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STUDY OF THE LOCATION OF BIRDS INSIDE THE BREEDING HALL OF BROILERS ROSE 308 AND ITS EFFECT ON ENVIRONMENTAL CONDITIONS USING A DOCUMENTED DATA SYSTEM

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Abstract

The location inside the hall is the parts or areas of the dormitory of the animal husbandry and can be divided into the beginning, middle and end and these areas have environmental differences in terms of temperature, humidity and ventilation, so this difference leads to differences in production or weights in the hall itself. The study was conducted for the period from 23/9 to 28/10/2018 and was used in the experiment rose meat type 308 308 number of 405 chicks non-naturalized from the age of 1 to 35 days, divided randomly into three thermal areas are the beginning of Hall (X) center Hall (Y) And the end of the hall (Z). The results showed that there was no significant effect of heat between the areas of the hall, while there was a significant superiority of the beginning and center of the hall on the end of the hall relative humidity and dew point inside the hall. The significant effect of carbon dioxide gas on the beginning of the hall on the center and end of the hall where the lowest percentage was at the beginning of the hall. It was concluded from the study that the area of the beginning of the hall is the best environmental elements, which reflected on the production in general and the occurrence of less deaths of birds in that area.

Key words : location of birds inside the breeding hall, Thermal areas, Environmental, documented data, Temperature, Humidity, Air speed, Carbon dioxide, Dew point, Broiler

Introduction

The economic and nutritional importance of poultry meat is evidenced by the fact that it is considered a basic form of human consumption because it is superior to other products in the nutritional value of its vitamins and proteins. Poultry occupies an important position in the economy of countries (Abdullah and Ali, 2017). Environmental conditions in poultry halls require regular monitoring to ensure the quality of the chickens produced and to reduce the mortality rate. Environmental conditions, such as increased carbon dioxide, extremely high and low temperatures and high humidity, lead to disease and increased mortality. Current methods used to monitor environmental conditions within poultry halls have proved ineffective because they are often manual. The adoption of the continuous monitoring of environmental conditions, continuous data storage and the provision of an alert system for environmental conditions in poultry halls facilitate the process of management and production. (Phiri and Hazael Phiri, 2018). The heterogeneous environmental conditions in the poultry rearing area lead to birds showing different performance depending on the location in terms of productivity. (Al-Chalabi *et al.,* 2016). The Aviagen (2014) manual also noted that heterogeneous environmental conditions with varying bird locations (the presence of pneumatically inert areas) resulted in variation in production rates. The aim of this study is to use the techniques of intelligent management and modern mechanization taking into account the internal environmental conditions of the hall as well as linking or knowing how the atmosphere of the hall was affected by external environmental conditions and the extent of difference and disparities in weights due to the variation in the environment in the interior hall areas.

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Materials and Methods

The experiment was carried out in a closed poultry hall, its dimensions (length 30mx width 7mx height 2.75m), on Ross-308 broiler meat with an initial weight of 40.2g, the chicks were reared in a hall divided into an area of 1 m2 each, the chicks received the clock It was transferred to the field, which was equipped with a sawdust mattress free of moisture. Evan fodder was used to feed the birds from day one to age (14 days). Feeding was free. Table 1 shows the chemical analysis of feed.

Table 1: Chemical analysis of the feed used in the experiment.

Finish	Grower	Starter	Chemical composition
18	20	22.50	Raw protein (%)
3250	3185	3069	Energy represented (Clio calories / kg feed)
1:180.56	1:159.25	1:136.4	Energy to protein ratio C / P riot
5.95	5.61	4.45	Crude fat (%)
1.21	1.21	1.33	Lysine (%)
0.50	0.56	0.64	Methionine (%)
0.90	0.95	0.98	Calcium (%)
0.41	0.43	0.45	Disposable phosphorus (%)

The ventilation system used in the hall is a low internal pressure system where there are two types of large air vacuums at the end of the hall with a discharge ranging from 545 - 554 m3 / s and small in the sides of the hall with a discharge between 460 - 465 m3 / s, use a lighting system Continuous for 23 hours a day and one hour of darkness for four days and then was reduced half an hour a day until reaching 20 hours of light per day and 4 hours of darkness until the end of the breeding period, gas incubators were used to warm the chicks where the chicks were received at a temperature of 32 ° C and then the temperature was 31 ° C 1-3 days and then from the age of 4 7-day the temperature was 30 ° C, F. The second week, the temperature was 29 m and after the heat has been reduced until reaching 25 m until the end of the breeding period by producing company Aviagen Manual (2014).

