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IMPACT OF SEX AND BIRD'S LOCATION INSIDE A LOCAL POULTRY HOUSE ON SOME PRODUCTIVE TRAITS THROUGH DIAGNOSTIC ENVIRONMENTAL MONITORING SYSTEM OF ROSE BROILER 308

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ABSTRACT

This Study was conducted in a closed Poultry house, Poultry Research Station, Office of Agricultural Research, Ministry of Agriculture, Baghdad, Iraq, for the period from 2/9 to 14/03/2016 for total rearing period of 35 days. To diagnose and monitoring of environmental factors such as temperature, humidity , density , and levels of carbon dioxide inside the house during the winter season and its impact on the productive performance of broiler chickens Rose 308 breed . The dimensions of the house were (length 35 m x width 7.5 m x Height 2.5 m) by total space volume 3656.25 m^3. The ventilation system in the house was (traditional mode [1] of negative pressure type). The house is totally closed, small fans for minimum ventilation in winter is functioned, and large fans for ventilation in the evaporative cooling operation is used in summer. Sometimes in the summer the need for greater ventilation rates increases so both types of fans are used. 1000 sexed birds were used in this experiment of Ross broiler 308 strain, imported through commercial hatchery in Abu Ghraib. The house was divided into three thermal Zones in order to find out whether heterogeneity is existed in environmental conditions of the house especially at birds level , as a result the impact of homogeneity in the weights of marketed birds. The treatments have been distributed into 32 rearing cages, 16 of them are male and other 16 are female. Two designs were used in this experiment the first is the complete randomized design (CRD) to find out which Zone is better in terms of feed intake, feed conversion efficiency and body weight gaining under the prevailing inside environmental conditions. The second design is complete randomized block design (CRBD) to determine which side (Block) of that particular Zone is better least significant differences (L.S.D) at 0.05 levels were used to compare the mean of treatments.

CONCLUSION

The results showed that males were superior in performance in comparison to females under the internal environmental Conditions. There were minor numerical (UN significant) differences in productivity traits concerning the sex within the Zones in some weeks, and significant in others. 24 hour Data recording collecting for 35 day showed that Environmental Conditions were heterogeneous among the three Zones of the House, as a result the treatments showed different performance according to the location in terms of productivity traits, such as body weight, body weight gain, feed intake and feed conversion ratio, due to the presence of cool air leaks into the house at the front, end of the house and its sides especially when fans are on. along with dead Air pockets that were identified in many places in the middle of the house create a combination of considerably high temperature with low relative humidity in Zone No 2 lead to make this Zone the one that had the best productive traits in comparison with the other two zones .not to mention the high level of Carbone Dioxide inside the house especially in the beginning of the Rearing period which exceeded 9000 PPM .that indicate mistakes in determining the correct ventilation Ratio and the necessity for more (Minimum winter ventilation) even if it was at the expense of the targeted temperature and Relative Humidity for the house.

[1] Traditional mode in terms of how air moves which is from one side to another (lateral).

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KEYWORDS: Diagnostic Monitoring. Environmental parameters. Relative humidity and Temperature .Heat Zones. Sex. Carbone Dioxide.
*This research is part of M.Sc. thesis of the second researcher.

INTRODUCTION

A diagnostic experiment was conducted inside a poultry house belonged to Poultry Research Station, Office of Agricultural Research, Ministry of Agriculture, Baghdad, Iraq in winter season. To study environmental parameters such as heat, humidity, Carbon Dioxide, wind speed as well as other factors such as a bird location within a certain zone inside the house in addition to the effect of a commercial brand –sex, on productivity traits to determine which sex is more profitable for rearing under local conditions.

Environmental monitoring will have the potential role to represent the main tool of developing strategies when combined in the poultry production process through their ability to save data, which make it qualified to enter this industry from wide doors. the development of livestock production technology, called idiomatically (PLF) Precise Livestock Farming , will help the agricultural food - sector in the efficiency of production cost ,as well as adapting a better productive skills that lead to improvement in the working environment which aid more comfort to the producer not mentioning better bird welfare .Data processing system on timetable interaction basis have been applied in many industries , but currently not regularly and permanent installed in agricultural production (animal) facilities . The benefits of these systems are many, the most important task is productivity data processing on the basis of time sequence interaction, (Corkery et al., 2013).

many options are available for the process of environmental monitoring inside the house, which shall be available according to the need and desire of the breeder (producer), those options include the possibility of monitoring the initial environmental elements involved in the work, during the rearing period by using electronic devices and equipment, to know the limitations and possibilities of the house machine through providing a recorded history of performance, for example, movement of the doors , slots of air entering also the number and speed of fans engaged in working during various ventilation systems modes .evolution in electronic equipment and modern systems for monitoring environmental parameters , made the integration of two process monitoring and controlling by computer and remotely even possible, such parameters include temperature, relative humidity, litter humidity, light, gases and temperature of drinking water and feed given to the animal (Kentucky university,2014).

The provision of appropriate and harmonious environment through all parts zones of the house, leads to productivity homogeneous including growth rate and feed conversion ratio. The most important determining factor is the efficiency of the ventilation system. Heterogeneous ventilation controllers the internal environment of the house and keep it homogeneous in other words equally distribution of heat and moisture inside the house (Czarick, 1998).

brooders must be monitored in winter and always checking the suitability with the bird's performance in order to prevent bird migration, which will make the strongest birds have the opportunity to get the best (site) which affects the marketed production , because the harmonies become inefficient .the development of electronic sensors gave an accurate idea of what the birds are facing, they are important for the purpose of organizing work of the brooders including height of brooder or the temperature degree of emitted heat in order to suit the birds. These devises of temperature and humidity data loggers in other words time sequence interaction are necessary equipment regarding the monitoring and controlling of those conditions. Brooders are considered radioactive which means it deliver different amounts of heat in different degrees, so that the birds can choose the appropriate thermal region (Goats, 2002).

The purpose of this study is to find out whether the poultry house is environmentally homogenous or heterogeneous, plus which sex is more profitable from local demands point of view.

