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Effect of Melatonin and Lighting Regime on Physiological Responses and Reproductive Traits of Layers

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INTRODUCTION

Whenever the homeostatic mechanisms of birds are activated, extra energy is expended in the process which is no longer available for production process. This results to production losses especially when the physiological systems are altered

Melatonin regulates the brain's biological clock, acts on physiological functions and immune system.

It also provides elimination of free radicals in the

MATERIALS AND METHODS

- ◆Experiment done at Ebonyi State University, Abakaliki, Nigeria
- ◆Melatonin and Lighting were used at three levels (0,5,&10mls and 12,15 & 18hrs)
- ◆Vital signs were measured
- ◆Growth and production parameters were evaluated weekly
- ◆Data collected were analysed statistically using Minitab version 18 package.

RESULTS

Table 1: Mean values of the Physiological Responses of Nera Black

PARAMETERS	NBM ₀	NBM ₅	NBM ₁₀	SEM
RT (°C)	43.11 ^a	41.55 ^c	42.28 ^b	0.74
RR (bpm)	195.44 ^a	142.56 ^b	139.33 ^b	11.20
HR (bpm)	373.00 ^a	327.11 ^c	338.44 ^b	13.85

^{a-c} Means in the same row with different superscripts are significantly different (p<0.05).

Table 2. Mean of the physiological responses of Isa Brown

PARAMETERS	ISM ₀	ISM ₅	ISM ₁₀	SEM
RT (°C)	43.56 ^a	40.55 ^c	41.52 ^b	0.39
RR (bpm)	195.22 ^a	139.44 ^c	143.00 ^b	1.23
HR (bpm)	337.77	320.22	334.33	8.71

^{a-c} Means in the same row with different superscripts are significantly different (p<0.05).

Table 3. Interactive effect of melatonin and lighting on the physiological responses of Isa Brown

PAT	M ₀ L ₁₂	M ₀ L ₁₅	M ₀ L ₁₈	M ₅ L ₁₂	M ₅ L ₁₅	M ₅ L ₁₈	M ₁₀ L ₁₂	M ₁₀ L ₁₅	M ₁₀ L ₁₈	SEM
RT	43.16 ^a	43.13 ^a	43.03 ^a	42.56 ^{bc}	42.26 ^{bc}	42.03 ^{bc}	41.66 ^{cd}	41.13 ^d	41.66 ^{cd}	0.38
RR	195.33 ^a	195.00 ^a	197.66 ^a	143.66 ^b	143.33 ^b	138.00 ^{bc}	142.66 ^b	139.33 ^{bc}	132.00 ^c	2.56
HR	365.33 ^b	369.66 ^{ab}	384.00 ^a	345.00 ^c	338.33 ^{cd}	331.00 ^{cde}	326.00 ^{de}	339.33 ^{bc}	339.00 ^{cd}	10.4

PAT=Parameter, RT = Rectal Temperature, RR = Respiratory Rate, HT = Heart Rate

^{a-c} Means in the same row with different superscripts are significantly different (p<0.05).

DISCUSSION

- . The rectal temperature and respiratory rate were significantly (p<0.05) higher on control groups compared to those on increased levels of melatonin in both experiments.
- . The reduced rectal temperature indicated that melatonin alleviated the negative impact of heat stress in both experiments.



FIG. 1: Measurement of feeding parameters



FIG. 2: Reproductive organ and growing follicles



FIG. 3: Taking of Egg Weight

CONCLUSION

- . Melatonin and lighting improved the overall physiological status of the two strains especially those on 5mg of melatonin and 15hrs of lighting
- . The growth and production parameters of the two strains of birds were improved by the administration of melatonin and lighting regime.

RESULTS

Table 5: Main Effect of Light on Performance of Nera Black

Parameters	NBL ₁₂	NBL ₁₅	NBL ₁₈	SEM
IBWT (kg)	1.20	1.12	1.10	0.03
BWTG (kg)	0.50 ^b	0.60 ^a	0.56 ^b	0.20
FBWT (kg)	1.65 ^b	1.74 ^a	1.73 ^a	0.40
Egg WT (g)	60.78 ^b	70.00 ^a	68.98 ^a	1.95
OvaryWT (g)	42.53 ^b	47.05 ^a	48.27 ^a	1.54
Ovid WT(g)	56.11	58.03	54.65	0.62
LYF	5.55 ^b	7.30 ^a	7.95 ^a	0.60
SWF	6.35 ^b	8.44 ^a	8.30 ^a	1.53
HDEP (%)	69.33 ^c	76.22 ^a	72.22 ^b	3.99
FCR	1.61 ^b	1.60 ^b	1.68 ^a	0.10
MORTALITY	0.77	0.77	0.88	0.01

^{a-c} Means in the same row with different superscripts are significantly different (p<0.05).

Table 6: Effect of melatonin on Performance Evaluation of Isa Brown

Parameters	ISM ₀	ISM ₅	ISM ₁₀	SEM
IBWT (kg)	0.95	0.94	0.95	0.07
BWTG (kg)	0.35 ^b	0.37 ^{ab}	0.38 ^a	0.01
FBWT (kg)	1.30 ^b	1.32 ^{ab}	1.35 ^a	0.01
Egg weight (g)	59.21 ^b	59.8 ^b	61.52 ^a	0.89
Ovwt (g)	44.22 ^{bc}	46.63 ^b	48.20 ^a	1.15
Oviwt (g)	54.40 ^b	61.59 ^a	64.18 ^a	2.92
LYF(mm)	5.55 ^b	8.30 ^a	8.11 ^a	4.60
SWF(mm)	6.35 ^c	7.84 ^b	8.50 ^b	2.03
HDEP (%)	79.11 ^c	86.33 ^b	91.66 ^a	3.63
FCR	1.78 ^a	1.79 ^a	1.73 ^c	0.02
MORTALITY	2.00 ^a	0.55 ^b	0.33 ^b	0.52

^{a-c} Means in the same row with different superscripts are significantly different (p<0.05).

IBWT= Initial body weight, BWTG = Body weight gain, FBWT = Final body weight gain, DFI = daily feed intake, TFI, = Total Feed Intake, FCR = Feed Conversion Ratio, HDEP = Hen Day Egg Production

DISCUSSION

- ◆The body and egg weight increased with increased number of melatonin in both experiments.
- ◆Those in 5mg of melatonin performed better than those in 0mg and 10mg in both experiment respectively
- ◆The body and egg weight of Nera Black was higher than Isa Brown in both experiments.

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