

## COMPARATIVE ETHOGRAM OF MALE SEXUAL BEHAVIOUR OF RHODE ISLAND RED AND VANARAJA FOWL

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**ABSTRACT :** Experiment was conducted to compare the male sexual behaviour of Rhode Island Red and Vanaraja fowl parent stock managed under deep litter system. Twenty males and 140 females of each genetic group were selected randomly in two batches belonging to age and body weight ranges of 36-48 weeks & 2.8-4.5 kg respectively. Sexual behaviour was recorded for one hour starting at 5 PM. Every bird was observed for 20 sessions. The transformed data were analysed to identify the variation due to genetic group if any.

Frequency of mounting in RIR and Vanaraja males are  $1.80 \pm 0.01$  and  $1.78 \pm 0.01$  respectively. Frequency (per hour) of forced mounting is seen significantly ( $P \leq 0.01$ ) more in Vanaraja ( $1.93 \pm 0.02$ ) than that in RIR ( $1.77 \pm 0.01$ ). Frequency of copulation and forced copulation in RIR are  $1.87 \pm 0.01$  and  $1.62 \pm 0.01$  respectively; whereas in Vanaraja these values are  $1.84 \pm 0.01$  and  $1.63 \pm 0.01$ . Frequency of male to male aggression does not differ significantly as the values are exactly the same in both genetic groups ( $2.29 \pm 0.03$ ). Frequency of male to female aggression in Vanaraja ( $2.64 \pm 0.02$ ) is significantly ( $P \leq 0.05$ ) more than that in RIR ( $2.56 \pm 0.02$ ). Frequency of waltzing pattern is seen significantly ( $P \leq 0.01$ ) more in RIR ( $2.10 \pm 0.02$ ) than in Vanaraja ( $1.95 \pm 0.02$ ). Frequency per hour of high step advance for both RIR and Vanaraja are  $2.06 \pm 0.02$  and  $1.9 \pm 0.02$  respectively; Frequency per hour of steps off is seen more in RIR ( $2.00 \pm 0.01$ ) than that in Vanaraja ( $1.94 \pm 0.01$ ). Statistical analysis revealed significant effect of genetic group on steps off activity. It is concluded that RIR cocks appear to be more successful breeder. Vanaraja cocks have made more aggressive display of different patterns.

**Key words :** Ethogram, Sexual behaviour, Rhode Island Red, Vanaraja, Fowl.

### INTRODUCTION :

Knowledge on behaviour of the stock and the application of that knowledge in the care of the stock plays an important role in the maximization of production efficiency of poultry production enterprise. Complete knowledge on male sexual behaviour is essential to detect cause of low breeding efficiency in breeders flock. A number of behavioural patterns are associated with expression of sexual behaviour of fowl. A series of displays occurs before mating, based on a stimulus-response sequence (Fischer 1975) initiated by the male. Male courtship displays

are generally elaborate, involving vocalisations and noises, postures, spreading of the feathers to increase apparent size and emphasise plumage characteristics (Kovach 1975). These patterns that function in the initiation, progression and culmination of the stimulus response sequence are most significant (Guhl and Fischer 1975). Information on ethogram of male sexual behaviour of Vanaraja is seriously lacking. Hence, the study was undertaken to compare ethogram of male sexual behaviour of Vanaraja with that of a better studied breed Rhode Island Red.

## **MATERIALS AND METHODS:**

The study was conducted on two genetic groups of fowl, Rhode Island Red (RIR) and Vanaraja reared under deep litter systems. RIR chicken was originally developed in Massachusetts and Rhode Island in the 1880's and 1890's. The bird has adapted very well as dual purpose bird under backyard system. Vanaraja is a suitable bird for backyard farming in rural and tribal areas, developed by the Project Directorate on Poultry (ICAR), Hyderabad. Vanaraja is a multicoloured dual purpose bird with attractive plumage which can be reared either for meat or egg production.

The experimental birds (twenty from each genetic group) of RIR and Vanaraja were reared in two different farms viz. Haringhata Poultry Farm, Govt. of West Bengal and Poultry Seed Project (ICAR) Farm, West Bengal University of Animal and Fishery Sciences respectively located at Mohanpur, Nadia, West Bengal. The age of the birds selected for this experiment was between 36-40 weeks with body weight varying from 3.4 to 4.0 kg. The birds were kept under deep litter systems of rearing with 2.5 sq. ft. per bird floor space permitting free and comfortable movement. Standard poultry feed (mash) was given according to age and body weight in hanging feeder. Wholesome drinking water was made available to the bird in automatic drinker. The experiment was conducted for a period of 12 weeks (from 25.5.2011 to 27.8.2011).