MATERIALS AND METHODS

The experiment was performed in a closed poultry house, the Agricultural Research Station, Office of Agricultural Research in Abu Ghraib, for Rearing period for broiler chickens up to five weeks. The dimensions of the room were (length 35 m x width 7.5 m x H 2.5 m) , total volume of (656.25 m3) as in Figure (1). The interior house

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space is divided into three Zones: - front middle and rear of house. 1000 sexed bird were Used in this experiment in of 308 Rose broiler strain imported through commercial hatchery in the Abu Ghraib city (quarter) . These birds distributed into 32 pens (Cages) half male and half are female. Area of each pen is 5m2 .The ventilation system in the house was negative pressure type of conventional (lateral) mode. as the house is closed, small fans are used in winter for minimum ventilation . Heating system was by using seven brooders operate with full or less capacity by choosing accurate number of working brooders as needed towards the targeted temperature. Lighting system used for birds was 22 hours light and 2 hours Dark. Feeders used are of the automatic inverted type, and drinkers of the automatic inverted type equipped with water through a main tank and through pipelines attached to it. Thickness of litter used is 5 cm.

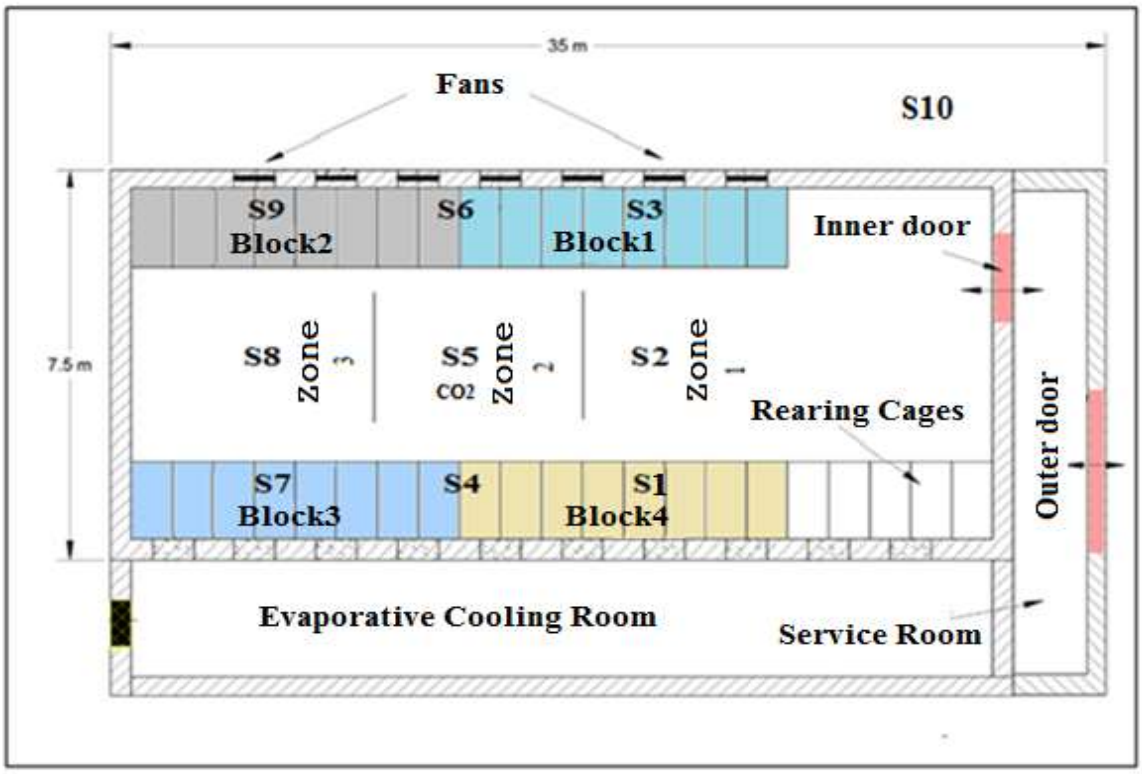

Figure (1) shows the scheme of how setting up electronic sensors after dividing the house into Three Zones and Four Blocks (S1, S2, S3, S4, S5, S6, S7, S8, S9): sensors (Data Loggers) of temperature and Relative humidity placed inside to monitor the internal environment. S10: sensor (Data Logger) for temperature, Relative humidity, placed outside the house to monitor the external environment. CO2: sensor (Data Logger) for carbon dioxide gas.

Devices Used in the Experiment.

We have divided the house into three Zones and put Three sensors for Each single Zone, equals nine electronic sensors of Temperature and Relative humidity for entire house (of data loggers type called TH-4) . as showed above in the scheme for each Zone locations of sensors are:- near the ventilation slot , in the middle, and near the exhaust air slot where fans exist. One single sensor placed outside the house (outdoors) , to monitor changes in the outside environment (weather) , as well as to draw a clear picture of developments inside the house in terms of fluctuations in Relative humidity and air temperature from the moment air enters the house until it left it. One sensor was placed in the middle of the house at birds level for monitoring and measuring of carbon dioxide gas, another electronic device of hand held type Anemometer for measuring wind speed inside the house was used. the work of monitoring of what Data Logger devices do, can be summed up to first measuring and recording parameters such as temperature, humidity and Carbone dioxide in which are stored within individual device, then after a specified period (any period suits the user say one week) we download the data . to connect the devices into PC an interface must be installed, which represent the means of communication between the device and computer, through a cable (link) the devices one after the other linked to PC and data are collected into an Excel sheet. Through the analysis of those data of (Relative humidity, temperature, and Carbone dioxide) diagnosing

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Impact Factor: 4.116
CODEN: IJESS7

process can be performed. Likewise results into improving of the environmental factors (parameters) inside the house, that leads to a better performance of hens. That's how we find out whether Environmental conditions between and within each individual block is homogeneous or heterogeneous during the rearing period. as well as the extent or proximity to the target temperature and humidity achieved according to bird life . Weights of chickens and feed intake was calculated and statistically analyzed using the Statistical Analysis Program - System (SAS version 2001) (Version 9.1, SAS, and Inc.Cary.NC)

Figure (2) Sensor Data Logger type of (T &RH)

Figure (3) Sensor Data Logger type of (CO^2 gas)

Figure (4) Anemometer

Studied Traits

First : - Temperature .

second : - Relative humidity .

nine electrical devices of recording type (Data Logger) to measure temperature and relative humidity have been used, besides another device placed (outside the house) to monitor and measure external environment through all the rearing period of five weeks , please see (Figure 2) and scheme of the house (figure 1).

Third : - Carbon Dioxide CO_2

An electronic device of (data logger type) was used to monitor and measure carbon dioxide level inside the house through all the rearing period of five weeks . Please see (Figure 3).