Environmental attributes

Electronic sensors were imported from China specifically for experiment measurements from Shenzhen U-Control Electric Co., Ltd. The measured environmental characteristics were as follows:

Temperature and humidity (%)

Sensors were used to measure the temperature (m) and relative humidity (%) of the hall environment. Three sensors were installed inside the hall, the first one at the beginning of the hall (the first thermal zone), the second in the center of the hall (the second thermal zone) and the third one in End of the hall (third thermal zone). A fourth sensor was erected outside the hall under the shadow. These sensors are documented data that record the readings and stored in the memory of the sensor for a period specified by the user, with the possibility of controlling the determination of the minimum and maximum temperatures to be sensor readings within these limits and according to the area where the sensor is.

Air speed (m/s)

The air velocity is measured by a digital display measuring sensor, which is measured by directing the sensor inside each thermal zone separately and several places within the same thermal zone. The measurement is carried out through the rotation of the fan in the sensor which starts to circulate as soon as there is movement of air inside and after the hall. They are recorded. The readings are taken through the corridors between the alkanan, *i.e.* 6 readings at a time.

Carbon dioxide CO_2 ppm and Dew point

Three sensors have been installed to measure carbon dioxide gas and dew point inside the hall. Hall and the third at the end of the hall.

These sensors record data and store it in the memory of the sensor, with the possibility of controlling the determination of the minimum and maximum gas, temperature and relative humidity to be sensor readings within these limits and depending on the area where the sensor, the sensors are operated by UPS Desktop Calculator being rechargeable batteries to ensure Continuity of sensors work during power outages.

Complete Randomized Design (CRD) was used in the statistical analysis to study the effect of the site on the studied characteristics. Statistic Significant differences between the mean were compared with the mean level of 0.01, 0.05 using the Tukey. Rawi and Khalaf Allah, (1980) and used the program SAS, (2012) to perform statistical analysis.

Results and Discussion

Temperature

The results shown in Fig. 2 indicate that there were no significant differences in temperature between the areas of the hall with different densities. These results show that the breeding hall was homogeneous and in a good environment in terms of temperature despite the presence of a computational difference of about (1° C or more). On the production hall. This is consistent with Chalabi *et al.*, (2017), which indicated that temperature

