a	P<0.05*
	6.04 ± 0.38b	4.20 ± 0.22b	4.79 ± 0.25b	4.99 ± 0.20	4.65 ± 0.25b	
Sit	46.45 ± 0.73b	45.55 ± 0.57b	47.32 ± 0.54b	46.25 ± 0.35b	50.10 ± 0.58b	P<0.01**
	49.61 ± 0.73a	51.31 ± 0.57a	50.03 ± 0.54a	51.90 ± 0.35a	52.53 ± 0.58a	
Stand	7.88 ± 0.30a	5.65 ± 0.16a	3.19 ± 0.14a	3.26 ± 0.17	2.70 ± 0.11a	P<0.01
	4.82 ± 0.30b	2.67 ± 0.16b	2.67 ± 0.14b	3.40 ± 0.17	1.90 ± 0.11b	
Stretch	0.00 ± 0.08b	0.62 ± 0.12b	1.21 ± 0.11	1.38 ± 0.11a	1.59 ± 0.10	P<0.01**
	0.79 ± 0.08a	1.52 ± 0.12a	1.38 ± 0.11	0.83 ± 0.11b	1.38 ± 0.10	
Walk	7.63 ± 0.24	7.49 ± 0.19a	5.59 ± 0.18b	4.54 ± 0.17b	5.48 ± 0.16b	P<0.01
	7.15 ± 0.24	6.66 ± 0.19b	6.97 ± 0.18a	6.94 ± 0.17a	7.84 ± 0.16a	
Wingshake	0.00 ± 0.08b	1.00 ± 0.17b	1.00 ± 0.18b	0.93 ± 0.11	1.45 ± 0.14	P<0.01
	0.76 ± 0.08a	3.81 ± 0.17a	3.64 ± 0.18a	0.86 ± 0.11	1.45 ± 0.14	
Other	3.51 ± 0.19	2.98 ± 0.14a	2.84 ± 0.11a	2.29 ± 0.14	2.46 ± 0.09a	P<0.01
	3.90 ± 0.19	2.08 ± 0.14b	2.15 ± 0.11b	2.67 ± 0.14	1.14 ± 0.09b	

Means having different superscripts within column of each parameter differ significantly.
t = fluorescent light source, **b** = incandescent light source.

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