Fourth: - sample location within the house's zone.

ISSN: 2277-9655
Impact Factor: 4.116
CODEN: IJESS7

studying the effect of location on some of the qualities of productivity traits, such as feed conversion ratio, Body Weight gaining and feed intake. where the house was divided into three locations (or Zones) each Zone is divided into two (blocks or sites) on the sides were birds exist to find out what is the best location for birds through the impact on weight gain and feed conversion ratio (please see figure1).

Fifth: - bird sex

studying the effect of this parameter was due to the importance of determining which sex (gender) of the bird Rose broiler 308 is more profitable on production traits likewise on yield for the producer based on local demands and point view.

RESULTS AND DISCUSSIONS

First: - Heat Temperature of Air (H) : -

an approximate control over temperature within the birds neutral zone environment was managed . in general a little difference was existed among the thermal Zones of the house also the blocks .there were even fluctuations ups and downs in data concerning the temperature recorded by an individual device placed in a certain site or position . let's take for an example readings recorded of one device . in the beginning of rearing period it had (± minus plus 2 degrees) then the gap in fluctuations even increased at the end of rearing period during day and night reached (± minus plus 3degrees) . some days variations have reached to (± minus plus 4 degrees) ,but it was on a limited scale and lasted for a few days only . for instance let's take the ninth day of birds age . we see that most devices readings in all thermal Zones weren't matching the target temperature but close to it (± minus plus the target temperature) . despite this fact , some of the sites within the thermal Zones had more stability in temperature and humidity .this homogeneous and of course heterogeneous which existed in certain Zones affected production traits , that's way some birds located in different Zones in the houses performed better. (Kuney,1998), (Jones et.al.,2005), (Czarick and Fairchild ,2008). results also showed that the body weight gaining was superior numerically in locations close to the fans places, particularly at the beginning of the house and at the end, the fact that these sites had better quantity of ventilated air but not good enough in quality , because the air when enters the barn, he was entering relatively cold from the leaks around doors and windows, and begin to gain heat from the nearing vicinity , carrying with it a bit of heat energy then heads towards the fans ,that causes the bird to cooled then eat a little much more to feel warm resulting in bigger weight with less feed conversion ratio. The problem is even worse especially when inner door is opened for workers to get inside and outside the house. A certain scenario happens when door is opened heat is removed along with harmful gases and puhouse it toward the middle of the house, on the other hand the area at the end of the house ,were a large door made for large equipment entry is existed , a similar process happens , because of the unavoidable air leakage around that door . data Obtained from this study showed through all of rearing period that longitudinal line in the middle axis recoded higher temperatures compared to the sides, and the reason for this is that brooders arranged in a sequential manner along the strait line in the middle of the house. those areas are heated directly By the brooders the rest of the house was heated hot air produced from brooders meaning that birds depends for it welfare hot air puhouse from brooders in a manner similar to forced air produced by thermal furnaces , however, this method remains effective in terms of heating, but not positive from an economic point of view as well as the comfort of the birds, (Czarick and Fairchild, 2005).

Table (1) shows the weekly rates of heat temperature (°C) inside and outside the House.

Weeks	Average of Air Temperature			
	Zone 1	Zone 2	Zone3	Outdoors weather
1	29.25	30.44	30.69	14.98
2	26.14	27.35	27.32	19.38
3	23.03	23.51	21.74	17.37
4	19.19	22.59	20.95	17.95
5	18.77	20.78	18.91	18.22
average	23.28	24.93	23.92	17.58

Second: - The Relative Humidity (RH): -

sensors readings showed that humidity in the house including all Zones thought all the rearing period (except for the first region in certain times), were not within the targeted Relative humidity (65-75) % which was approved by the station management stuff . Although the workers were trying to add water directly on the floor, but that did

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CODEN: IJESS7

not succeed in increasing the Relative humidity to the desired level of during the whole period .in order to summarize data we show here the weekly readings. We see that the majority are between (40 to 58)% . the highest level of Relative humidity is found in the first Zone, which is located near the inner door from which workers come to the house during the service time . likewise The first Zone achieved the closest readings to the decided point of the target Relative humidity (Which is called neutral Zone or extent) and better marketed weights for the birds, but the consumption of feed is highest and the rate of feed conversion is worse . This means that the birds felt cold in that particular Zone, that's way they consumed more food with worse FCR . daily data showed that Relative humidity in Zone 1 reached 60% because of the daily scenario when workers often open the service door . as a result that assures that increasing in relative humidity there is due to the accidental ventilation rates ,though it pushes harmful gases away , but temperature is cutting less . best FCR has been obtained from the second Zone and this may be due to the combination resulting from Relative Humidity (smaller or equal) ≤ 50 and high temperature (greater than or equal to) ≥ neutral thermal Range corresponding age of the bird, (Aviagen ,2010),(Aviagen, 2013) please see table (4).

Table (2) shows weekly relative humidity data experienced by bird, according to mathematical equations using Excel program . the advantage in body weight was for the first Zone during the first two weeks, but afterward the third Zone became better in the trait of body weight due to the presence of leaks around the large door dedicated to enter the equipment service of the house , led to air leakage into the house, affecting the levels of humidity making it comparable relatively to the levels of humidity in the first Zone. increasing ventilation rates during weeks 3, 4 and 5 it is evident the low temperatures and increased humidity at sites 1 and 3, which explains the presence of leakage of air to inside the house . because when hot air comes into contact with higher air temperature condensation of moisture happens and humidity increases to double. for example, if the degree of internal (inside) air ambient temperature was 32 ˚C and humidity 50%, and the cold air caused air temperature to drop into 21 ˚C, this would cause relative humidity to be increased and doubled (Czarick and Lacy ,1991).