A batch of 10 cocks was identified with coloured adhesive ribbons fixed at shank in a mixed flock with 70 hens. Sexual behaviour was recorded for one hour starting at 5 PM. At the beginning of an observation session, the observer took a position avoiding to be seen directly by birds and waited for 3-5 min. until all the experimental birds were spotted. The observer then started a stopwatch and walked quietly along the passage outside the pen and recorded data on printed sheet for different patterns of male sexual behaviour. Instantaneous scan samples (Martin and Bateson 1986) of all the ten birds in a pen were

recorded at the start of the observation and continued through the 60 minutes time at 5 min intervals. A tabulated data was obtained by summing the number of frequencies of every pattern for each bird for the entire 60 minutes time. Every bird was observed for 20 sessions. Thus a total of 400 observations were recorded for each genetic group.

The count data was transformed to stabilize the variance. The transformed data were analysed to identify the variation due to genetic group if any (Snedecor and Cochran 1992).

## **RESULTS AND DISCUSSION :**

The sexual behaviour of male has been categorised under different patterns of behaviour, some may be normal or some in the form of displaying aggression towards females. These behavioural patterns are tabulated in terms of frequency per hour of different patterns in Table 1. Findings are discussed in following subsections.

### **Mounting:**

Mounting is the principal pattern of sexual behaviour in male. Mounting refers to a male approaches a female gently and place one or both feet on her back (Millman *et al.* 2000).

The frequencies per hour of mounting for both RIR and Vanaraja males are  $1.80 \pm 0.019$  and  $1.78 \pm 0.019$  respectively. The effect of genetic group is found to be non significant statistically though the value in RIR is slightly higher ( $1.80 \pm 0.019$ ) than that of Vanaraja ( $1.78 \pm 0.019$ ).

From these findings it appears that RIR male performs more frequent mounting activity than Vanaraja male though it does not differ significantly. Millman *et al.* (2000) found that broiler breeder male performed significantly more frequent mounting than laying strain males. However as the present study has been conducted on two dual-purpose strains no significant difference is noticed.

**Forced mounting:**

Forced mounting means the male approaches the female forcefully to mount over her when the female avoided the male and no further elements of copulatory sequence is performed (Millman *et al.* 2000).

The frequencies of forced mounting for both RIR and Vanaraja males are  $1.77 \pm 0.019$  and  $1.93 \pm 0.023$  respectively. Comparison of values of frequency between both the genetic groups reveals that value in Vanaraja is significantly ( $P \leq 0.01$ ) higher ( $1.93 \pm 0.023$ ) than that of RIR ( $1.77 \pm 0.019$ ).

From this finding, it reveals that male of Vanaraja attempts significantly more forced mounting than the male of RIR. It shows that males of Vanaraja are more aggressive during mating time than males of RIR. This may be due to that the females of Vanaraja avoid their male counterparts more frequently than did by the females of RIR (Table 1) which is supported by the findings of Millman *et al.* (2000) where they found that when females avoided males, more males used to mount forcefully over female.

**Copulation:**

Copulation defined as the male mounted, gripped and trod a female and appeared to achieve cloacal contact (Millman *et al.* 2000). The male sexual behaviours are quantified here in terms of copulation and the results are discussed below.

Frequency per hour of copulation for both RIR and Vanaraja are  $1.87 \pm 0.02$  and  $1.84 \pm 0.02$  respectively. The effect of genetic group on frequency of copulation is found to be non significant statistically though the value in RIR ( $1.087 \pm 0.019$ ) is slightly higher than that in Vanaraja ( $1.84 \pm 0.019$ ).

From these findings it is revealed that the males of RIR perform more copulation than the Vanaraja males though it does not differ significantly. Millman and Duncan (2000) reported that some breeds performed copulation more frequently than others. They observed that broiler breeder strain males copulated more frequently than others *viz.* Game strain and layer breeders.

**Forced copulation:**

The sexual behaviour of male is identified as forced copulation when a male mounts a female and appears to achieve cloacal contact following a struggle (Millman *et al.* 2000).

The frequencies per hour of forced copulation exhibited by both RIR and Vanaraja are  $1.62 \pm 0.015$  and  $1.63 \pm 0.016$  respectively. The difference is non significant.

Mench (1993) observed that males are extremely rough during mating, forcing copulation and often injuring or killing females. Millman *et al.* (1996) reported that some breeds perform more forced copulation than others. They found that broiler breeder males forced more copulation than commercial laying strain males. In the present study on two dual purpose strains naturally no difference could be detected.

**Male to Male aggression:**

The pattern of male to male aggression has been recorded where the male chased, pecked and jumped at other male in the pen (Millman *et al.* 2000).