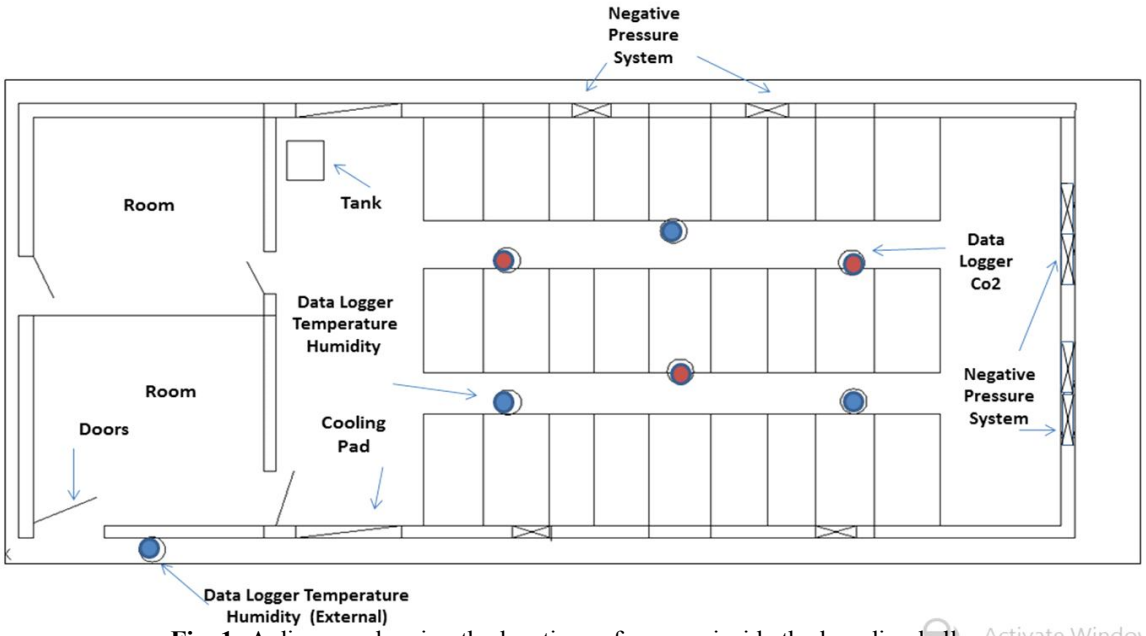
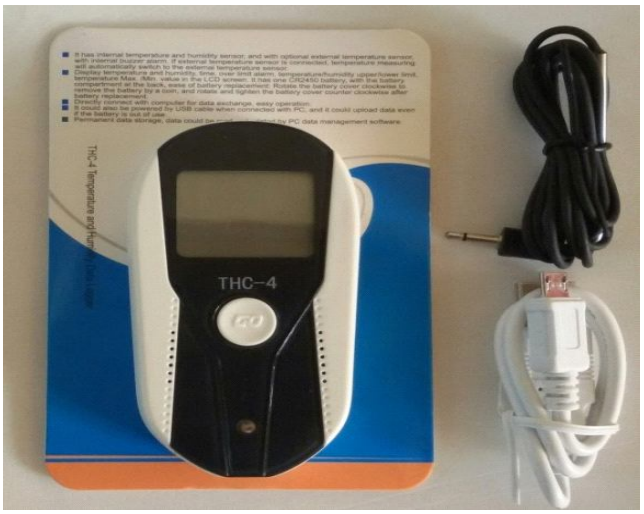


Fig. 1: A diagram showing the locations of sensors inside the breeding hall.

Picture 1: Sensor used to measure temperature and relative humidity of the environment.



Picture 2: Sensor used to measure air speed.

Picture 3: Sensor used to measure carbon dioxide, temperature, relative humidity and dew point.

Picture 4: Shows how to set up the sensor used to measure carbon dioxide, temperature, relative humidity and dew point.

differences existed between the areas of the hall mathematically but did not constitute a statistical difference between the regions.

However, it should be noted that the areas of the hall despite the homogeneity of heat, but there are times there is a difference in temperature between the beginning and end of the hall where it reaches 2 - 3 degrees Celsius and this change in temperature shows when the cooling fans run at full power or when the morning and sometimes other times. The external heat plays an important role in determining and increasing or decreasing the temperature inside the hall and thus influencing the birds, as is known, the atmosphere of Iraq is characterized by extreme extremes of temperature not only at the level of seasons, but per day there is a big difference between night and day Appropriate ventilation that maintains temperatures within the required range is an important and essential factor for raising poultry. The extremes that recorded the device outside the room and shown in table 3, which shows some of the features of heat during the breeding period of (35) days note that the device is placed in the shade.

Table 2: Shows some of the heat parameters outside the hall during the breeding period.

Reading	External temperature parameters	
5433	Number of readings	1
27.1175	Mean	2
0.07655	Standard error	3
39.9	Maximum	4
15.1	Minimum	5

This extremism can be observed between the highest and lowest degree and its deviation from the general average (27.1175) as the difference between the highest degree and the lowest degree is about (12 - 13) degrees Celsius and this difference makes maintaining the internal temperature is very difficult, so as previously noted that the hall Great control and high quality to preserve the internal environment in all areas of the hall is essential for raising poultry in general and to increase the density in particular, so it is necessary to start or think about increasing the density of breeding must assess the hall at the environmental level in general and to provide appropriate heat for birds for all ages and all areas of the hallA special form.