Table (2) shows the weekly rates of Relative humidity inside and outside the House

Weeks	Relative Humidity %			
	Zone 1	Zone 2	Zone 3	Outdoors weather
1	58.56	45.93	48.13	57.95
2	52.26	47.21	47.57	53.39
3	54.96	50.34	56.56	77.11
4	47.32	42.43	46.35	60.50
5	40.90	38.70	39.50	52.06
average	50.80	44.92	47.62	60.20

Third: - Carbone Dioxide (CO2)

The Data of this sensor (CO2 Data Logger) showed high levels of this gas especially on the first day of rearing in other words the first day on which the birds arrived. the levels exceeded (9999 ppm) which is harmful to the health of all individuals and workers inside the House as well as birds , resulting in a lack of system's ability to follow-up measurement and monitoring . it even called for reprogramming the device and operate it on the second day please see (Figure 5) .the reason is the deliberated action of ventilation reduction conducted by workers in order to maintain the optimum temperature which is a big mistake (Aviagen, 2014) , (Alchalabi, 2003) .afterwards on the second day reached (7330 ppm) by an average of (6234.632 ppm). The data in table (3) shows some descriptive statistics of CO2 gas on the day afterwards which is basically the second day of rearing. the sharp rise in the levels of this gas on the first day and the second is due to the operation of all gaseous brooders as a result for an attempt to make the house warm enough for the birds,likewise the air temperature is close to the target Zone called (Neutral Zone) in which birds feel comfortable with also corresponds with what station stuff strived for . it was on the expense of carbon dioxide gas that accumulated into high levels greater than the recommended (3000 ppm), (which is a maximum level recommended for birds at this age of one week) (Corkery et. al., 2013), (Czarick, 2007) and (Knizatova et .al., 2010). all the readings for this gas Started gradually to decrease as birds got older for example it reached on the ninth day a level (Maximum 3544 ppm), (Mean 2444.066 ppm), due to the fact that when birds get older the producer must use higher ventilation rates and lower temperatures (depending on the age of the bird), as well as to get rid of harmful odors (gases) resulting from the decomposition

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Impact Factor: 4.116
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of poultry waste feces and urine . for instance some descriptive statistical analysis was for CO2 gas data observed on the seventh day of birds age 16/2/2016 were as follows: -

Table (3) some descriptive statistics of CO2 gas level in the house, birds at the age of two days

CO_2(PPM)	
6234.632	Average
46.45468	Stander error
6017	Median
5854	Mode
519.3791	Stander deviation
269754.7	Variance
1896	Range
5434	Minimum
7330	Maximum
779329	Count

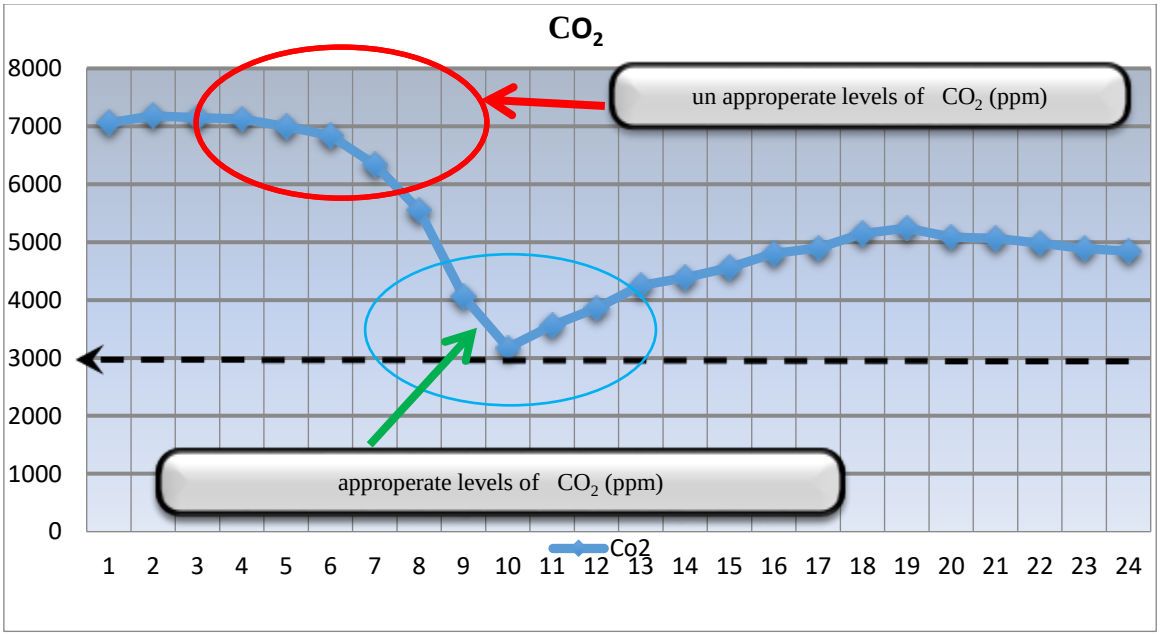

Figure (4) shows a diagram of CO2 gas on the second day of rearing (after reprogramming the device as a result of reaching to peak levels)

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Impact Factor: 4.116
CODEN: IJESS7

