



A comparison of the behaviour of free-range laying hens in an agro-forestry system with an intensive commercially reared laying hens

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Abstract

Despite the popularity of intensive commercial systems (CR) of management, free ranged back yard system (FR) of poultry management still plays an important role in rural agriculture. The backyard poultry are normally free ranged and feed mainly on scavenging and, to a certain extent on household wastes. Free range system is gaining popularity as a mean of minimizing the behavioural restrictions imposed by intensive commercial management systems. Objective of this study was to compare the behavior of free-ranged laying hens in a backyard system with intensively reared commercial laying hens. Five laying chicken were randomly selected from each type of flock. The study was conducted in two consecutive days. Behaviour of birds was recorded between 0900-1200h by direct live focal observation on 18 mutually exclusive behaviours by using an ethogram. Behaviour was recorded continuously at 15 seconds intervals for 3 hrs. In FR, the most prominent activity was eating (43%) whereas in CR it was standing (53%). A notable intake of forages was observed in FR system. FR birds spent significantly more time on walking (36%), scratching the floor (18%), running (3%), compared to the CR birds. CR birds spent significantly more time on standing (53%) and drinking (7%). CR birds spent 17% of their time budget on litter eating. The time spent on behaviors such as lying, laying, eating, head movements, wing flapping, bird interactions, jumping, dust bathing, body shaking, vocalization and feather pecking were not affected by the rearing system. The frequencies of eating, scratching floor and running were significantly higher in FR where as frequency of drinking was higher in CR. It was concluded that compared to intensive commercial system, free range rearing system of poultry promotes active behaviors of birds. Further studies are suggested to evaluate the welfare implications of restricted behaviors in commercial poultry rearing systems.

Key words: Behaviour, Commercial rearing, Free range, Poultry

Introduction

Free range (FR) system is where hens are kept with access to an open area at a stocking density defined by regulation in the European Economic Community as being no higher than 1000 birds/ha (FAWC, U.K., 1993) has recommended a maximum stocking density of either 375 birds/ha or space of 26.7 m²/hen. If hens are maintained at a higher density without being moved to a new area then the risk of disease infestation is high. The incidence of worm infestation and coccidiosis was comparatively higher in a well-run FR system than in battery cages (DEFRA, 2008). Also FR birds are subjected to extreme weather conditions are subjected to poor welfare conditions. Despite above disadvantages, free range poultry sector is increasingly becoming popular all over the world. In developed

countries, free range poultry products are regarded as organic or welfare maximized products. In developing countries, back yard free range poultry management systems are popular among rural poor populace as low input animal enterprise that facilitate food security.

Restriction of behavior in commercial poultry management systems is highly criticized as being unethical and artificial. The natural behavior patterns of poultry including grazing live plants and hunting for bugs. In order to compare the impact of intensive commercial management systems on poultry welfare, it is necessary to compare the behavior of birds under such systems with natural or less artificial poultry management systems. As behavior is highly influenced by climatic and management practices the validity and accuracy of direct extrapolation of the results of

behavioral studies conducted in other countries to Sri Lankan conditions are questionable. No such comparative behavioral studies have been made under Sri Lankan conditions. Therefore, the objective of this study was to compare the behavior of free-ranging laying hens in a backyard system with intensive commercially reared laying hens.

Methodology

This experiment was carried out at a peri-urban agro forestry system in Kamburupitiya which consisted of a FR poultry rearing system and at the CR system practicing at the poultry unit of the Faculty of Agriculture, University of Ruhuna at Mapalana. Five laying chicken were randomly selected from either type of the flocks. The study was conducted in two consecutive days at the same time of the day. Five

trained persons were appointed for each of the laying hen in both FR and CR systems. Behaviour of birds was recorded between 0900-1200h by direct live focal observations on 18 mutually exclusive behaviours by using an ethogram (Table 1). Behaviour was recorded at 15 second intervals for consecutive 3 hrs. Five trained observers entered the two rearing systems, 10 minutes before the onset of behaviour recording and stayed motionless 2-3m away from the chicken, enabling them to habituate to the presence of the observers and return to normal behaviours before behaviour recording was initiated (Marchant-Forde et al., 2008). Then the proportion of time for engaged in individual behaviours or postures, along with frequencies of each behaviour or posture were calculated.