This is consistent with what Al-Bash'an and Al-Banki (2010) observed when observing the breeding halls of broiler and laying hens that the air temperature was an average of (28 ± 3.7) and ranges between (8 - 37) ° C (extreme temperatures). For poultry farming. This is confirmed by Makki, (2014) where he showed that the production of poultry in Iraq suffers from the presence of extreme extremes in temperature between night and day and summer and winter.

Relative humidity%

Note that the difference between the first area (the beginning of the hall) and the second area (the center of the hall) was higher with relative humidity (48.493 and 46.753%), respectively. The third area (the end of the hall) with an average (38.875%) This difference may be due to the presence of cooling vents, which work to carry and insert moisture into the hall when the work of clouds fans, since the cooling system in the hall is evaporative cooling. These results are consistent with Chalabi et al. (2017) which showed a difference in relative humidity between the hall locations but the superiority of the first area (the beginning of the hall) and the third (the end of the hall) compared to the second area (the center of the hall) and a significant level ($P < 0.05$). Superiority for the beginning and end of the hall, but the center of the hall

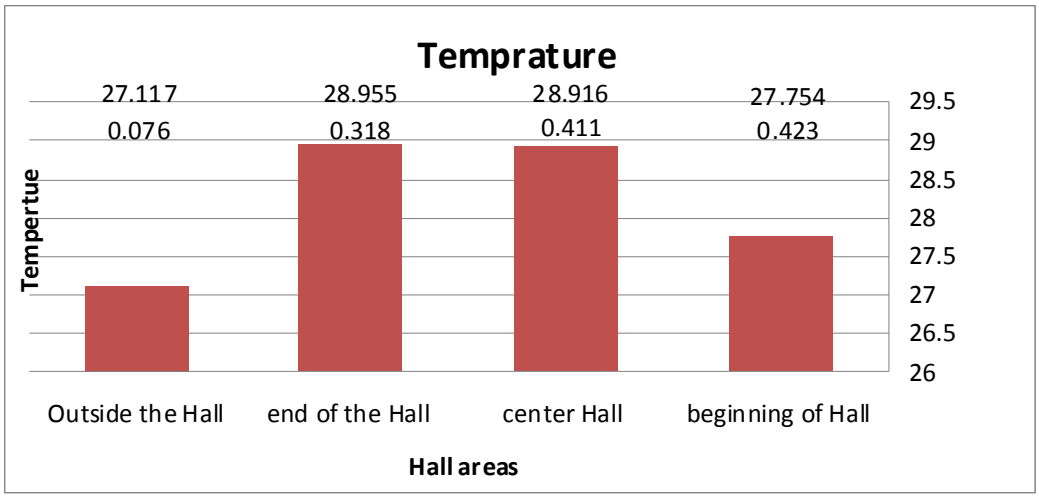


Fig. 2: Shows the temperature (± standard error) in the hall areas from the age of 1 day to 35 days.

was the best in terms of production, and researchers attributed the reason for the existence of environmental harmony of the region in the middle of the hall. They pointed out that the reason for this variation in humidity is due to the presence of air leaks at the beginning and end of the hall as a result of the presence of cooling vents and doors of the hall. The breathing of birds also works to throw out steam from the birds, which are mechanisms to put heat out of the body of the bird, so the number of birds as well as the season has an important role in determining humidity.

The humidity of the external air plays an important role in determining the humidity of the house. The operation of ventilation fans works to enter the air and the air may be humid or dry. Or the presence of dew on the vegetation or the presence of a nearby water source or water surface (river, lake, sea, etc.) So there is a convergence between the air humidity and relative humidity of the atmosphere of the hall as the average relative humidity of the hall as a whole was (44.707 ± 0.917%) Approach to what was observed when the humidity sensor was placed outside the room, table 3J Some moisture parameters Sacrifice device outside the hall.