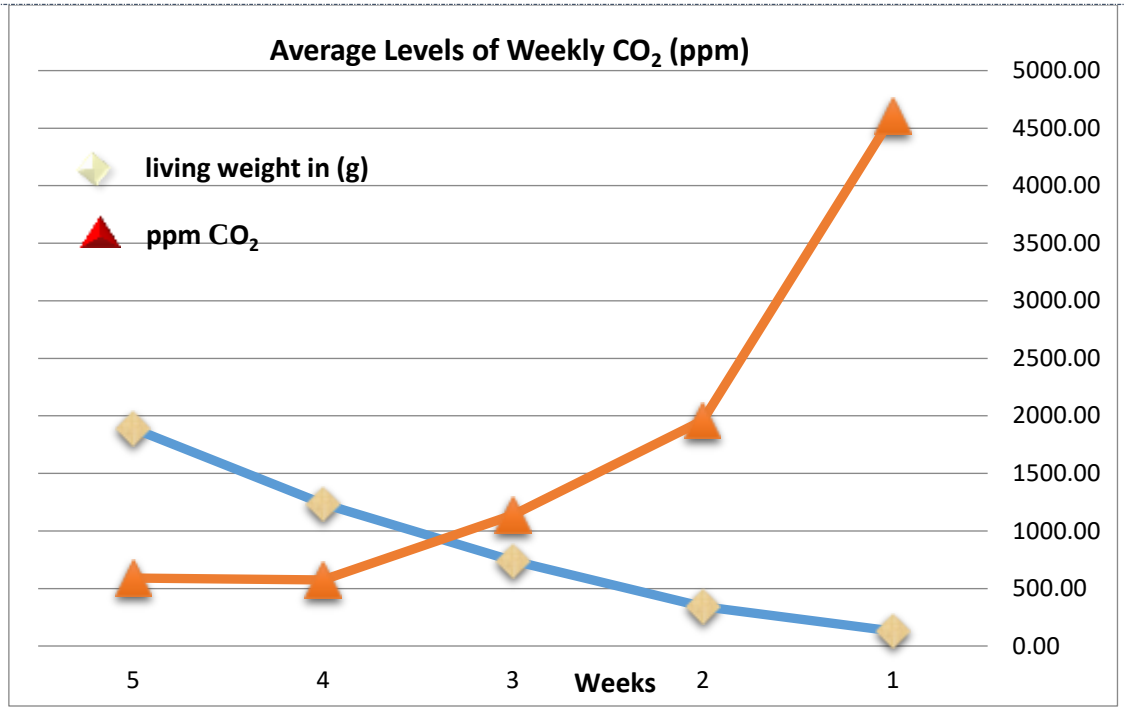

Figure (5) shows the average of bird's weights (g / bird) with weekly rates of CO_2 gas (ppm)

carbon dioxide levels in the rest of the Rearing period remained within the acceptable range .there weren't any relationship between carbon dioxide levels in one hand and heat, humidity or dew point in the other hand . there weren't any indications of carbon dioxide levels affecting the growth rates due to the number of birds Reared haven't been on economic scale.

Table (4) shows temperatures required under various levels of relative humidity to achieve a neutral zone for birds (2013, Aviagen)

Age (days)	Humidity %					
	40%	50%	60%	70%	80%	
One day	36	33.2	30.8	29.2	27	Temperature (°C)
3	33.7	31.2	28.9	27.3	26	
6	32.5	29.9	27.7	26	24	
9	31.3	28.6	26.7	25	23	
12	30.2	27.8	25.7	24	23	
15	29	26.8	24.8	23	22	
18	27.7	26.8	23.6	21.9	21	
21	26.9	25.5	22.7	21.3	20	
24	25.7	24.7	21.7	20.2	19	
27	24.8	23.5	20.7	19.3	18	

Note: - Temperatures in red are the standard corresponds the standard moisture levels

Fourth: - the effect of the sample location (Zone and Block) in the house on the productivity Traits:
The Three thermal Zones of the house performed differently. for example table (5) shows high output in terms of marketed weights was obtained from the first Zone, that reached 1925.5 g feed / g live weight per bird, along with the worst accumulative feed conversion Ratio reached 71.8 g feed / g body weight . table (6) represent the

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Impact Factor: 4.116
CODEN: IJESS7

second statistical analysis from which we can identify the particular Block (side) located Within the first Zone, that gave the top marketing weights . Table (6) shows that it was (fourth Block), the part located nearby the exhaust fans at the front of the house, was the one physically high. the first Zone environment can be described by the highest levels of Relative Humidity in the house, and temperatures were the least as a result of the largest amounts of air leakage in comparison with the third Zone that air leakage was identified ,but in less rates .that explains a lot, the high body weights obtained in the first Zone happened as a result of more feed consumed by the bird to maintain their body temperature along with a slight increase on body weights in return .body weights of the other two regions were relatively close with less feed consumption due to the better FCR . The results also showed that the level of Relative humidity for the second Zone was the least, because of the concentration of heat in this area as a result of the rush of air leaking from the sides. Table (5) indicates that productivity variation of thermal Zones is due to the low humidity levels combined with high temperatures. this is a common problem in winter that producers encountered ,because the cold weather is has a little moisture and when it enters the House in ventilation process, it acquires temperatures in heating process inside the air then expands and the basically low moisture content decreases .on the way of going out of the house, this dry air become gain ability to carry the leftover existing humidity resulted from breathing , feces or urine inside the house, this situation affected the productivity (physically) numerically in terms of differences in feed consuming , feed conversion ratio among Zones . this is a common problem in the houses with no Internal circulation fans that can be used to maintain evenness of air quality and temperature at chick level. (Aviagen ,2010,2014) , (Smith, 1993) , (Al-Batshan,1999) and (Naila et al., 2014) .chickens productivity Traits were affected numerically (physically) due to relative variations in temperature and humidity levels .statistical analysis of the productivity traits of the three thermal Zones, as in the table (5), for instance it showed similarity in feed conversion ratio, despite the fact that the second Zone performed better (numerically) in terms of cumulative feed conversion ratio reached 1.69 g feed / per g body weight . The Third Zone, followed afterwards by converting feed ratio reached 1.78 g feed / g body weight each.

Fifth: - The effect of sex on productivity Traits

Table (7) shows males outperformed females mathematically (sometimes called physically) on in the sex effect on weight during the first week then. Similarity during the second and third week occurred, despite the fact that the improvement in performance was in favor of males. During week four and five a significant superiority in favor of males was seen, where the value of $p > f = (0.002)$, (0.027) and body weight rates for males (1300.9) , (2014.7) g respectively. in feed consumption trait, males outperformed un significantly during the first four weeks , in spite of the fact that improvement during that time was in favor of males, up to the fifth week the superiority developed to be significant including the accumulative value of the same trait . $p > f = (0.036)$, (0.034) by feed weights for males (1269.3) ,(3375.0) g / bird respectively. The results also showed that males were superior un significantly in the effect of sex on the body weight gaining in the first week and similarity have found during the third and fourth weeks, despite the fact that the improvement whilst was in favor of males. The improvement developed more to become significant for weeks four and five and the accumulative rate , $p > f = (0.001)$, (0.0001), (0.002) and by body weights for males (540.3), (713.0) (1975.9) respectively . in the trait of feed conversion ratio there were similarity between males and females, despite the existence of a clear improvement in favor of males in achieving better FCR (the least compared to females) throughout all the five production weeks, as well as in the accumulative rate(GPA) . the reason for the different rates of these traits between males and females, is due to the result of interaction between the male hormone (androgen) , with thyroxin hormone, which is responsible for the acceleration of metabolism within the animal body (Zuowei et al., 2011)