Table 1. Ethogram of the behavioural study

<i>Activity</i>	<i>Description</i>
Standing (St)	Standing with no apparent movement of legs
Walking (Wk)	Taking one or more steps
Lying (Ly)	Lay down on the ground performing no perceptible behaviour
Laying (La)	Laying one egg
Eating (Et)	Head extended towards available feed resources and appears to be manipulating or ingesting feed
Head movement (Hm)	Immobile body apart from rapid head movements in any directions or rotations of the head around its vertical or horizontal axis
Wing Flapping (Wf)	Extension and flapping of wings
Scratching floor (Sf)	Scratch floor with feet usually associated with eating behaviour
Bird Interactions (Bi)	Attacking the other birds in an aggressive manner
Jumping (Jp)	Jumping without moving wings
Dust bathing (Db)	Bathing the dust with the use of wings and head
Body Shaking (Bs)	Raise feathers and shake body
Drinking (Dr)	Beak in contact with water and appears to be drinking water
Vocalization (Vc)	Making any kind of noise
Running (Rn)	Speedily taking one or more steps
Feather Pecking (Fp)	Beak related behaviour that pecks its own feathers
Flying (Fl)	Flapping of the wings forcing the birds to lift from the ground or displacement
Litter Eating (LE)	Head extended towards litter and appears to be manipulating or ingesting litter

The data gathered were then processed to determine the proportion of time spent engaged in individual behaviours or postures, along with frequencies of each behaviour or posture. Data were analyzed by GLM option of ANOVA using the statistical package Minitab 14.1.

Results and Discussion

In FR system of poultry management, the most prominent activity was eating (43%) whereas in CR of management it was standing (53%). It was observed

that a notable intake of forages in FR system which is restricted under CR systems. FR birds spent significantly ($p < 0.05$) more time on walking (36%), scratching the floor (18%), running (3%), compared to the CR birds (Table 2). CR birds spent significantly ($P < 0.05$) more time on standing (53%) and drinking (7%) (Table 2). CR birds spent 17% of their time budget on litter eating (Table 2). The time spent on behaviours such as lying, laying, eating, head movements, wing flapping, bird interactions, jumping, dust bathing, body shaking, vocalization and feather

pecking were not affected by the rearing system ($p>0.05$) (Table 2). The reason for the above behavioural observations may be due to the restricted spacing (2ft^3) given for CR birds whereas FR birds given adequate space to express their normal behaviour which is one of the prime requirements to satisfy the welfare of the animals (FAWC, 1993).

Table 2. Percentages of duration spent on various behaviours of chicken reared under CR and FR systems

<i>Activity</i>	<i>CR</i>	<i>FR</i>
	%	%
Standing	52.93	18.97
Walking	22.27	36.20
Lying	8.67	18.03
Laying	0.10	1.13
Eating	26.39 ^b	43.90 ^a
Head movement	12.83	7.77
Wing Flapping	0.60	2.03
Scratching Floor	1.50 ^b	18.20 ^a
Bird interaction	1.57	2.70
Jumping	0.33	1.30
Dust bating	0.03	1.47
Body shaking	0.27	0.23
Drinking	6.77	1.03
Vocalization	0.20	0.93
Running	0.20 ^b	3.20 ^a
Feather pecking	6.90	10.43
Flying	0.10	0.03
Litter eating	17.03	0.00
Other	0.30	6.37

^{a,b} Percentage values bearing different letters in different columns are significantly differ .

The frequencies of eating, scratching floor and running were significantly higher in FR where as frequency of drinking was higher in CR (Table 3). This implies that the rearing system has played a significant role in the frequency of behaviour of the animals (Table 3). As the birds in the intensively reared system show a higher frequency in drinking behaviour, it can conclude that CR birds are in more stress compared to FR birds (Table 3).

Table 3. Frequency of various behavioral activities between of chicken engaged in CR and FR system

<i>Activity</i>	<i>CR</i>	<i>FR</i>
Standing	60.20	43.60
Walking	58.00	75.60
Lying	5.40	12.00
Laying	0.20	0.40
Eating	31.00	79.80
Head movement	39.00	32.00
Wing flapping	2.60	7.80
Scratching floor	4.60	42.20
Bird Interaction	6.80	11.60
Jumping	2.00	8.40
Dust bathing	0.20	3.80
Body shaking	0.60	1.20
Drinking	15.20	2.40
Vocalization	21.80	4.60
Running	0.60	14.20
Feather pecking	14.00	26.80
Flying	0.60	0.20
Litter eating	47.00	0.00
Other	1.20	22.80

Conclusion

From the study it was concluded that compared to intensive commercial system, free range rearing system of poultry promotes active behaviors of birds. Further studies are suggested to evaluate the welfare implications of restricted behaviors in intensive commercial poultry rearing systems.

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