Table 3: Shows some relative humidity parameters outside the hall during the breeding period.

Reading	External temperature parameters	
5433	Number of readings	1
44.2649	Mean	2
0.21193	standard error	3
85.9	Maximum	4
16.7	Minimum	5

This table shows the existence of a large contrast between the highest and lowest reading of the device, recorded the highest reading in times of rain where the percentage of air humidity is high and it must be noted in times when there is a significant decrease in humidity is sprayed the ground between cages with water, especially at the beginning of the experiment to avoid the occurrence of dehydration of chicks.

The different letters mean there are significant differences between the averages of the regions according to Tukey test.

(**) Indicates the existence of high moral differences between the averages of regions according to Tukey test.

Air speed m/s

Fig. (4) shows a significant difference (P <0.05) in the air velocity between the areas of the hall where the highest or best value was in the first area (the beginning of the hall) with an air speed of 0.610 m / s (where it

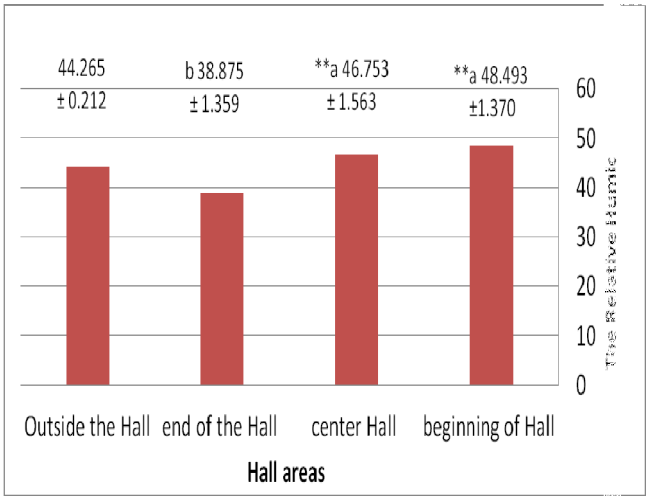


Fig. 3: Shows the relative humidity% (± standard error) in and outside the hall from 1 day to 35 days of the experiment.

surpassed the second zone) In the middle of the hall, the air speed reached (0.488 m / s) but no significant differences were observed between the third area (the end of the hall) and the air speed reached (0.536 m / s) with the rest of the areas. This may be due to ventilation and cooling vents at the beginning of the hall. Low) and thus compensate for this decline pressure air to enter the more the pressure pervaded the more income air and increased air speed more than any other words, the greater the number of ventilation fans air speed increased inside the hall, as well as having access doors of the hall and thus smooth flow more air to enter and increase its speed.

In the second area (the center of the hall), the air velocity is reduced, which may be due to the reduced pressure due to the compensating air entering the pressure, as well as the presence of birds and installations that act as bumpers that reduce the air speed. The third area (the end of the hall) was characterized by good air speed comes second stage after the first area (the beginning of the hall) This may be due to the presence of fans as well as working birds and facilities to reduce the air speed in the area. These results are consistent with Al-Chalabi *et al.,* (2016) where environmental conditions were found to be heterogeneous among the three areas within the hall, and as a result birds showed different performance by location. Abbas *et al.*, (2011) also found when laying chickens in Saudi Arabia although some chicken breeding halls tried to overcome this problem (heterogeneity of the hall) by adding more cooling pads and exhaust fans, but there are still differences in Various places inside the hall.

These results are inconsistent with what Blanes-Vidal *et al.*, (2007) found in an experiment to demonstrate the effect of indoor air velocity and pressure in different areas of the hall. In the middle of the rest.