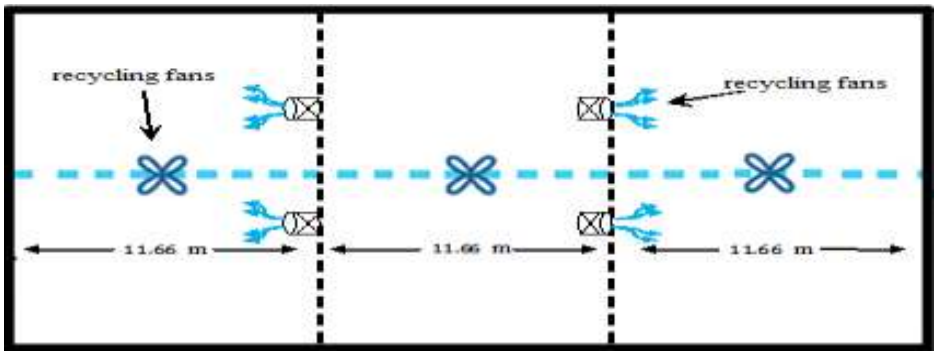

Figure (6) shows how to make use of recycling fans to reduce horizontal and vertical variation in air movement and thermal air layers

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Impact Factor: 4.116
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Table (5) shows effect of the three Zones on body weight , feed consumption , body weight gaining and feed conversion ratio (weekly and accumulative) for broiler chickens

Traits	Zone	Weight in Weeks					Accumulative
		1	2	3	4	5	
Body Weight (g)	1	133.0 [a]	349.2 [a]	748.8 [a]	1246.8 [a]	1925.5 [a]	--
	2	131.8 [a]	347.9 [a]	736.5 [a]	1229.0 [a]	1866.1 [a]	--
	3	125.7 [a]	334.1 [a]	740.2 [a]	1231.2 [a]	1882.5 [a]	--
	L.S.D	7.558	27.475	64.391	119.29	175.08	--
	p > f	0.114	0.497	0.926	0.948	0.785	--
Feed Consumption (g)	1	122.3 [a]	320.3 [a]	763.6 [a]	914.6 [ab]	1277.9 [a]	3398.1 [a]
	2	116.2 [a]	309.6 [a]	697.5 [ab]	770.3 [b]	1131.1 [b]	3024.7 [b]
	3	117.0 [a]	302.3 [a]	672.7 [b]	926.1 [a]	1174.3 [ab]	3192.5 [ab]
	L.S.D	7.622	27.271	90.349	147.03	136.43	302.47
	p > f	0.238	0.4	0.121	0.073	0.105	0.064
Weight Gaining (g)	1	92.1 [a]	216.2 [a]	399.6 [a]	497.1 [a]	678.7 [a]	1884.6 [a]
	2	91.3 [a]	215.8 [a]	388.8 [a]	492.5 [a]	637.2 [a]	1825.7 [a]
	3	85.2 [a]	209.2 [a]	405.3 [a]	491.0 [a]	651.3 [a]	1842.1 [a]
	L.S.D	7.421	21.73	46.02	66.961	64.666	175.01
	p > f	0.122	0.75	0.76	0.976	0.43	0.79
FCR (g) Feed / (g) weight gaining	1	1.33 [ab]	1.55 [a]	2.025 [a]	1.93 [a]	1.93 [a]	1.87 [a]
	2	1.29 [b]	1.52 [a]	1.86 [a]	1.60 [a]	1.78 [a]	1.69 [a]
	3	1.39 [a]	1.54 [a]	1.83 a	2.00 [a]	1.81 [a]	1.79 [a]
	L.S.D	0.08	0.192	0.276	0.414	0.246	0.244
	p > f	0.047	0.881	0.302	0.126	0.464	0.356

Note:-
Vertically different letters indicate that there are differences among the averages.
L.S.D: comparison of averages using the least significant difference.
1, 2, 3: represent thermal Zones inside the House
p > f: the level of significance.

Table (6) shows the impact of the four Blocks (sectors) on body weight , feed consumption , body weight gaining and feed conversion ratio (weekly and accumulative) for broiler chickens

Traits	Block	Weight in Weeks					Accumulative
		1	2	3	4	5	
Body Weight (g)	1	130.6 [ab]	341.9 [a]	740.1 [a]	1210.4 [a]	1860.9 [a]	--
	2	128.4 [ab]	340.4 [a]	741.1 [a]	1233.5 [a]	1886.9 [a]	--
	3	125.1 [b]	332.1 [a]	721.3 [a]	128.2 [a]	1856.9 [a]	--
	4	134.1 [a]	359.1 [a]	763.6 [a]	1279.540 [a]	1958.890 [a]	--
	L.S.D	8.059	32.511	77.225	131.27	167.84	--
	p > f	0.553	0.182	0.391	0.732	0.701	--
Feed Consumption (g)	1	118.2 [ab]	315.2 [a]	726.8 [ab]	832.0 [a]	1191.9 [a]	3184.6 [a]
	2	120.3 [ab]	309.1 [a]	662.3 [b]	834.1 [a]	1172.2 [a]	3099.7 [a]
	3	113.4 [b]	300.8 [a]	684.9 [ab]	953.2 [a]	1153.9 [a]	3206.3 [a]
	4	121.6 [a]	314.4 [a]	761.5 [a]	875.2 [a]	1254.7 [a]	3327.5 [a]
	L.S.D	7.011	31.327	87.299	178.88	161.230	328.5
	p > f	0.109	0.757	0.117	0.478	0.599	0.56
Weight Gaining (g)	1	89.7 [ab]	211.3 [a]	398.3 [a]	470.3 [a]	650.5 [a]	1820.0 [a]
	2	87.8 [ab]	212.0 [a]	401.6 [a]	492.0 [a]	653.4 [a]	1846.3 [a]
	3	85.6 [b]	206.110 [a]	389.2 [a]	497.0 [a]	638.710 [a]	1816.5 [a]
	4	93.9 [a]	224.540 [a]	404.5 [a]	516.0 [a]	679.350 [a]	1918.3 [a]

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CODEN: IJESS7

	L.S.D	7.983	26.146	55.642	63.24	46.181	167.99
	p > f	0.553	0.182	0.391	0.732	0.701	0.573
FCR (g) Feed / (g) weight gaining	1	1.33 [a]	1.55 [a]	1.92 [a]	1.88 [a]	1.88 [a]	1.80 [a]
	2	1.38 [a]	1.56 [a]	1.82 [a]	1.79 [a]	1.80 [a]	1.71 [a]
	3	1.34 [a]	1.57 [a]	1.87 [a]	2.03 [a]	1.81 [a]	1.82 [a]
	4	1.30 [a]	1.44 [a]	1.98 [a]	1.79 [a]	1.89 [a]	1.8 [a]
	L.S.D	0.057	0.236	0.343	0.546	0.327	0.32
	p > f	0.453	0.874	0.809	0.774	0.932	0.899