The frequency of male to male aggression exhibited by both RIR and Vanaraja males are  $2.29 \pm 0.03$  and  $2.29 \pm 0.03$  respectively. It is noticed that the values of frequency of male to male aggression in both the genetic groups are same. Thus both the dual purpose strain males display aggression towards other males in the pen during the performance of sexual courting possibly to scare other male(s) of low social ranking.

**Male to Female aggression:**

The male pecks a female with a downward blow of the beak, usually directed at her head at the time of courtship display which refers as male to female aggression (Millman *et al.* 2000).

The frequency per hour of male to female aggression for both the genetic groups are  $2.56 \pm 0.02$  in RIR and  $2.65 \pm 0.02$  in Vanaraja. The values differ significantly ( $P > 0.05$ ) with higher value in Vanaraja ( $2.65 \pm 0.02$ ) than that in RIR ( $2.56 \pm 0.02$ ).

From these findings it reveals that the males of

Vanaraja direct more aggression towards females than do the males of RIR during mating time possibly due to more avoidance by Vanaraja females. Millman *et al.* (2000) found that when female avoided the males more, the males behaved more aggressively towards females. Mench (1993) and Brake (1998) observed in commercial broiler strain that males behaved aggressively towards females during mating time.

males of some breed performed waltzing more frequently than the males of other breeds. They found that male of game type strain waltzed more than ten times as frequently as did males of other strain *viz.* broiler breeder and layer strain. However Millman *et al.* (2000) reported that waltzing did not differ significantly between strains.

**High step advance:**

High step advance is a courtship display, in which

**Table 1 : Frequency (per hour) of different patterns of male sexual behaviour in two genetic-groups of fowl (Mean SE).**

Patterns of Behaviour	Rhode Island Red	Vanaraja
Mourting	1.80 ± 0.01	1.78 ± 0.01
Forced Mourting	1.77 <sup>b</sup> ± 0.01	1.93 <sup>a</sup> ± 0.02
Copulation	1.87 ± 0.01	1.84 ± 0.01
Forced Copulation	1.62 ± 0.01	1.63 ± 0.01
Male to male aggression	2.29 ± 0.03	2.29 ± 0.03
Male to female aggression	2.56 <sup>b</sup> ± 0.02	2.64 <sup>a</sup> ± 0.02
Waltzing	2.10 <sup>a</sup> ± 0.02	1.95 <sup>b</sup> ± 0.02
High step advance	2.06 ± 0.02	1.99 ± 0.02
Steps off	2.00 <sup>a</sup> ± 0.01	1.94 <sup>b</sup> ± 0.01

**Waltzing:**

The pattern of waltzing by males during courting time has been recorded. Waltzing refers to the male approaches the female in a sideways or circling path with his far wing lowered and feet making a rasping sound as they pass through the primary feathers of the wing (Millman *et al.* 2000).

Frequency per hour of waltzing display exhibited by RIR and Vanaraja are 2.10 ± 0.02 and 1.95 ± 0.03 respectively. Comparison of frequency of waltzing between both the genetic groups reveals a significantly ( $P \leq 0.01$ ) higher value in RIR than that in Vanaraja. Millman and Duncan (2000) observed that

the male approaches the female with a strutting walk (Millman *et al.* 2000).

Frequency of high step advance for both RIR and Vanaraja are 2.06 ± 0.027 and 1.99 ± 0.029 respectively. The effect of genetic group on frequency per hour of high step advance reveals a non significant effect. The findings of the present study also reveal that in both the dual purpose strains *viz.* RIR and Vanaraja males show considerable frequencies of high step advance display. Millman *et al.* (2000) reported that laying strain males displayed high step advance much more frequently than did broiler breeder males.

## Comparative ethogram of male sexual behavior of RIR and Vanaraja fowl

### Steps off:

This display occurs in males after completion of mating, where usually males walked in forward direction i.e. steps off in forward direction after mating (Guhl and Fischer 1975). The pattern of steps off display by males of both the genetic groups has been recorded.

Frequency of steps off display exhibited by both RIR and Vanaraja are  $2.00 \pm 0.01$  and  $1.94 \pm 0.02$  respectively. The values differ significantly ( $P \leq 0.01$ ) between genetic groups.

The findings of the present study reveals that RIR males show significantly more steps off than the Vanaraja males. This may be due to the fact that RIR males show more frequency of mounting and copulation than Vanaraja males which means RIR males perform more successful mating, which is in agreement with the report of Guhl and Fischer (1975) where they stated that after mating is over the males usually steps off in forward direction and execute a waltz.

### CONCLUSION :

It is concluded that RIR cocks appear to be more successful breeder. Vanaraja cocks have made more aggressive display of different patterns.

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