Although there are differences in the air speed inside the hall, the average air speed in each room was good (0.564 ± 0.0177 m / s). This gives an indication that the ventilation was good and works to get rid of the heat and harmful gases and makes it within good and acceptable levels. It works to get rid of harmful gases such as carbon dioxide, hydrogen sulfide and ammonia, and equip the hall with the amount of oxygen commensurate with the numbers of birds and the size of the hall and homogeneously throughout the hall. (Aviagen, 2014). Bennett, (2008) also found that poor ventilation in the hall led to the levels of carbon dioxide reaching harmful levels. He pointed out that in winter some bad ventilation systems may add 3-4 times the amount of CO_2 produced by the birds. In the summer, it was found that places close to the inactive areas (inert) increased the chances of getting higher levels in the barn of carbon dioxide as evidence that the existing environmental conditions are not homogeneous at the level of thermal areas inside the hall.

Different letters mean the presence of significant

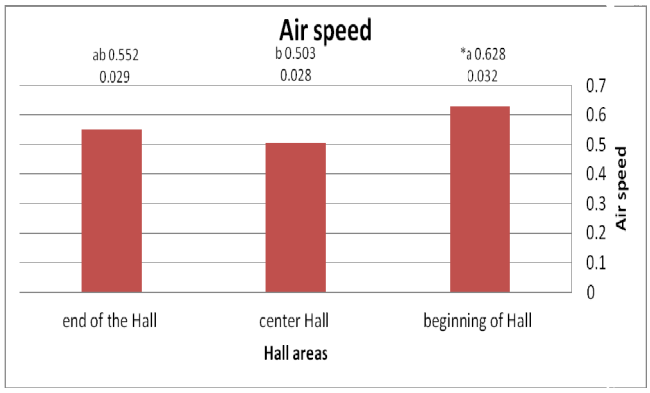


Fig. 4: Shows the air speed m / h (standard error) in the hall areas from the age of 1 day to 35.

differences between the averages of regions according to the Tukey test. (*) indicates a significant difference between the averages of regions according to Tukey test

Carbon dioxide CO_2 ppm

Fig. 5 shows a decrease in the level of CO_2 in the first area (the beginning of the hall) with an average reading of 503,935 ppm, which had a high moral significance (P <0.01) than the rest of the hall, which was 559.269 and 583.729 ppm for the second and third regions respectively. The difference in the level of CO_2 in the first area (the beginning of the hall) may be due to good ventilation due to the presence of large-size cooling vents that enter the oxygen-loaded fresh air that pushes the air loaded with dioxide. Carbon to logic Tin other than the level of gas leads to rise in these areas in addition to the presence of birds that are a source of carbon dioxide gas CO_2 and slowing air speed leads to this increase the level of gas. It should be noted that the level of carbon dioxide gas CO_2, although high in the rest of the areas of the hall but overall did not exceed the limits allowed and this is indicative of something that indicates the efficiency of ventilation inside the hall. This is consistent with Bennett, (2008), who showed that the purpose of summer ventilation is to maintain a carbon dioxide level below 700ppm. In winter, some poor ventilation systems add 3-4 times more CO_2 to the room.. Carbon dioxide levels usually do not reach harmful levels unless the heating system is poor and ventilation rates are not within the appropriate rates (ie bad ventilation). It is noticeable from the readings of the devices that the level of CO_2 gas in the areas of the hall was a good level as well as the overall level of carbon dioxide CO_2 in the breeding hall in general was good with an overall average of 545.160 ± 9.612 ppm. The table below illustrates some of the parameters of CO_2.

Table 4: Shows some of the parameters CO_2 gas inside the hall during the breeding period.

Reading	External temperature parameters	
12572	Number of readings	1
550.62ppm	Mean	2
1.356	Mode	3
435 ppm	standard error	4
1534 ppm	Maximum	5
305 ppm	Minimum	6

Knížatová *et al.,* (2010) found that carbon dioxide emissions were predominantly affected at the end of the fattening period and at a highly significant level (P <0.01). It should be noted that the CO_2 gas is dangerous because it is a gas heavier than the air, so it is at the level of birds, so we have developed gas sensors at the level of birds for the purpose of accurate screening of gas levels.