Table (7) shows the effect of sex body weight , feed consumption , body weight gaining and feed conversion ratio (weekly and accumulative) for broiler chickens

raits	sex	Weight in Weeks					accu
		1	2	3	4	5	
y Weight (g)	Female	126.8 [b]	334.5 [a]	722.9 [a]	1169.9 [b]	1766.0 [b]	
	Male	133.0 [a]	352.3 [a]	760.6 [a]	1301.0 [a]	2014.8 [a]	
	L.S.D	5.699	22.989	54.627	92.822	118.68	
	p > f	0.44	0.366	0.456	0.027	0.002	
onsumption (g)	Female	114.8 [b]	299.7 [a]	678.1 [a]	824.4 [a]	1117.1 [b]	30
	Male	122.1 [a]	320.8 [a]	739.7 [a]	923.3 [a]	1269.3 [a]	33
	L.S.D	4.958	22.151	61.73	126.48	114	2
	p > f	0.112	0.316	0.166	0.242	0.036	0
t Gaining (g)	Female	86.4 [b]	207.7 [a]	388.0 [a]	447.0 [b]	597.1 [b]	17
	Male	92.2 [a]	219.3 [a]	408.3 [a]	540.3 [a]	713.8 [a]	19
	L.S.D	5.645	18.488	39.345	44.722	32.655	1
	p > f	0.498	0.375	0.611	0.001	< 0.0001	0
FCR / (g) weight ining	Female	1.34 [a]	1.56 [a]	1.90 [a]	1.91 [a]	1.88 [a]	1
	Male	1.34 [a]	1.52 [a]	1.90 [a]	1.80 [a]	1.80 [a]	1
	L.S.D	0.061	0.167	0.242	0.386	0.231	0
	p > f	0.527	0.798	0.755	0.494	0.653	0

Note: -
Vertically different letters indicate that there are differences among the averages.
L.S.D: comparison of averages using the least significant difference.
p > f: the level of significance.

Diagnostic observations in winter season, which confirms the lack of homogeneity in the air heading into the house Regarding Winter ventilation (minimum ventilation): -

1. On 10/03/2016 while the fans were running. air velocity have been measured by the hand held Anemometer and found Zero at the level of 25 cm and 150 cm height in the middle of the first Zone between pen NO . 30 and 3.
2. In the middle of the house which is Zone two, air speed was zero , at a height of 25 cm, and a height 150 cm , air speed was found 0.27 m / s
3. there isleakage of air at the end of the house (third thermal zone) and was leaking air speed at a height of 150 cm was 1.55 m / s and at the level of bird 0.60 m / s near the pen NO. 20.
4. On 14/03/2016 which is day 33 of rearing period .a re-calibration of air inlets was conducted by workers to make total open inlets five instead of three and by a size of 30% of the original size of the window (40 x 20) cm. air speed was measured and heterogeneity founded in the accelerated rates of entered air, as follows: -

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CODEN: IJESS7

A- In the front of the house near the pen No. 3 and at a height of 130 cm and at the level of the birds found air speed of 4.68 m / s and 0.65 m / s, respectively. Inside the pen NO. 31 air speed at a height of 130 cm and at the level of the birds air speed found of 2.20 m / s and 0.65 m / s, respectively.

B- In the middle of the house in the corridor near the pen NO. 26 air speed found zero at the level of birds while moving toward the back, specifically near the pen NO. 23 that the velocity was 0.68 m / s . between pen NO. 23 and 11 air velocity was measured at a height of 130 cm and found 4.25 m / s and at the level of the birds inside the pen air velocity was 0.68 m / s.

C- C- At the end of the house near the pen NO. 20 air velocity was found zero . at a height of 130 cm air speed was found 0.04 m / s.

Table (8) shows some descriptive statistics of the first Zone

Descriptive Sts.	H 1	RH 1	H 2	RH 2	H 3	RH 3
Mean	32.40	57.35	32.67	59.02	32.36	59.33
St .Error	0.06	0.17	0.08	0.19	0.09	0.27
Median	32.00	57.75	31.90	59.20	31.45	60.55
Mode	31.50	59.80	31.90	55.00	31.40	51.90
St .Deviation	1.10	2.86	1.41	3.28	1.60	4.55
Variance	1.21	8.19	1.98	10.74	2.55	20.66
Range	4.00	10.40	4.50	12.00	5.30	14.90
Minimum	30.70	52.40	31.00	54.10	30.20	51.70
Maximum	34.70	62.80	35.50	66.10	35.50	66.60
Total	9331.30	16517.30	9409.90	16997.10	9320.70	17087.20
NO .Daily records / 5 minutes	288.00	288.00	288.00	288.00	288.00	288.00

Table (9) shows records obtained on the third day of rearing on 11/2/2016

S1		S2		S3	
average / hr		average / hr		average / hr	
H	RH	H	RH	H	RH
33.10	53.75	33.35	55.70	33.35	55.15
33.25	54.30	33.65	55.35	33.61	54.35
33.40	54.60	33.85	54.60	33.85	52.57
33.65	54.60	34.30	55.02	34.25	51.95
34.11	55.25	34.71	55.05	34.65	52.41
34.30	55.55	35.15	55.10	35.11	52.65
34.20	57.75	35.10	57.35	34.91	56.21
33.50	61.00	34.25	60.60	34.05	61.40
33.00	62.25	33.65	62.05	33.45	63.35
32.15	58.95	32.75	60.10	32.52	61.80
31.65	57.45	32.01	60.60	31.71	62.50
31.41	59.45	31.50	64.15	31.35	65.35
31.15	58.85	31.15	64.30	30.91	64.41
31.22	56.25	31.01	61.65	30.55	61.40
31.35	53.51	31.10	58.05	30.65	58.01
31.45	53.55	31.30	56.40	30.70	57.01
31.75	56.25	31.65	58.30	31.10	59.65
32.00	59.25	31.90	61.20	31.40	62.80
31.95	59.45	31.85	60.90	31.31	62.75

ISSN: 2277-9655
Impact Factor: 4.116
CODEN: IJESS7

31.55	58.80	31.50	60.01	30.95	62.25
31.45	59.55	31.50	61.55	30.91	63.55
31.50	60.81	31.65	61.90	31.01	64.20
31.57	58.90	31.53	60.02	30.96	62.22
32.00	59.25	32.90	61.20	31.40	62.81

Note:
S1= Sensor NO.1
H=Heat Temperature
S2 =Sensor NO.2
RH=Relative Humidity
S3= Sensor NO.3
three sensors of (TH-4) are located in Zone NO.1 as explained earlier.