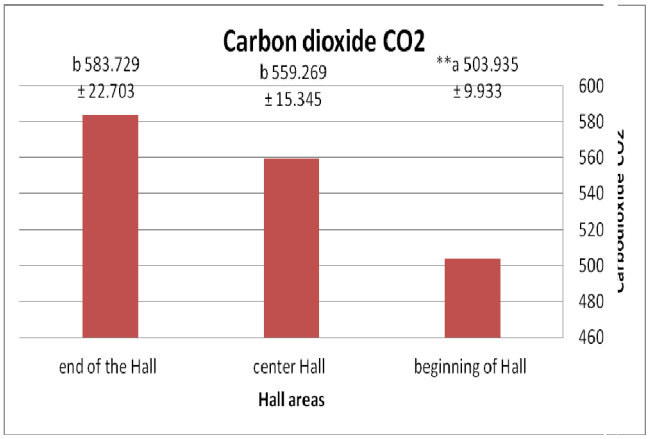


Fig. 5: Shows the CO_2 ppm gas (± standard error) in the hall areas from the age of 1 day to 35 days by experiment.

Different letters mean there are significant differences between the averages of the regions according to Tukey test.

(**) Indicates the existence of high moral differences between the averages of regions according to Tukey test.

Degree of dew point

Fig. 6 shows that there is superiority of the first and second zone compared to the third zone of dew point temperature and high level of significance (P <0.01). This may be due to the higher atmospheric humidity of these two regions compared to the third region which was less humid. The dew point in the Fig. shows the presence of dryness in the air of the hall despite the continuous spraying of water in order to raise the relative humidity in the atmosphere of the hall. The dew point is a useful method for estimating moisture useful in the atmosphere, where the dew point value indicates the amount of moisture present in the air. Because the dew point is directly related to the amount of moisture in the air, it is a good tool for measuring humidity. In general, especially in the summer months, when the humidity in the atmosphere is low as well as its importance in the desert areas, if the dew point is recorded above 65^{0}C is considered humid air and if it reaches 70^{0}C and above it is considered much humidity and annoying if associated with high temperatures. If the dew point is recorded in the fifties, the atmosphere is considered comfortable for most people, while if recorded 40 and less, the air is considered dry. The table below shows the features of the dew point in the education hall.

Table 5: Shows some parameters of the dew point temperature inside the hall during the breeding period.

Reading	External temperature parameters	
5433	Number of readings	1
21.197	Mean	2
0.765	standard error	3
39.753	Maximum	4
6.687	Minimum	5

Table 5 indicates that there is a decrease in the dew point in the hall as a whole with an average of 21.197^{0}C and a minimum dew point value of 6.687^{0}C. This is a negative indicator for the hall. Cooling fans without running water on evaporative cooling pads.

The different letters mean there are significant differences between the averages of the regions according to Tukey st. (**) Indicates the existence of high moral differences between the averages of regions according to Tukey test

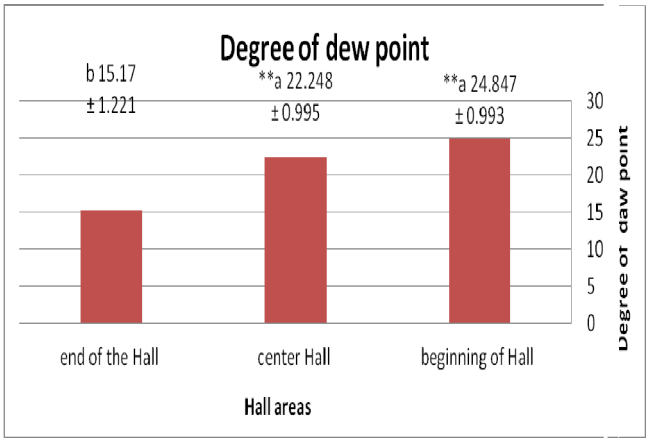


Fig. 6: Shows the dew point temperature (standard error) in the hall areas from 1 day to 35 days of the experiment.

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