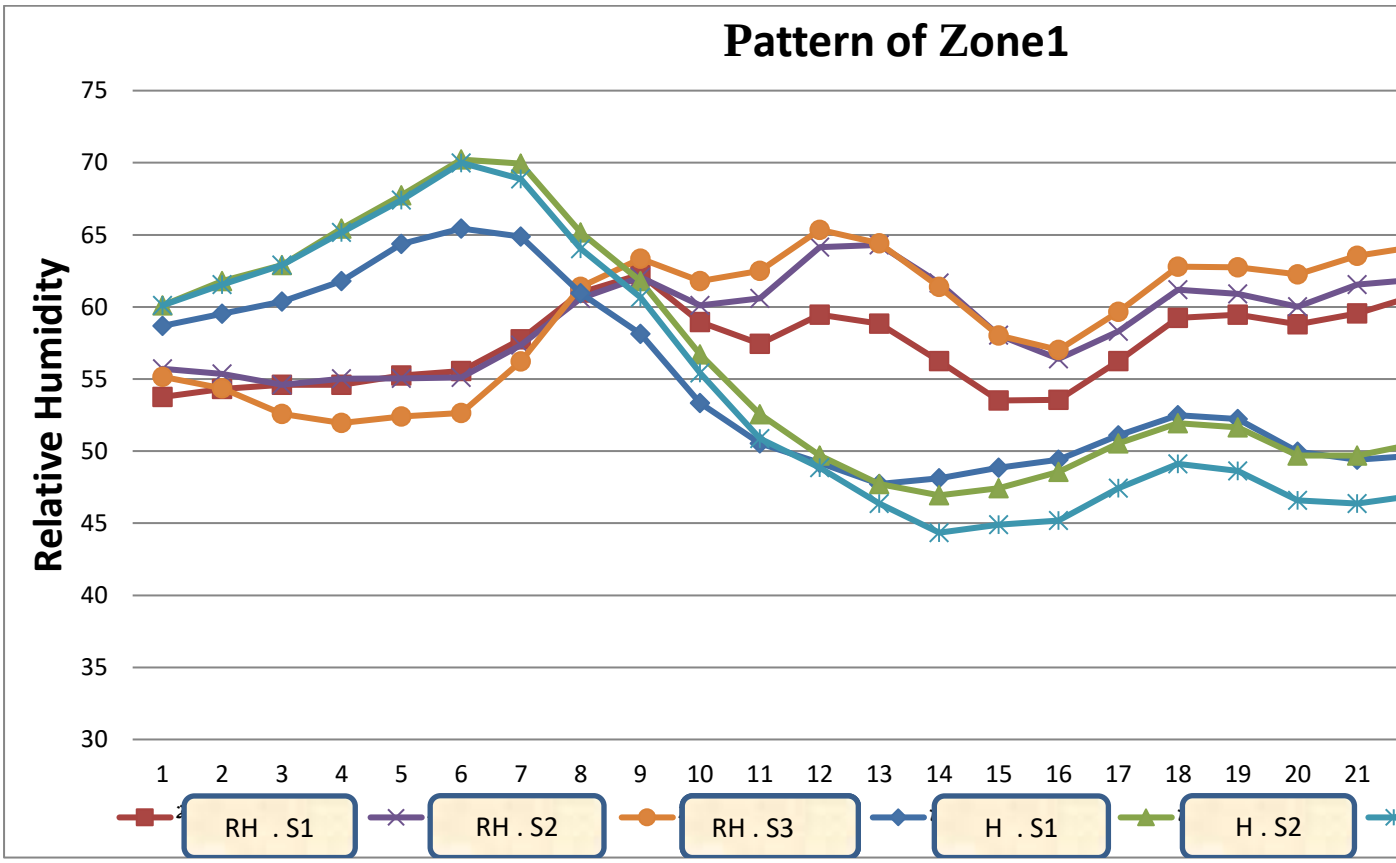

Figure (7) Shows diagnostic diagram for the first Zone of temperature and Relative humidity pattern

Note: H = Temperature of Heat RH = Relative Humidity S = Sensors

CONCLUSIONS AND RECOMMENDATIONS

1) The use of sexing technique by breeding males in the production process of Rose broiler 308 breed , would increase production in quality and quantity .under the same prevailing environment , both gender (sex) have relatively different FCR along with improvements were for the preference of the male sex . males had better Feed conversion ration along with significant superiority in the marketed weights.
2) low relative humidity (RH) in the house below the 50% that would make the birds prone to drought (2013, Aviagen) which affect performance, but the right combination of temperature increase at low humidity would compensate in bird performance , as what happened in the second Zone where the birds recorded the best FCR and best marketed body weight (if excluded the thermal Zone I ,although

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Impact Factor: 4.116
CODEN: IJESS7

marketed weight, was the highest in the house among the three Zones but consumed larger quantity of feed resulted in bad FCR which is basically the worst),

3) the presence of air currents at different speeds within the house is an evidence of air leaks that indicates to the ventilation air inlets are not corresponding the running fans in other words not opened to the size suitable with fans capacity used or even not in sufficient number . thus the house become heterogeneous environmentally, which affects the disbursement of fuel
4) accumulation of CO2 gas is harmful to the health of employees and birds alike, rising to high levels < (9000ppm) especially in the early days of the rearing period as well as the possibility of accumulation of other harmful gas, Carbone Monoxide CO which is produced as a result of the burning of any Fossil fuel in conditions of Oxygen shortage especially at higher temperatures that's why we recommend conducting the larger ventilation rates even if at the expense of the target temperature and humidity .
5) Use the recycling fans of air in winter season in the middle of the house to push warm air into the ends (from second thermal zone to the first and third Zone). That Would make the excess heat in the center to move into the front and end of the house where it's needed most. As well as using internal fans moving vertically in winter to push air from the bottom up at an appropriate speed (relatively low) would reduce the variation in vertical thermal layers please see figure (6).
6) The use of air shutters inside the house (Louvers) is ipmortant to control the direction of entered air so that it is towards the ceiling in winter and down towards the floor in summer.

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